

REVIEW OF ENVIRONMENTAL FACTORS (REF) CULBURRA SEWAGE TREATMENT PLANT (STP) UPGRADES

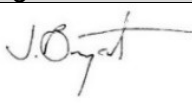
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Document control

Item	Details
Project	Review of Environmental Factors – Culburra STP Upgrades
Client	Shoalhaven Water, Shoalhaven City Council
Prepared By	City Services, Shoalhaven City Council

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*Review and endorsement statement:

“I certify that I have reviewed and endorsed the contents of this REF document and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation, and the information it contains is neither false nor misleading”.

Assessment and approvals overview

Item	Details
Assessment type	Division 5.1 (EP&A Act) - Review of Environmental Factors (REF)
Proponent	Shoalhaven City Council
Determining authority / authorities	Shoalhaven City Council
Required approvals (consents, licences and permits)	Nil
Required publication	No

1. PROPOSAL AND LOCATION

1.1 Overview

This Review of Environmental Factors (REF) addresses the potential environmental impacts of – and provides mitigation measures for – proposed upgrades of Culburra Sewage Treatment Plant (STP).

Proposed upgrades of the STP would include:

- **Aeration System**
 - Modify existing blower set such that all four feed a common header (all blowers can feed a single reactor) before splitting to each reactor.
 - Install actuated valves on the header to control airflow between reactors, this requires modification to the control system such that reactor cycles are 180° out of phase.
 - Install additional instrumentation (aeration header flow meter, temperature and pressure protection and reactor dissolved oxygen probes) for system control.
 - Undertake control system changes to integrate the new equipment and necessary changes.
 - Install new diffused aeration grids within each reactor to transfer the peak aeration requirements.
- **Sludge Lagoon**
 - Reshape the sludge lagoons to repair damage (noting no works to the liner itself).
 - Install wave protection.
 - Install overflow pipework from supernatant pump station to storm storage.
 - Install concrete base suitable for retrofitting aeration bridges columns in the future.
 - Install HDPE liner anchored to the concrete base (would mediate any seepage risks).
 - Install new inlet / outlet points and access bridges.
- **Inlet Works**
 - Remove existing grit chamber internals and grit washing equipment.
 - Install new grit removal mechanical equipment (assumed retention of existing electricity supply).
 - Remove existing step screen and washing system.
 - Install new flow through band screen and associated screenings washing system.
 - Provide new inlet works switchboard to accommodate the additional screenings boards (it may not be possible to integrate back into the existing board).

All proposed upgrades would occur within the existing footprint of the STP, involving replacement of existing components or installation of additional components to existing structures.

The STP would remain online during works. Works on the sludge ponds would occur one-at-a-time to allow continued function of two ponds while one is emptied and upgraded.

Disturbance of the ground surface would be limited to the possible excavation beneath the sludge ponds to construct concrete bases. Concreting of the bases may instead be undertaken over the existing bases. Investigation of the pond and ground to determine the most appropriate method would be carried out after each pond is emptied.

Proposed upgrades would improve performance and/or extend the asset life of the existing treatment systems but would not substantially increase capacity.

Figures 1 and 2 below show the site and locations of upgrade works.

Shoalhaven City Council (SCC) is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This Review of Environmental Factors (REF) provides an assessment of the proposed activity and associated impacts on the environment, in the context of Division 5.1 of the Act and section 171 of the *Environmental Planning and Assessment Regulation 2021*, and in doing so, satisfies the requirement of section 5.5 of the Act, that SCC examines and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

1.2 Location

The proposed works would occur within the existing footprint of Culburra STP on Lot 1 DP 631825 (9 Strathstone St, Culburra Beach).

Details of affected land are provided in Table 1.

Table 1. Property affected by the proposal

Lot / DP	Description	Land owner / manager	Other pertinent information
Lot 1 DP 631825	Culburra STP	Shoalhaven City Council	Land Zone SP2 covering cleared land containing the STP, with Land Zone C2 surrounding.

Figure 1. Site location



Figure 2. Site showing locations of proposed upgrades



2. EXISTING ENVIRONMENT

The current assessment is informed by desktop investigations in addition to an Aboriginal Cultural Heritage Due Diligence Assessment (Feary & Knight 2024), prepared for Shoalhaven Water as part of options planning for the STP upgrades.

As the proposed upgrades would occur entirely within the existing footprint of the STP, affecting only existing structures, with no risk of directly impacting on significant environmental features, and not increasing treatment capacity, site inspections and surveys were considered unnecessary as part of the current REF assessment.

2.1 Subject site – general description

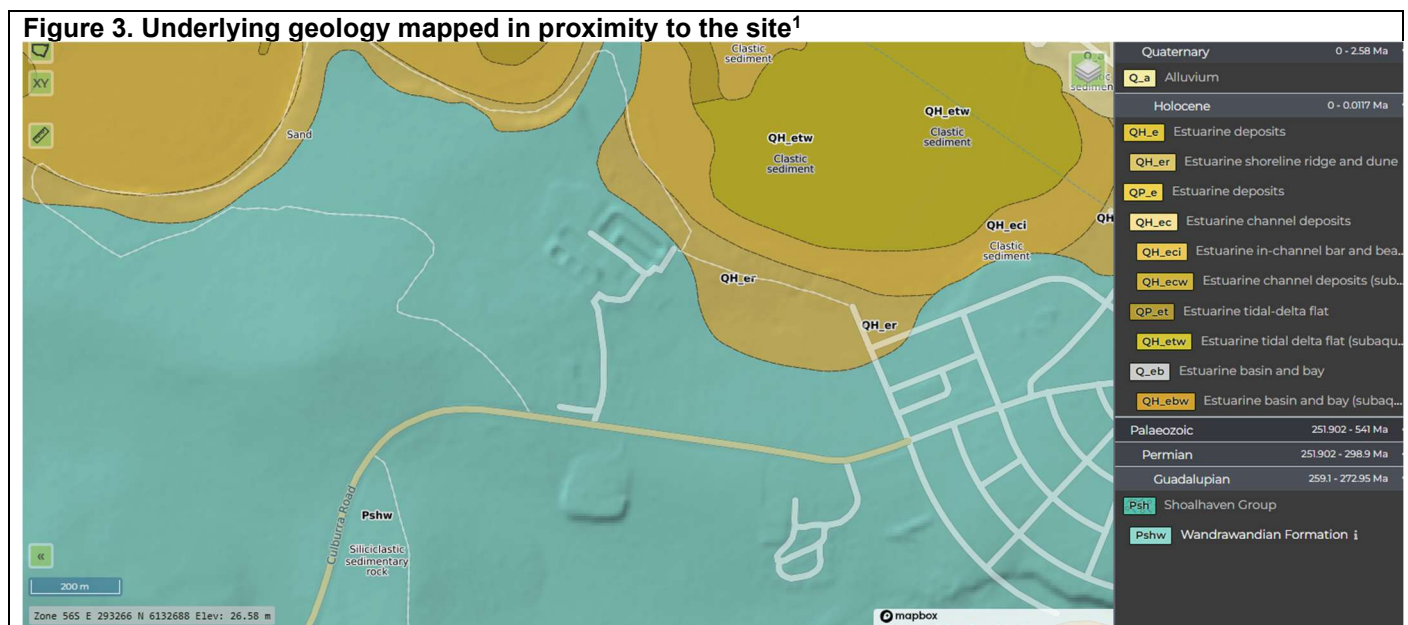
The subject site, Lot 1 DP 631825, is 23.49 ha in area with an approximately 6.84 ha central area within the lot, which is zoned SP2 and is largely cleared and containing the footprint of the STP. Native vegetation surrounds the cleared STP land.

2.2 Topography, geology and soils

No watercourses occur within the site. Curleys Bay occurs along the north-eastern boundary of the site at least 100 m from the cleared STP footprint.

The underlying geology of the majority of the site is mapped as Wandrawandian Formation (fine-grained quartz-lithic silty sandstone, mudstone and siltstone), with estuarine shoreline ridge occurring adjacent to Curley's Bay, and an estuarine in-channel bar and tidal delta flat occurring in the bay to the north-east of the site¹ (Figure 3).

A gentle, north-east facing slope occurs over the site, falling towards Curley's Bay (Figure 4).



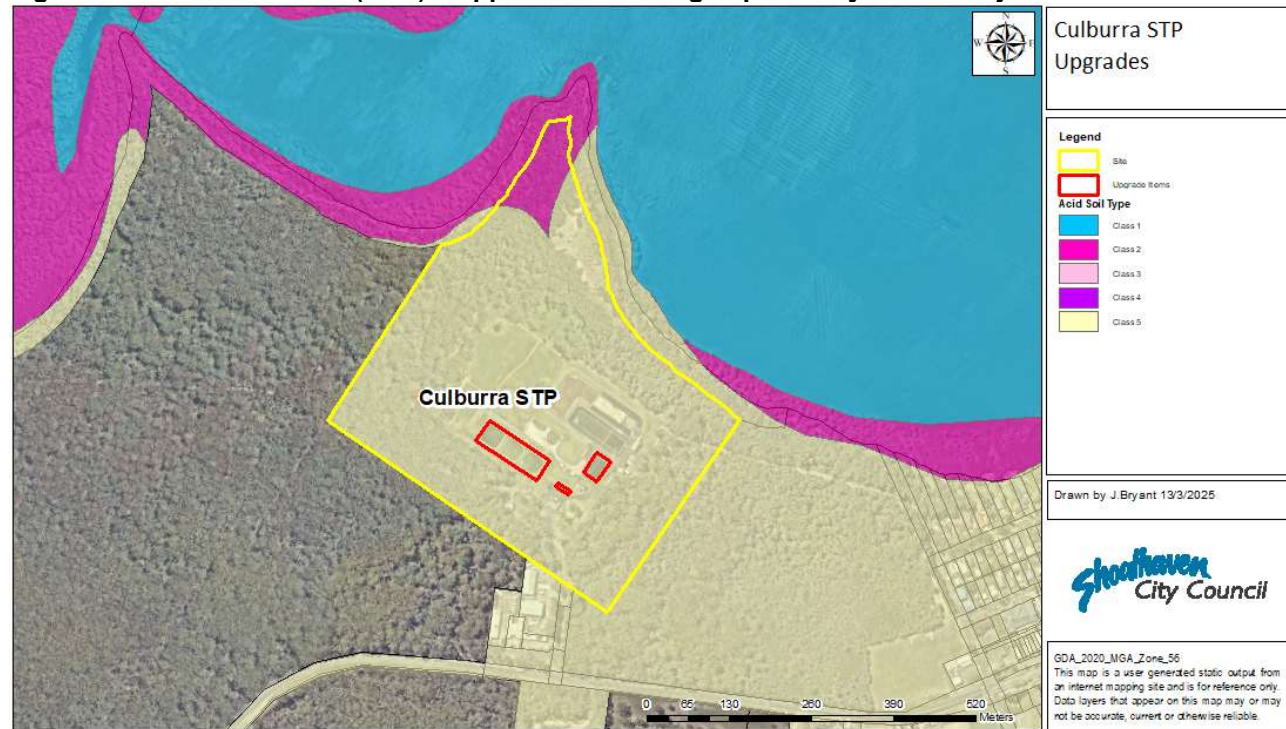
¹ Source: <https://minview.geoscience.nsw.gov.au/>

Figure 4. Topography over and in proximity to the site



The subject site and surrounds are mapped as Class 5 Acid sulfate soils (ASS), with Class 1 and Class 2 ASS mapped in association with Curley's Bay at least 280 m from the sludge ponds where excavation may be required (Figure 5).

Figure 5. Acid sulfate soils (ASS) mapped as occurring in proximity to the subject site



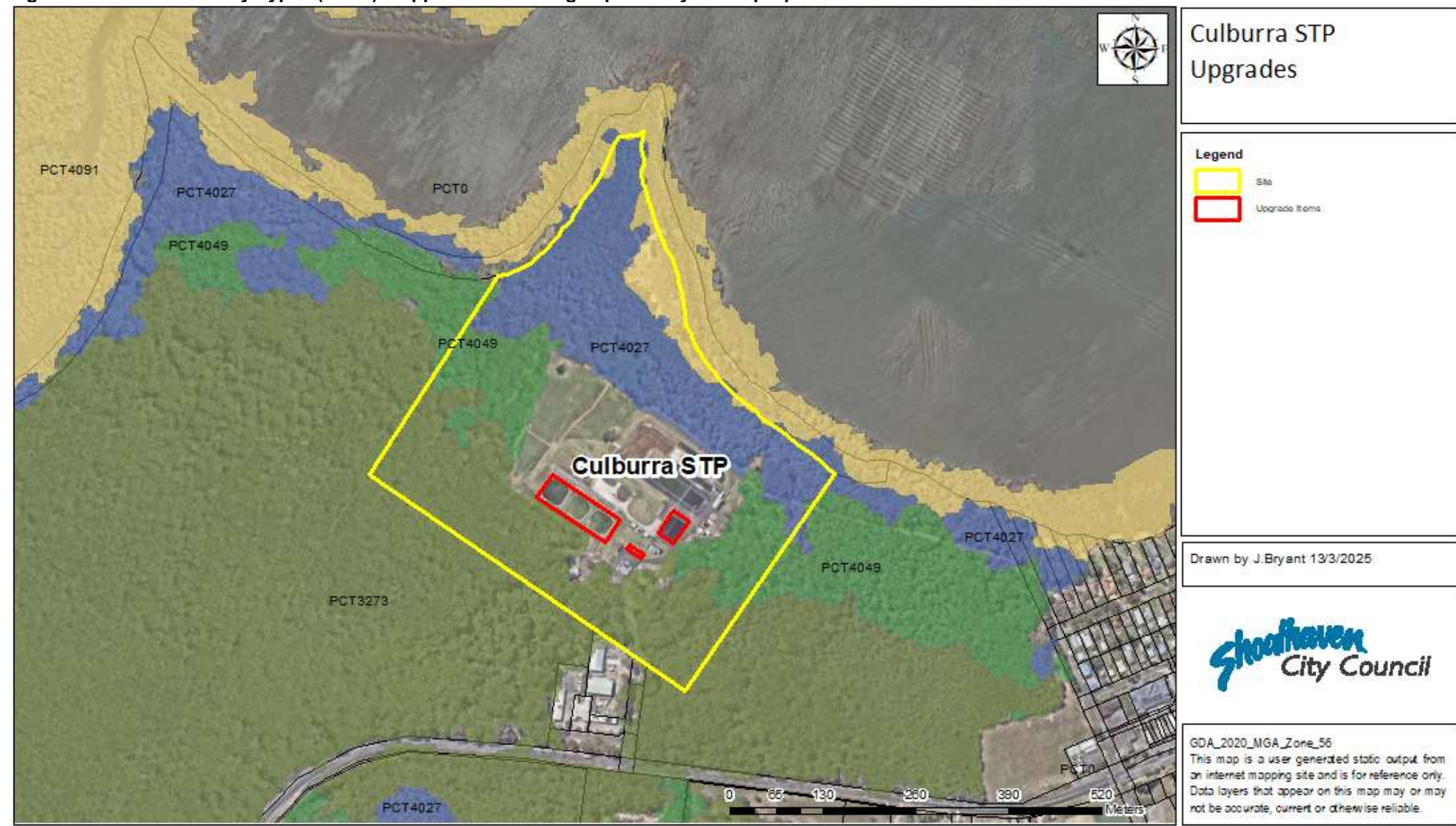
2.3 Habitat and vegetation

NSW Plant Community Types (PCTs) mapped as occurring in proximity to the site (refer to Figure 6 below) include:

- PCT3273 South Coast Lowland Shrub-Grass Forest – this vegetation community is not associated with any TEC.
- PCT4049 South Coast Floodplain Grassy Swamp Forest – this vegetation community is associated with NSW Swamp Oak Floodplain Forest TEC and Commonwealth Coastal Swamp Oak Forest TEC
- PCT4027 Estuarine Swamp Oak–Mangrove Forest – this vegetation community is associated with NSW Swamp Oak Floodplain Forest TEC and Commonwealth Coastal Swamp Oak Forest TEC
- PCT4091 Grey Mangrove-River Mangrove Forest – this vegetation community is not associated with any TEC.

Locations of upgrade works under the current proposal would occur entirely within existing cleared and modified land surrounded by hard-stand and turfed buffers.

Figure 6. Plant Community Types (PCTs) mapped as occurring in proximity to the proposal



3. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

3.1 Impacts associated with the proposal

All proposed upgrades would occur within the existing footprint of the STP, involving replacement of existing components or installation of additional components to existing structures.

The current proposal would occur entirely within existing cleared and modified land and would not involve any clearing or other direct impacts on native vegetation or habitat.

Disturbance of the ground surface would be limited to possibly required excavation beneath the sludge ponds to construct concrete bases. Concreting of the bases may instead be undertaken over the existing bases. Assessment of the pond and ground to determine the most appropriate method would be carried out after each pond is emptied.

Sediment and erosion controls shall be installed and maintained to prevent indirect associated impacts to waterways and adjacent intact native vegetation.

The STP would remain online during works. Works on the sludge ponds would occur one-at-a-time to allow continued function of two ponds while one is emptied and upgraded.

Proposed upgrades would improve performance and/or extend the asset life of the existing treatment systems but would not substantially increase capacity.

Potential impacts on the environment, including indirect impacts have been considered, including:

- Impacts on threatened species;
- Impacts on indigenous and non-indigenous heritage;
- Impacts on water quality, the riparian zone and key fish habitat;
- Impacts associated with flood liable land.

Each of these is discussed below.

3.2 Threatened species impact assessment (NSW)

Section 1.7 of the EP&A Act 1979 applies the provisions of Part 7 of the NSW *Biodiversity Conservation Act 2016* and Part 7A of the *NSW Fisheries Management Act 1994* that relate to the operation of the Act in connection with the terrestrial and aquatic environment. Each are addressed below.

3.2.1 Part 7A Fisheries Management Act 1994

Part 7A relates to threatened species conservation.

There are no threatened species listed under the Act which are mapped as occurring in proximity to the site², or likely to occur in proximity to the site.

No marine vegetation or threatened marine fauna would be directly impacted by the proposal.

The proposal is therefore unlikely to result in any impact on threatened entities or their habitat, and the proposal would not contribute significantly to key threatening processes, as listed under Part 7A of the Act.

² Fisheries NSW Spatial Data Portal https://webmap.industry.nsw.gov.au/Html5Viewer/index.html?viewer=Fisheries_Data_Portal

The proposed activity therefore does not require an Environmental Impact Statement (EIS) or Species Impact Statement (SIS) under the Act.

3.2.2 Part 7 Biodiversity Conservation Act 2016

An assessment of the potential for NSW threatened flora and fauna species occurring on-site or otherwise being impacted by the proposal was undertaken (refer to Appendix A). No species or endangered ecological communities (EECs) are known to occur on-site or are considered to have some potential to occur on-site or be otherwise impacted by the proposal. There are therefore no species or EECs that require further assessment under Part 7 of the NSW *Biodiversity Conservation Act 2016*.

No “*areas of outstanding biodiversity values*” have been declared in the City of Shoalhaven.

The proposed activity would not constitute, involve or exacerbate any key threatening processes listed in the NSW *Biodiversity Conservation Act 2016*.

Further assessment under Section 7.3 of the Act (including the ‘five-part’ test) is therefore not warranted to determine whether the proposed activity is likely to significantly affect threatened species or ecological communities, or their habitats.

Furthermore, the proposed activity does not require a Biodiversity Development Assessment Report (BDAR), an Environmental Impact Statement (EIS) or Species Impact Statement (SIS) under the Act.

3.3 Threatened species impact assessment (Commonwealth EPBC Act 1999)

A Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Report was generated on 17th March 2025. An EPBC Protected Matters Report provides general guidance on matters of national significance and other matters protected by the EPBC Act in the area selected. Of those threatened species and endangered ecological communities reported as likely occurring or having habitat within the area of the report, none were considered to have potential habitat on the site and requiring of further assessment.

Refer also to Likelihood of Occurrence Table in Appendix A.

The proposal is therefore unlikely to have an adverse effect on any vulnerable, endangered, critically endangered or migratory species or its habitat, nor on the extent or integrity of an endangered ecological community such that its local occurrence is likely to be placed at risk of extinction.

No other matters of significance, i.e.:

- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- world heritage properties;
- national heritage places;
- the Great Barrier Reef Marine Park;
- nuclear actions; or
- a water resource, in relation to coal seam gas development and large coal mining development;

would be affected as a result of the proposed activity.

Further assessment and referral to the Commonwealth is therefore not required.

3.4 Indigenous heritage

Under Section 86 of the NSW *National Parks and Wildlife Act 1974* (NPW Act) it is an offence to disturb, damage, or destroy any Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP). The Act, however, provides that if a person who exercises 'due diligence' in determining that their actions will not harm Aboriginal objects has a defence against prosecution if they later unknowingly harm an object without an AHIP (Section 87(2) of the Act). To effect this, the NSW Department of Environment, Climate Change and Water have prepared the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (hereafter referred to as the 'Due Diligence Guidelines') to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for an AHIP.

An Aboriginal cultural heritage due diligence assessment involving a site walk-over and review of existing archaeological information was undertaken to inform upgrade options for the Culburra STP (Feary and Knight 2024).

The assessment noted that one Aboriginal site had been previously recorded within the study area (52-5-0184) and three sites had been recorded close to the STP study area boundary (52-5-0114, 52-5-0185 and 52-5-0183) – noting that two of these sites (52-5-0185 and 52-5-0114) are the same site recorded by different people at different times. These sites form part of a complex of mounded middens recorded in 1983 and assessed as having high cultural and scientific values (Feary and Knight 2024).

One extensive mounded midden complex (likely belonging to site 52-5-0114/52-5-0185), was observed over a point extending into Curleys Bay, over 500 m north of proposed works. Two other middens previously recorded in the vicinity of the observed midden complex, were unable to be located, due to either incorrect grid coordinates and/or heavy leaf litter and understorey vegetation (Feary and Knight 2024).

A Scribbly Gum (*Eucalyptus sclerophylla*) on the south-western boundary of the fenced STP, with a 153 cm long by 30 cm wide, oval scar, was recorded as possible culturally modified tree ('scar tree') Refer to Figure 7, below. This tree occurs in the vicinity of the sludge ponds (Feary and Knight 2024).

The Aboriginal cultural heritage due diligence assessment recommends that upgrade designs attempt to avoid any harm to the two sites within the study area (the tree and observed midden complex). If this is not possible, further assessment will be required to verify the cultural origin of the scarred tree and to determine the correct location of the previously recorded midden. An Aboriginal Heritage Impact Permit (AHIP) may be required if harm to these sites cannot be avoided (Feary and Knight 2024).

As the proposal would occur on disturbed land and would not impact on any recorded Aboriginal sites or places, the Due Diligence Guidelines requires no further assessment, an AHIP is not required and the activity can proceed with caution. It is recommended that the possible scar tree is located and appropriate steps are taken to ensure that it is not damaged during works. Appropriate steps may include implementing an exclusion zone if there is any risk of impact, or if the tree is already protected by fencing, structures or other vegetation, simply ensuring that machine operators and other staff are aware of the tree make be adequate.

Figure 7. Possible culturally modified tree from Feary and Knight 2024.



3.5 Non-indigenous heritage

No items of local heritage significance or any items on the State Heritage Register or listed in the Shoalhaven Local Environmental Plan occur in close proximity to the site such that the proposed works might impact them.

3.6 Acid Sulfate Soils

Acid sulfate soils (A.S.S) are the common name given to sediments and soils containing iron sulfides which, when exposed to oxygen generate sulfuric acid. The majority of acid sulfate sediments were formed by natural processes in the Holocene geological period (the last 10,000 years). Formation conditions require the presence of iron-rich sediments, sulfate (usually from seawater), removal of reaction products such as bicarbonate, the presence of sulfate reducing bacteria and a plentiful supply of organic matter. These conditions tend to exist in mangroves, salt marsh vegetation or tidal areas, and at the bottom of coastal rivers and lakes. The relatively specific conditions under which acid sulfate soils are formed usually limit their occurrence to low lying parts of coastal floodplains, rivers and creeks. This includes areas with saline or brackish water such as deltas, coastal flats, backswamps and seasonal or permanent freshwater swamps that were formerly brackish. Due to flooding and stormwater erosion, these sulfidic sediments may continue to be re-distributed through the sands and sediments of the estuarine floodplain region. Sulfidic sediment may be found at any depth in suitable coastal sediments – usually beneath the watertable (ASSMAC 1998).

The subject site and surrounds are mapped as Class 5 Acid sulfate soils (ASS), with Class 1 and Class 2 ASS mapped in association with Curley's Bay at least 280 m from the sludge ponds where excavation may be required (refer to Figure 5 in section 2.2).

The *Shoalhaven Local Environment Plan 2014* (SLEP) indicates that a risk of exposure of Acid Sulfate Soil exists on land mapped as Class 5 ASS where works would occur within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum (AHD) and by which the watertable is likely to be lowered below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land.

The proposal would occur within 500m of Class 1 and Class 2 ASS land, but the proposal would not involve or result in any lowering of the watertable.

It is therefore unlikely that Acid Sulfate Soil exposure would occur.

No further consideration is warranted.

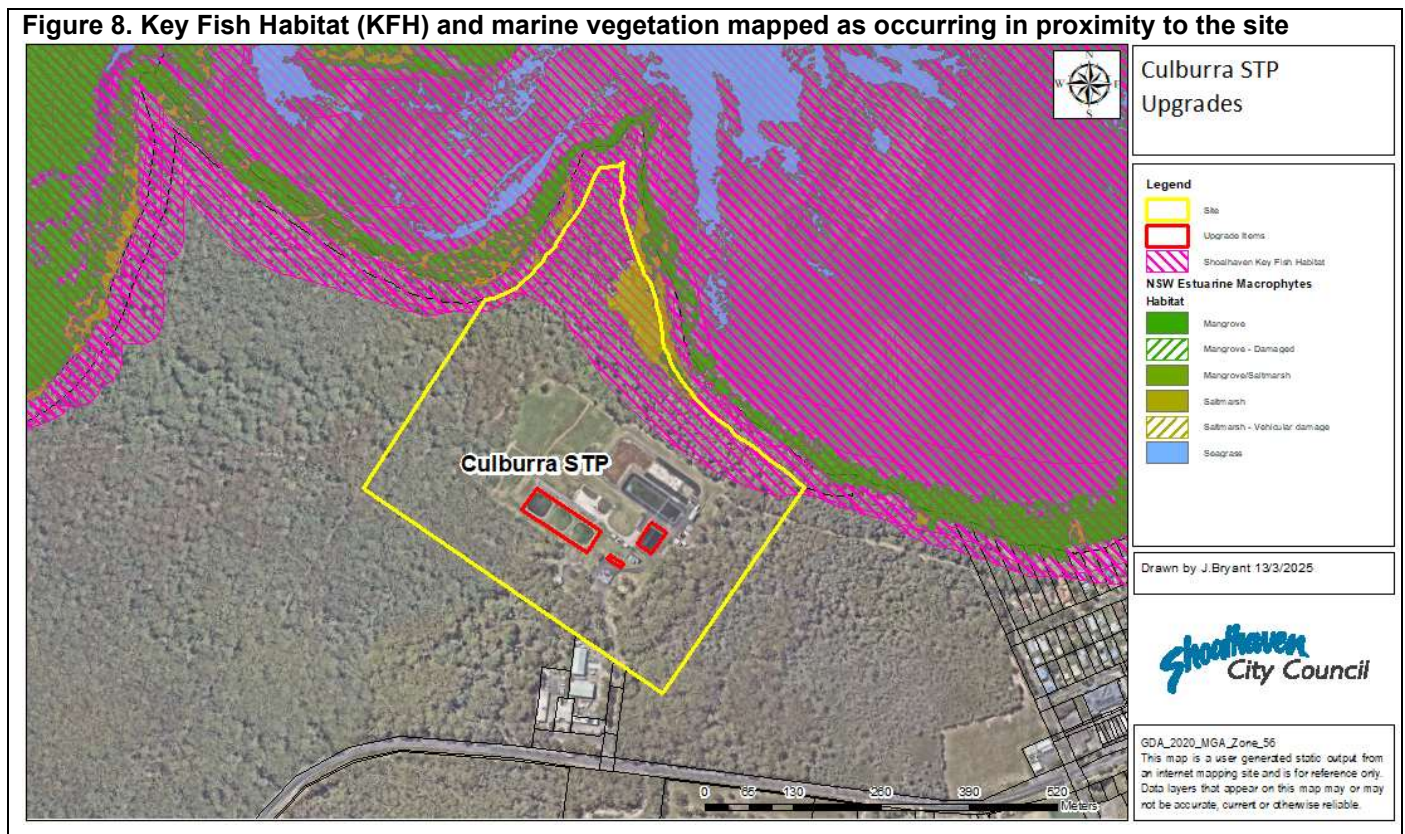
3.7 Riparian corridors, water quality, Key Fish Habitat and marine vegetation

Impacts on riparian corridors, water quality, Key Fish Habitat (KFH) and marine vegetation were considered regarding the following:

- Likely and potential impacts on vegetation as a result of construction activities;
- Sediment movement into waterways as a result of construction activities;
- Dredging and reclamation activities in KFH or impact on protected marine vegetation requiring permit under the *Fisheries Management Act 1994*.

No watercourses or riparian corridors occur within the site.

Key Fish Habitat and marine vegetation are mapped as occurring within and in proximity to the site in association with Curleys Bay (refer to Figure 8).



No aquatic habitat occurs in proximity to upgrade works locations within the site. All proposed upgrade works would occur within existing cleared and modified land involving replacement of existing components or installation of additional components to existing structures.

Disturbance of the ground surface would be limited to possibly required excavation beneath the sludge ponds to construct concrete bases. Concreting of the bases may instead be undertaken

over the existing bases. Assessment of the pond and ground to determine the most appropriate method would be carried out after each pond is emptied.

Sediment and erosion controls shall be installed and maintained to prevent indirect associated impacts to waterways and adjacent intact native vegetation.

The proposal would therefore not impact on any riparian corridor, would not impact directly on key fish habitat and is unlikely to result in impacts on water quality, including impacts associated with sediment movement.

3.8 Flood liable land

Flood-liable land is mapped as occurring along the north-eastern side of the site, associated with Curleys Bay (refer to Figure 9).

The proposal involves the replacement of existing components and installation of additional components to existing structures and would result in only negligible changes to landform.

The proposal is therefore unlikely to affect flood behaviour other than to a minor extent.

Figure 9. Flood liable land mapped in proximity to the site



3.9 EP&A Regulation – Section 171 matters of consideration

Section 171(2) of the *Environmental Planning and Assessment Regulation 2021* lists the factors to be taken into account when consideration is being given to the likely impact of an activity on the environment under Part 5 of the EP&A Act. The following assessment in Table 2 deals with each of the factors in relation to the proposed activity.

Table 2. Section 171 Matters of consideration

Does the proposal:	Assessment	Reason
a) Have any environmental impact on a community?	Positive	The proposed upgrades would improve performance and/or extend the asset life of the existing treatment systems. The proposed activity would not have any impact on other community services and infrastructure.
b) Cause any transformation of a locality?	Negligible	The locality's current use would remain unchanged.
c) Have any environmental impact on the ecosystem of the locality?	Low adverse	The five-part test of significance (Section 3.2 of this REF) concludes that the proposed activity would not have a significant impact upon threatened species or endangered ecological communities. All works would occur within existing cleared and modified land. No removal of native vegetation would occur. Aquatic ecosystems are not likely to be affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. Refer to Sections 3.2.2 and 3.3 of this REF for more information. Environmental safeguards and mitigation measures (Section 7 of this REF) would be employed to minimise risk of impacts.
d) Cause a diminution of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Negligible	The proposal would not have more than a negligible impact on aesthetic, recreational, scientific or environmental values.
e) Have any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, or social significance or	Negligible	The site of the proposed activity has no significant aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social values. No items in the vicinity of the work site which are listed on the State Heritage Register and the Shoalhaven Local environmental Plan would be impacted by the proposal. The site is not within an Aboriginal Place declared under the <i>National Parks and Wildlife Act 1974</i>.

other special value for present or future generations?		In accordance with the NSW Department of Environment, Climate Change and Water's Due Diligence Code of Practice, the proposed activity does not require an Aboriginal Heritage Impact Permit as the activity is unlikely to harm an Aboriginal artefact (refer to Section 3.4 of this REF).
f) Have any impact on the habitat of protected fauna (within the meaning of the Biodiversity Conservation Act 2016)?	Negligible	No vegetation or other important habitat will be removed or otherwise impacted. The five-part test of significance, provided in Section 3.2 of this REF, concludes that the proposed activity would not have a significant impact upon threatened fauna. The specified environmental mitigation measures (Section 7 of this REF) would mitigate indirect impacts to fauna and habitat including through control of sediment.
g) Cause any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	Negligible	The five-part test of significance, provided in Section 3.2 of this REF, concludes that the proposed activity would not have a significant impact upon threatened fauna. Refer to Sections 3.2.2 and 3.3 of this REF for more information. There are no species likely to rely on the site of the proposed works to the extent that modification would put them further in danger.
h) Have any long-term effects on the environment?	Negligible	Works would be relatively short-term and the noise generated will occur during normal working hours. The proposed activity would not use hazardous substances or use or generate chemicals which may build up residues in the environment. The possible impacts have been discussed in detail under Section 3 of this REF. Refer also to the conclusions and recommendations in Section 7 of this REF.
i) Cause any degradation of the quality of the environment?	Low-adverse	Aquatic ecosystems are not likely to be affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. The proposal would not intentionally introduce noxious weeds, vermin, or feral animals into the area or contaminate the soil. Environmental safeguards and mitigation measures (Section 7 of this REF) would be employed to minimise risk of impacts.
j) Cause any risk to the safety of the environment?	Negligible	The proposed activity would not involve hazardous wastes and would not lead to increased bushfire or landslip risks.

		The proposal is not anticipated to adversely affect flood or tidal regimes, or exacerbate flooding risks.
k) Cause any reduction in the range of beneficial uses of the environment?	Negligible	The site and local environment will remain relatively unchanged. The proposal is consistent with the existing land use. The proposal is not anticipated to result in further degradation of the site or surrounding land.
l) Cause any pollution of the environment?	Low adverse	The proposal would involve a temporary and local increase in noise during the construction phase due to the use of machinery. Minor sediment disturbance may result from works, but this is anticipated to be minimal and would be captured and managed during works and stabilised following works. Sediment and erosion control in accordance with the Blue Book will be implemented to minimise movement of sediment into waterways. It is unlikely that the activity (including the environmental impact mitigation measures) would result in water or air pollution, spillages, dust, odours, vibration or radiation. The risk of contamination and spills from machinery including fuel and hydraulic fluids would be minimised through safeguards and mitigation measures (refer to Section 7 of this REF).
m) Have any environmental problems associated with the disposal of waste?	Negligible	Any waste generated during upgrade works would be recycled or re-used in accordance with resource recovery exemptions or otherwise disposed of at a licensed waste facility. There would be no trackable waste, hazardous waste, liquid waste, or restricted solid waste as described in the <i>NSW Protection of the Environment Operations Act 1997</i>.
n) Cause any increased demands on resources (natural or otherwise) which are, or are likely to become, in short supply?	Low adverse	The amount of resources that would be used are not considered significant and would not increase demands on current resources such that they would become in short supply.
o) Have any cumulative environmental effect with other existing or likely future activities?	Negligible	The assessed low adverse or negligible impacts of the proposal are not likely to interact. Mitigation measures (refer to Section 7 of this REF) shall be implemented to minimise the risk of cumulative environmental effects.

p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	Low adverse	The proposed activity would have no effect on coastal processes including those projected under climate change conditions. The site is not located in a coastal hazard area.
q) Any applicable local strategic planning statement, regional strategic plan or district strategic plan made under Division 3.1 of the Act	Positive	The proposed activity meets Planning Priority 2 (Delivering Infrastructure) of the <i>Shoalhaven 2040</i> Strategic Land-use Planning Statement https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D20/437277 The proposed activity is not inconsistent with the Illawarra Shoalhaven Regional Plan 2041 (ISRP): https://www.planning.nsw.gov.au/-/media/Files/DPE/Plans-and-policies/Plans-for-your-area/Regional-plans/Illawarra-Shoalhaven-Regional-Plan-05-21.pdf
r) Any other relevant environmental factors	N/A	

4. PERMISSIBILITY

4.1 *Environmental Planning & Assessment Act 1979*

Section 4.1 (Development that does not need consent) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) states that:

“If an environmental planning instrument provides that specified development may be carried out without the need for development consent, a person may carry the development out, in accordance with the instrument, on land to which the provision applies.”

In this regard, section 2.126(2) of the NSW *State Environmental Planning Policy (Transport and Infrastructure) 2021* (TISEPP) provides that:

“Development for the purpose of sewage treatment plants or biosolids treatment facilities may be carried out without consent on land in a prescribed zone in the prescribed circumstances.”

Development carried out by or in behalf of a public authority constitutes development carried out in the prescribed circumstances, pursuant to s2.126(1) TISEPP.

Prescribed zones include SP2 Infrastructure which is site is zoned as (refer to s1.2 of this REF).

The proposal therefore constitutes an ‘activity’ for the purposes of Part 5 of the EP&A Act, and can be carried out by (or on behalf of) a public authority as development without consent.

Environmental impact assessment under Part 5 of the EP&A Act is required, including consideration of matters outlined in Section 171 of the EP&A Regulation 2021 (refer to s3.10 of this REF). This REF provides this assessment and ensures that Council as determining authority in consideration of the activity, meets its obligation under s5.5 of the EP&A Act, to examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

It should be noted that most of the proposed upgrade works could be carried out as exempt development under the provisions of s2.127(b)(viii) TISEPP:

“maintenance or replacement of sewerage system components that does not increase capacity (or increases capacity only to a minimal extent)”

The possible exception to this is the excavation beneath the sludge ponds (if required) to facilitate concreting of the pond bases. Excavation and concreting can nevertheless be carried out as development without consent under section 2.126(2) TISEPP.

The EP&A Act provides that exempt development can be carried out without requirement for environmental impact assessment under Division 5.1 (EP&A Act Section 1.6).

Exempt development components are included in this Environmental Impact Assessment to ensure that the proposal is carried out in a manner which considers and minimises potential impacts to the environment, and that Council satisfies all obligations with regard to environmental assessment and authorisation.

4.2 *Biodiversity Conservation Act 2016*

The proposed development complies with the *Biodiversity Conservation Act 2016* for the following reasons:

- The proposed activity is unlikely to have a significant impact on threatened species and/or threatened ecological communities listed in the schedules of the Act. There is, therefore, no requirement to 'opt in' to the Biodiversity Offset Scheme.
- The design and mitigation measures (Section 7 of this REF) would ensure that no *serious and irreversible impacts on biodiversity values* (as defined by the BC Act) occur at the site of the proposed activity.
- The proposed activity is not within an area declared to be of "outstanding biodiversity value" as defined in the Act and Regulations.

Because of the above considerations, neither a species impact statement nor a biodiversity development assessment report is required for the proposed activity.

It is also a defence to a prosecution for an offence under Part 2 of the Act (harming animals, picking plants, damaging the habitat of threatened species or ecological communities *etc*) if the work was essential for the carrying out of an activity by a determining authority within the meaning of Part 5 of the Environmental Planning and Assessment Act 1979 after compliance with that Part.

The activity will not remove vegetation that is listed under Schedule 1 Threatened Species, Schedule 2 Threatened ecological communities and Schedule 6 Protected Plants. Therefore, the activity is considered permissible as this REF has been prepared and determined in accordance with the EP&A Act.

Refer to Section 3.2 for more information.

4.3 State Environmental Planning Policy (Resilience and Hazards) 2021

The *State Environmental Planning Policy (Resilience and Hazards) 2021* (RHSEPP) provides development controls and land-use planning frameworks associated with coastal management; hazardous and offensive development; and remediation of land.

Coastal Wetland under the RHSEPP is mapped as occurring associated with Curleys Bay in proximity to the site of the proposal (refer to Figure 10).

No works involving vegetation clearing, harm of marine vegetation, earthworks, levee construction, draining of the land, or environmental protection works, would be carried out on land identified as Coastal Wetlands (or Littoral Rainforest) on the *Coastal Wetlands and Littoral Rainforests Area Map*.

The proposed works therefore do not trigger the requirement for development consent under clause 2.7 of the RHSEPP.

Other issues covered by the RHSEPP are not applicable to the proposal.

Figure 10. Coastal Wetland (RHSEPP) mapped in proximity to the site



4.4 Other

A summary of other relevant legislation and permissibility is provided in Table 3 below.

Table 3. Summary of other relevant legislation and permissibility

NSW STATE LEGISLATION	
<i>Shoalhaven Local Environmental Plan 2014 (SLEP)</i>	
Permissible	☒ Not permissible ☐
Justification: Under the SLEP the proposed activity may have required development consent. The provisions of SEPP Transpot and Infrastructure, however, prevail over the SLEP where there is an inconsistency by virtue of Section 3.28 of the EP&A Act. Consequently, development consent is not required.	
<i>Protection of the Environment Operations Act 1997</i>	
Permissible	☒ Not permissible ☐
Justification:	

The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.

National Parks and Wildlife Act 1974 (NP&W Act)

Permissible ☒ Not permissible ☐

Justification:

- The proposed activity would not encroach into National Park estate.
- The Act provides the basis for the legal protection and management of Aboriginal sites in NSW. Under Sections 86 and 90 of the Act it is an offence to disturb an Aboriginal object or knowingly destroy or damage, or cause the destruction or damage to, an Aboriginal object or place, except in accordance with a permit of consent under section 87 and 90 of the Act.
- As there are no recorded sites or visible objects and as the site is on 'disturbed land', the Due Diligence Guidelines requires no further assessment as it is reasonable to conclude that there is a low probability of objects occurring in the area of the proposed activity and an AHIP is not required. Refer to Section 3.4 for more information.

Fisheries Management Act 1994

Permissible ☒ Not permissible ☐

The proposed activity:

- would not affect declared aquatic reserves (Part 7, Division 2 of the Act);
- would not involve dredging or reclamation in Key Fish Habitat (Part 7, Division 3);
- would not involve or result in the blocking the passage of fish (s.219);
- would not impact mangroves and marine vegetation (Part 7, Division 4);
- would not involve disturbance to gravel beds where salmon or trout spawn (s.208 of the Act);
- does not involve the release of live fish (Part 7, Division 7);
- does not involve the construction of dams and weirs (s.218);
- would not impact declared threatened species of endangered ecological communities (Part 7A);
- does not constitute a declared key threatening process (Part 7A); and
- would not use explosives in a watercourse (Clauses 70 and 71 of the *Fisheries Management (General) Regulation 2019*).

A Fisheries Permit would not be required. Refer to s3.2.1 and s3.7 of this REF for more information.

Heritage Act 1977

Permissible ☒ Not permissible ☐

Justification:

- The proposed activity would not disturb an item of state heritage significance.
- The Act also provides statutory protection to relics, archaeological deposits, artefacts or deposits. Section 139 to 146 of the Act require that excavation that is likely to contain, or is believed may contain, archaeological relics is undertaken in accordance with an

excavation permit issued by the Heritage Council. The Act defines an archaeological relic as “*any deposit, artefact, object or material evidence that:*

- a) *relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement; or*
- b) *is of state and local heritage significance”*

As the site has little to no archaeological potential, a permit is not required.

Water Management Act 2000

Permissible ☒ Not permissible ☐

Justification:

- Local councils are exempt from s.91E(1) of the Act in relation to all controlled activities that they carry out in, on or under waterfront land by virtue of clause 41 of the *Water Management (General) Regulation 2018*.
- The proposal would not interfere with the aquifer and therefore an interference licence is not required (s.91F).

COMMONWEALTH LEGISLATION

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EP&BC Act)

Permissible ☒ Not permissible ☐

Justification:

The proposed activity would not be undertaken on Commonwealth land and no matters of National Environmental Significance are likely to be significantly impacted by the proposed activity (Section 3.3). The proposed activity is therefore not a controlled action and does not require commonwealth referral.

Commonwealth *Native Title Act 1993*

Permissible ☒ Not permissible ☐

Justification:

Works would occur entirely on freehold operational land Lot 1 DP 631825.

Upgrade works would involve replacement and additional components entirely within the footprint of existing structures.

It is therefore assumed that Native Title has been extinguished as a Previous Exclusive Possession Act. No procedural rights are applicable.

5. CONSULTATION WITH GOVERNMENT AGENCIES

5.1 Transport & Infrastructure SEPP

Clause 2.10 – Development with impacts on council-related infrastructure or services

Shoalhaven Water, the proponent of proposed works, is also the custodian of sewer infrastructure and the land on which the proposal would occur.

The proposed activity would not have any effect on traffic generation; would not involve connection to, or substantial use of, any part of the water supply system; would not have any effect on a public place, nor pedestrian or vehicular traffic; and would not involve excavation of a road or footpath.

Further consultation under clause 2.10 is therefore not required.

Clause 2.11 – Development with impacts on local heritage

No impacts on any local heritage item would occur (refer to Section 3.5 of this REF).

Consultation under Clause 2.11 is therefore not required.

Clause 2.12 – Development with impacts on flood liable land

The proposal would not occur on land which is mapped as being flood-liable.

The proposal is unlikely to affect flood behaviour other than to a minor extent.

Refer to Section 3.8 of this REF for more information.

Clause 2.13 – Consultation with State Emergency Service—development with impacts on flood liable land

The proposal would not occur on land which is mapped as being flood-liable and would not be carried out under a relevant provision for Clause 2.13.

Furthermore, the proposal is unlikely to affect flood behaviour other than to a minor extent (refer to Section 3.8).

Notification to NSW State Emergency Service Risk Reduction is therefore not required.

Clause 2.14 – Development with impacts on certain land within the coastal zone

The proposal would not occur within a coastal vulnerability area. Consultation is therefore not required.

Clause 2.15 – Consultation with public authorities other than councils

In consideration of the consultation requirements specified under Clause 2.15 of the Infrastructure SEPP, the proposed activity:

- would not be undertaken on adjacent to land reserved under the *National Parks and Wildlife Act 1974* or in Zone C1 or in equivalent zones.

- would not comprise a fixed or floating structure in or over navigable waters
- would not increase the amount of artificial light in the night sky and located on land within the dark sky region as identified on the dark sky region map
- would not be undertaken within Defence communications facility buffer (only relevant to the defence communications facility near Morundah)
- would not be undertaken on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*
- would not involve development on – and would not impact – any part of the Willandra Lakes Region World Heritage Property
- would not involve development within a Western City operational area specified in the Western Parkland City Authority Act 2018.

Clause 2.16 – Consideration of Planning for Bush Fire Protection (PBP)

The proposed activity is not a type applicable to this clause *i.e.* health services facilities, correctional centres and residential accommodation. Consideration of PBP is therefore not required.

Summary

No consultation with government agencies under Part 2.2, Division 1 of the Transport & Infrastructure SEPP is required.

6. COMMUNITY ENGAGEMENT

In accordance with Council's Community Engagement Policy, the proposal constitutes a *Local Area – Low Impact* activity. Formal community engagement is not required.

7. ENVIRONMENTAL SAFEGUARDS AND MEASURES TO MINIMISE IMPACTS

Note that safeguards are prescribed unless stated otherwise.

Safeguard / Measure	Responsibility												
Site Establishment													
1. Any construction compounds, machinery, vehicles and stockpiles shall be located within the construction footprint, or otherwise in existing cleared areas, and shall not encroach into native vegetation, including the drip zone of trees.	SCC Project Manager; Construction Contractor												
2. Erosion and sediment controls in accordance with the ‘Blue Book’ (Landcom 2004) shall be installed and maintained to prevent the entry of sediment into waterways. Erosion and sediment controls shall be maintained in good working order for the duration of the works and subsequently until the site has been stabilised and the risk of erosion is minimal.	Construction Contractor												
3. It is recommended that the possible Aboriginal culturally modified ‘scar tree’ is located and appropriate steps are taken to ensure that it is not damaged during works. Refer to Section 3.4 of this REF.	SCC Project Manager; Construction Contractor												
Construction works													
4. Construction works shall generally be within the times shown below with works generating high noise and/or vibration levels scheduled during less sensitive time periods. <table><tr><th>Construction hours</th><th>Monday to Friday</th><th>Saturday</th><th>Sunday and public holidays</th></tr><tr><td>Standard construction hours</td><td>7:00 am to 6:00 pm</td><td>8:00 am to 1:00 pm</td><td>No work¹</td></tr><tr><td>Construction activities with impulsive or tonal noise emissions</td><td>8:00 am to 5:00 pm²</td><td>9:00 am to 1:00 pm²</td><td>No work¹</td></tr></table> ¹ Emergency works to protect persons, property and the environment permitted ² Works may be carried out in continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block. ‘Continuous’ includes any	Construction hours	Monday to Friday	Saturday	Sunday and public holidays	Standard construction hours	7:00 am to 6:00 pm	8:00 am to 1:00 pm	No work ¹	Construction activities with impulsive or tonal noise emissions	8:00 am to 5:00 pm ²	9:00 am to 1:00 pm ²	No work ¹	Construction contractor
Construction hours	Monday to Friday	Saturday	Sunday and public holidays										
Standard construction hours	7:00 am to 6:00 pm	8:00 am to 1:00 pm	No work ¹										
Construction activities with impulsive or tonal noise emissions	8:00 am to 5:00 pm ²	9:00 am to 1:00 pm ²	No work ¹										

Safeguard / Measure	Responsibility
<i>period during which there is less than a one hour respite between ceasing and recommencing any of the work the subject of this condition.</i>	
5. All machinery to be used shall be cleaned, degreased and in good working order prior to entering the site.	Construction Contractor
6. The contractor shall keep an emergency spill kit on-site at all times with procedures to contain and collect any leakage or spillage of fuels, oils and greases from plant and equipment.	Construction Contractor
7. No major equipment maintenance works shall be undertaken on-site.	Construction Contractor
8. To avoid the risk of pollution from machinery, refuelling shall generally be done off site, however if refuelling on site is required, due care shall be taken to avoid spilling fuel and a tray shall be used to catch any accidentally spilt fuel.	Construction Contractor
9. If engineering fill is imported to the site, all conditions prescribed in the applicable Resource Recovery Exemptions shall be complied with, including: - ensuring the producer of the waste has complied with the applicable Order such as testing and validation - ensuring the material has met all chemical and other material requirements specified in the applicable Order - keeping a written record of the following for a period of six years: - the quantity of material received - the name and address of the supplier	Construction Contractor
10. If Virgin Excavated Natural Material (VENM) is taken to the site (i.e. without chemical testing and validation): - the material must meet the definition of VENM (refer to Section Error! Reference source not found.) - the supplier must fill out and complete the <i>VENM Certificate</i> (http://www.epa.nsw.gov.au/waste/virgin-material.htm) - The completed <i>VENM Certificate</i> shall be kept for at least six years and provided to the EPA upon any request.	Construction Contractor
11. Pruning of trees where required is to be undertaken in accordance with AS 4373-1996 "Pruning of Amenity Trees".	Construction Contractor
12. In the event that any wildlife be significantly disturbed or injured during works, Council's Environmental Officers are to be contacted on 4429 3405, or if unavailable, Wildlife Rescue – South Coast should be contacted on 0418 427 214, to rescue and relocate the animal(s).	Construction Contractor

Safeguard / Measure	Responsibility
13. Staff working at the site will be instructed to stop work immediately on identification of any suspected Aboriginal heritage artefact. If any objects are found, NSW Department of Planning, Industry and Environment (ph:131 555) shall be contacted.	Construction Contractor
14. Any disturbed ground shall be stabilised following construction with seeding, jute mesh, turf, hydromulch or similar.	Construction Contractor
Post construction	
15. An asset form shall be trimmed to file 44574E on commissioning of the assets in Accordance with POL15/8 Asset Accounting Policy section 3.1.4 and POL16/79 Asset Management Policy section 3.3.	SCC Project Manager

8. SIGNIFICANCE EVALUATION & DECISION STATEMENT

This Review of Environmental Factors has assessed the likely environmental impacts, in the context of Part 5 of the Environmental Planning and Assessment Act 1979, of a proposal by Shoalhaven City Council for upgrades of Culburra Sewage Treatment Plant (STP)

In consideration of the proposal as described in Section 1, in accordance with any design plans referred to in this report, and assuming the implementation of all proposed safeguards and mitigation measures (Section 7), it is determined that:

1. It is unlikely that there will be any significant environmental impact as a result of the proposed activity, and an Environmental Impact Statement is not required.
2. The proposed activity 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, and a Species Impact Statement / BDAR is not required.
3. No statutory approvals, licences, permits or external government consultations are required.
4. The proposed activity may proceed.

In accepting and adopting this REF, Shoalhaven City Council commits to ensuring the implementation of the proposed safeguards and mitigation measures identified in this report (Section 7) to minimise and/or prevent detrimental environmental impacts.

Determined by:



Matthew Kidd
Director Shoalhaven Water (Acting)
Shoalhaven Water

Date: 17/4/2025

9. REFERENCES

- DAWE (Department of Agriculture, Water and the Environment, Australian Government). 2021. *Species Profiles and Threats Database* (online database). Available at <https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>
- DECCW (Department of Environment, Climate Change and Water, NSW) 2010 Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales.
- DoE (Department of Environment, Commonwealth of Australia). 2013. *Matters of National Environmental Significance Significant Impact Guidelines 1.1*. Available at: <http://155.187.2.69/epbc/guidelines-policies.html>
- EES (Environment, Energy and Science – NSW Department of Planning, Industry and the Environment). 2020. *Surveying threatened plants and their habitats*.
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- NSW Government. 2021. *Threatened Biodiversity Data Collection* (online database). Available at: https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_Default.aspx
- Richards, G.C. & Hall, L.S. 2012. *A natural history of Australian bats: Working the night shift*. CSIRO Publishing: Collingwood, Victoria.

APPENDIX A – Threatened Species Likelihood of Occurrence

NSW Threatened Species Likelihood of Occurrence Table

The table of likelihood of occurrence evaluates the likelihood of threatened species to occur on the subject site. This list is derived from previously recorded species within a 5 km radius (taken from NSW BioNet Atlas) around the subject site. Ecology information unless otherwise stated, has been obtained from the *Threatened Biodiversity Profile Search* on the NSW OEH (Office of Environment & Heritage) online database (<https://www.environment.nsw.gov.au/threatenedspeciesapp/>).

Likelihood of occurrence in study area

1. Unlikely – Species, population or ecological community is not likely to occur. Lack of previous recent (<25 years) records and suitable potential habitat limited or not available in the study area.
2. Likely – Species, population or ecological community could occur and study area is likely to provide suitable habitat. Previous records in the locality and/or suitable potential habitat in the study area.
3. Present – Species, population or ecological community was recorded during the field investigations.

Possibility of impact

1. Unlikely – The proposal would be unlikely to impact this species or its habitats. No NSW *Biodiversity Conservation Act 2016* “Test of Significance” or EPBC Act significance assessment is necessary for this species.
2. Likely – The proposal could impact this species, population or ecological community or its habitats. A NSW *Biodiversity Conservation Act 2016* “Test of Significance” and/or EPBC Act significance assessment is required for this species, population or ecological community.

Note that where further assessment is deemed required, this is undertaken within the REF as a Test of Significance (in the case of NSW listed species) or an EPBC Significant Impact Assessment (in the case of Commonwealth listed species).

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Threatened Ecological Community (TEC) name	Status	Likelihood of presence within areas impacted by the activity
<i>Bangalay Sand Forest of the Sydney Basin and South East Corner Bioregions (BC Act)</i>	Endangered - NSW BC Act	Not mapped as occurring nor associated with any mapped plant community types in proximity to the site.
<i>Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions (BC Act) Subtropical and Temperate Coastal Saltmarsh (EPBC Act)</i>	Endangered - NSW BC Act Vulnerable - Commonwealth EPBC Act	Not mapped as occurring nor associated with any mapped plant community types in proximity to the site.
<i>Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (BC Act)</i>	Endangered - NSW BC Act	Not mapped as occurring nor associated with any mapped plant community types in proximity to the site.
<i>Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion (BC Act) Illawarra and south coast lowland forest and woodland ecological community (EPBC Act)</i>	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Not mapped as occurring nor associated with any mapped plant community types in proximity to the site.
<i>Illawarra Subtropical Rainforest in the Sydney Basin Bioregion (BC Act) Illawarra– Shoalhaven subtropical rainforest of the Sydney Basin Bioregion (EPBC Act)</i>	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Not mapped as occurring nor associated with any mapped plant community types in proximity to the site.
<i>Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act) Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (EPBC Act)</i>	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Not mapped as occurring nor associated with any mapped plant community types in proximity to the site.
<i>Milton Ulladulla Subtropical Rainforest in the Sydney Basin Bioregion (BC Act) Illawarra– Shoalhaven subtropical rainforest of the Sydney Basin Bioregion (EPBC Act)</i>	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Not mapped as occurring nor associated with any mapped plant community types in proximity to the site.

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Threatened Ecological Community (TEC) name	Status	Likelihood of presence within areas impacted by the activity
<i>River-flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i> (BC Act) <i>River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria</i> (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Not mapped as occurring nor associated with any mapped plant community types in proximity to the site.
<i>Robertson Basalt Tall Open-forest in the Sydney Basin and South Eastern Highlands Bioregions</i> (BC Act)	Critically Endangered – NSW BC Act	Not mapped as occurring nor associated with any mapped plant community types in proximity to the site.
<i>Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions</i> (BC Act) <i>Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community</i> (EPBC Act)	Endangered - NSW BC Act Endangered - Commonwealth EPBC Act	Mapped as occurring in proximity to the site in association with PCT4049 South Coast Floodplain Grassy Swamp Forest and PCT4027 Estuarine Swamp Oak–Mangrove Forest. No native vegetation occurs within the site and no native vegetation would be directly or indirectly impacted on as a result of the proposal.
<i>Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions</i> (BC Act) <i>Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland</i> (EPBC Act)	Endangered - NSW BC Act Endangered - Commonwealth EPBC Act	Not mapped as occurring nor associated with any mapped plant community types in proximity to the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
<i>Chamaesyce psammogeton</i>	Sand Spurge	Flora	Endangered NSW BC Act	Grows on fore-dunes, pebbly strandlines and exposed headlands, often with Spinifex (<i>Spinifex sericeus</i>) and Prickly Couch (<i>Zoysia macrantha</i>). Sand Spurge seeds float, so some dispersal between beaches may occur.	No habitat present
<i>Distichlis distichophylla</i>	Australian Saltgrass	Flora	Endangered NSW BC Act	A coloniser of damp saline soils; found at the edges of salt marshes and on low dunes. Flowers and sets seed in late spring and summer.	No habitat present

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Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
<i>Prasophyllum affine</i>	Jervis Bay Leek Orchid	Flora	Endangered NSW BC Act	Highly localised species, known from 4 sites with 93% on private property. Found in heathland and sedge in well drained sandy soil (Stephenson 2011)	No habitat present
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	Flora	Vulnerable EPBC Act Endangered NSW BC Act	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest.	No habitat present
<i>Wilsonia backhousei</i>	Narrow-leafed Wilsonia	Flora	Vulnerable NSW BC Act	This is a species of the margins of salt marshes and lakes.	No habitat present
<i>Wilsonia rotundifolia</i>	Round-leafed Wilsonia	Flora	Endangered NSW BC Act	Grows in mud in coastal saltmarsh and inland saline or brackish lake beds.	No habitat present
<i>Litoria aurea</i>	Green and Golden Bell Frog	Amphibian	Vulnerable EPBC Act Endangered NSW BC Act	Marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha</i> spp.) or spikerushes (<i>Eleocharis</i> spp.).	No habitat present
<i>Apus pacificus</i>	Fork-tailed Swift	Bird	Migratory EPBC Act	Occurring over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea.	No habitat present
<i>Ardenna pacifica</i>	Wedge-tailed Shearwater	Bird	Migratory EPBC Act	A pelagic, marine bird known from tropical and subtropical waters.	No habitat present
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater	Bird	Migratory EPBC Act	Coastal, oceanic.	No habitat present
<i>Arenaria interpres</i>	Ruddy Turnstone	Bird	Migratory EPBC Act	In Australasia, the Ruddy Turnstone is mainly found on coastal regions with exposed rock coast lines or coral reefs.	No habitat present
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Bird	Migratory EPBC Act	Prefers grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches. Breeds in Siberia in the peat-hummock	No habitat present
<i>Calidris alba</i>	Sanderling	Bird	Vulnerable NSW BC Act	Often found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons.	No habitat present

Review of Environmental Factors Part 5 Assessment EP&A Act 1979

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
<i>Calidris canutus</i>	Red Knot	Bird	Migratory EPBC Act	Inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs.	No habitat present
<i>Calidris ferruginea</i>	Curlew Sandpiper	Bird	EPBC Act: Migratory NSW BC Act: Endangered	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms.	No habitat present
<i>Calidris melanotos</i>	Pectoral Sandpiper	Bird	Migratory EPBC Act	In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	No habitat present
<i>Calidris ruficollis</i>	Red-necked Stint	Bird	Migratory EPBC Act	The Red-necked Stint mostly forages on bare wet mud on intertidal mudflats or sandflats, or in very shallow water; mostly in areas with a film of surface water and mostly close to edge of water.	No habitat present
<i>Charadrius leschenaultii</i>	Greater Sand-plover	Bird	NSW BC Act: Vulnerable EPBC Act: Vulnerable	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks.	No habitat present
<i>Charadrius mongolus</i>	Lesser Sand-plover	Bird	EPBC Act: Migratory NSW BC Act: Vulnerable	In non-breeding grounds in Australia, this species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops.	No habitat present
<i>Charadrius veredus</i>	Oriental Plover	Bird	Migratory EPBC Act	Oriental Plovers usually forage among short grass or on hard stony bare ground, but also on mudflats or among beachcast seaweed on beaches.	No habitat present
<i>Chlidonias leucopterus</i>	White-winged Black Tern	Bird	Migratory EPBC Act	In Australia, and elsewhere in their non-breeding range, the species mostly inhabits fresh, brackish or saline, and coastal or subcoastal wetlands.	No habitat present

Review of Environmental Factors Part 5 Assessment EP&A Act 1979

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
<i>Diomedea exulans</i>	Wandering Albatross	Bird	Endangered EPBC Act Endangered NSW BC Act	Spend the majority of their time in flight, soaring over the southern oceans.	No habitat present
<i>Esacus magnirostris</i>	Beach Stone-curlew	Bird	Critically endangered NSW BC Act	They are found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on island, flats, banks and spits of sand, mud, gravel or rock, and among mangroves.	No habitat present
<i>Gallinago hardwickii</i>	Latham's Snipe	Bird	EPBC Act: Migratory	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies).	No habitat present
<i>Gelochelidon nilotica</i>	Gull-billed Tern	Bird	EPBC Act: Migratory	Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean	No habitat present
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	Bird	Vulnerable NSW BC Act	Shore bird. Found around the entire Australian coast, including offshore islands, being most common in Bass Strait.	No habitat present
<i>Haematopus longirostris</i>	Pied Oystercatcher	Bird	Endangered NSW BC Act	Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish.	No habitat present
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Bird	NSW BC Act Vulnerable Migratory EPBC Act	Found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands.	No habitat present
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird	Vulnerable NSW BC Act	Occupies open eucalypt forest, woodland or open woodland. She-oak or acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter	No habitat present
<i>Hirundapus caudacutus</i>	White-throated Needle-tail	Bird	Migratory EPBC Act	Almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground.	No habitat present

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<i>Hydroprogne caspia</i>	Caspian Tern	Bird	Migratory EPBC Act	Occur along the Australian coastline, and also occur inland along major rivers, especially in the Murray-Darling and Lake Eyre drainage basins, preferring wetlands with clear water to allow easy prey detection.	No habitat present
<i>Ixobrychus flavicollis</i>	Black Bittern	Bird	Vulnerable NSW BC Act	Terrestrial and estuarine wetlands generally in areas of permanent water and dense vegetation that may comprise grassland, woodland forest rainforest and mangroves. Roosts in trees or on ground amongst dense reeds, nests in branches overhanging water	No habitat present
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	Bird	Vulnerable NSW BC Act	Broad-billed Sandpipers favour sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat.	No habitat present
<i>Limnodromus semipalmatus</i>	Asian Dowitcher	Bird	Migratory EPBC Act	The Asian Dowitcher occurs in sheltered coastal environments, such as embayments, coastal lagoons, estuaries and tidal creeks. They are known to frequent shallow water and exposed mudflats or sandflats.	No habitat present
<i>Limosa lapponica</i>	Bar-tailed Godwit	Bird	Migratory EPBC Act	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays.	No habitat present
<i>Limosa limosa</i>	Black-tailed Godwit	Bird	Vulnerable NSW BC Act	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats.	No habitat present
<i>Lophoictinia isura</i>	Square-Tailed Kite	Bird	Vulnerable NSW BC Act	Summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March.	No habitat present
<i>Macronectes halli</i>	Northern Giant-Petrel	Bird	Vulnerable EPBC Act Vulnerable NSW BC Act	Breeding in Australian territory is limited to Macquarie Island and occurs during spring and summer. Adults usually remain near the breeding colonies throughout the year (though some do travel widely) while immature birds make long and poorly known circumpolar and trans-oceanic movements.	No habitat present
<i>Numenius madagascariensis</i>	Eastern Curlew	Bird	Critically Endangered EPBC Act	Most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with	No habitat present

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				large intertidal mudflats or sandflats, often with beds of seagrass.	
<i>Numenius minutus</i>	Little Curlew	Bird	Migratory EPBC Act	Found feeding in short, dry grassland and sedgeland, including dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas seasonally inundated.	No habitat present
<i>Numenius phaeopus</i>	Whimbrel	Bird	Migratory EPBC Act	Often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats.	No habitat present
<i>Pandion cristatus</i>	Eastern Osprey	Bird	NSW BC Act Vulnerable	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water.	No habitat present
<i>Pluvialis fulva</i>	Pacific Golden Plover	Bird	Migratory EPBC Act	This species usually forages on sandy or muddy shores (including mudflats and sandflats) or margins of sheltered areas such as estuaries and lagoons, though it also feeds on rocky shores, islands or reefs.	No habitat present
<i>Pluvialis squatarola</i>	Grey Plover	Bird	EPBC Act: Migratory	Grey Plovers usually forage on large areas of exposed mudflats and beaches of sheltered coastal shores such as inlets, estuaries and lagoons.	No habitat present
<i>Pterodroma solandri</i>	Providence Petrel	Bird	Vulnerable NSW BC Act	Marine, nest on the tops of Mount Gower and Mount Lidgbird and to a less extent, on the lower slopes of the mountains.	No habitat present
<i>Puffinus assimilis</i>	Little Shearwater	Bird	Vulnerable NSW BC Act	Marine, breeding sites at Lord Howe Island include Roach Island, Muttonbird Island, Blackburn Island and on the main Island at Muttonbird Point and Transit Hill.	No habitat present
<i>Stercorarius parasiticus</i>	Arctic Jaeger	Bird	Migratory EPBC Act	An inhabitant of oceans, coastal regions, boreal forest, grassland and tundra, the arctic jaeger shows a great ability to live in windy, wet climates as well as extremely dry and cold ones.	No habitat present
<i>Stercorarius pomarinus</i>	Pomarine Jaeger	Bird	Migratory EPBC Act	This species is marine outside the breeding season, remaining somewhat coastal, especially in upwelling regions of the tropics and subtropics. This species does not breed in Australia.	No habitat present

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<i>Sternula albifrons</i>	Little Tern	Bird	Endangered NSW BC Act Migratory EPBC Act	Mostly exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records).	No habitat present
<i>Thinornis cucullatus cucullatus</i>	Eastern Hooded Dotteral (Hooded Plover)	Bird	NSW BC Act: Critically Endangered EPBC Act: Vulnerable	In south-eastern Australia Hooded Plovers prefer sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding, much beachcast seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting.	No habitat present
<i>Tringa brevipes</i>	Grey-tailed Tattler	Bird	Migratory EPBC Act	Often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide.	No habitat present
<i>Tringa nebularia</i>	Common Greenshank	Bird	Migratory EPBC Act	Found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass.	No habitat present
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Bird	Migratory EPBC Act	Lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks.	No habitat present
<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	Mammal	Endangered EPBC Act Endangered NSW BC Act	Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only found in heath or open forest with a healthy understorey on sandy or friable soils.	No habitat present
<i>Phascolarctos cinereus</i>	Koala	Mammal	Vulnerable NSW BC Act	Eucalypt woodland and forest Home range sizes vary with quality of habitat ranging from less than two ha to several hundred ha. Preferred tree species on the south coast are Eucalyptus amplifolia, E.viminalis, & E.tereticornis but numerous other species also known food trees.	No habitat present
<i>Petaurus australis</i>	Yellow-bellied Glider	Mammal	Vulnerable NSW BC Act	Forest with old growth elements. Large Eucalypt Hollows for denning- Inhabits mature or old growth Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia mid storey.	No habitat present

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<i>Myotis macropus</i>	Southern Myotis	Microchiropteran bat	Vulnerable NSW BC Act	This species is predominantly roosts in caves, however, is known to roost in trees and man-made structures close to water. Roosts are generally located close to water, where the bats forage in small groups of three or four.	May occur transiently over site. No habitat present within site.
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	Microchiropteran bat	Vulnerable NSW BC Act	Small tree hollows and fissures in bark for roosting in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. May also roost in man-made structures.	May occur transiently over site. No habitat present within site.
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Microchiropteran bat	NSW BC Act Vulnerable	Prefers moist habitat that contains trees greater than 20 m high with a dense understorey. They are fast flyers. Roosts in hollow trunks of eucalyptus trees, in colonies of 3 – 80. Also may roost in caves and old wooden buildings.	May occur transiently over site. No habitat present within site.
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Microchiropteran bat	NSW BC Act Vulnerable	Specific caves are known maternity sites with other caves being primary roosting habitat outside breeding period. Also uses derelict mines, storm-water tunnels, buildings and other man-made structures. Hunts in forested areas, catching moths and other flying insects above the tree tops.	May occur transiently over site. No habitat present within site.
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Microchiropteran bat	Vulnerable NSW BC Act	Found mainly in gullies and river systems that drain the Great Dividing Range, it utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, below 500m, though it is most commonly found in tall wet forest.	May occur transiently over site. No habitat present within site.
<i>Caretta caretta</i>	Loggerhead Turtle	Reptile	Endangered EPBC Act Endangered NSW BC Act	Loggerhead Turtles are ocean-dwellers, foraging in deeper water for fish, jellyfish and bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical regions during the warmer months.	No habitat present
<i>Chelonia mydas</i>	Green Turtle	Reptile	Vulnerable EPBC Act Vulnerable NSW BC Act	Ocean-dwelling species spending most of its life at sea. Eggs are laid in holes dug in beaches throughout their range.	No habitat present
<i>Dermochelys coriacea</i>	Leatherback Turtle	Reptile	Endangered EPBC Act Endangered NSW BC Act	Ocean-dwelling species spending most of its life at sea. Eggs are laid in holes dug in beaches throughout their range.	No habitat present