

12A John Street

Riparian Plan and Coastal Impacts Assessment

By Ecological Consultants Australia Pty Ltd TA

Kingfisher Urban Ecology and Wetlands

October 2019 updated August 2020, March 2021, Dec 2021





About this document

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Statement of Authorship

This study and report was undertaken by Ecological Consultants Australia at Studio 1/33 Avalon Parade, Avalon. The author of the report is Geraldene Dalby-Ball with qualifications BSc. majoring in Ecology and Botany with over 20 years' experience in this field, Lisa Jones and Julian Reyes with qualifications BSc. Majoring in Ecology.

Limitations Statement

Information presented in this report is based on an objective study undertaken in response to the brief provided by the client. Any opinions expressed in this report are the professional, objective opinions of the authors and are not intended to advocate any particular proposal or pre-determined position.

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Distribution:	Tim Donovan C/O THW Architects Tim West BArch, BSci(Arch)Director THW Architects tim@thw.net.au

Signed: Geraldene Dalby-Ball – Director of Ecological Consultants Australia

A handwritten signature in blue ink that reads "G. Dalby-Ball".

Executive Summary

Introduction

- The purpose of this plan is to provide information on the establishment and management of a Riparian Zone at 12A John Street Avalon.
- This Plan specifically focuses on the riparian zone, its location, creation and management. Supplementary documents including the BDAR (of 2019 updated 2021) contains information relevant to the Riparian zone.

Methods

- On-ground survey took place in February 2019 by Geraldene Dalby-Ball and Tina Feodoroff and again in January and March 2020 by Geraldene Dalby-Ball during full Moon high-tides and a high-tide and rainfall event.
- Observations were made of the bank, bed, top of bank, tidal reach and storm-tidal reach as well as of riparian vegetation at the site and along the creek to the Careel Aby wetlands and to Careel Creek in Avalon. Flood mapping was also assessed.

Results

- The waterway is tidal at the site. Top of bank has been determined from mean high water and has taken into consideration super high-tide events and storm-tide combination events. The high tide (January) and the storm-high (March 2020) did not extend creek water into the property boundary of 12A John street. The Creek flowed full bank at both of these times.
- This part of Careel Creek can be considered as a first order tidal creek, rather than second order waterway, as there are no waterways flowing into up upstream from this point. Existing stormwater moving into the creek is via pipes (enclosed) and then the open concreted section of Careel Creek to the natural bed-base creek that continues directly to this location. The 20m zone requested by Council has been accepted by the property owner and used in this plan.
- The horizontal difference of the mean high and low tide is less than 1m in this location as the creek is channelised and tidal movement results in altering the depth as well as the width of water. King and high-tides with storm rainfall show some ~2m lateral spread in parts of Careel Creek. John street has minimal flooding from the creek relative to streets like Elaine Avenue. See also Coastal report (Cardno 2020).
- Proposed development has been reduced so that the encroachment of built form into the riparian zone is only in the outer 50% and is 24.7m² of built form. An area of 50m² outside of the riparian zone will be planted with the riparian zone species and be contiguous with the riparian zone. This vegetation will form an off-set for the encroachment (in accordance with the NSW Riparian Land Guidelines).
- The site is adjacent to the Threatened Ecological Community PCT1234 Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion.
- A riparian zone has been designed with species from the PCT1234 and native species growing upstream of the site.
- The ratio of tree replacement for no-net loss is 10:1 and these trees can be planted off-site. All native trees currently in the riparian zone are remaining.
- Stormwater will be managed to minimise impact and reverse some of the current impact (existing impact being sediment covering Mangrove pneumatophores).
- Considerations of the Coastal Mgt Act have been addressed and are included in Section 4.

Mitigation Measures

Before works:

1. Marking of the riparian boundary line and protection with orange para webbing or equivalent.
2. Riparian signage for entry only for permitted riparian works, no storage of building material or vehicles. Any works in the riparian zone to be supervised by ecologist or equivalent.
3. Effective site management to ensure sediment does not enter the waterway.
4. Gain permission (or not) for rehabilitation of the riparian zone on the public property section immediately adjoining the site. If granted then a qualified bush regeneration company, on Council's approved contractors list, to implement works and provide a brief report and photos to council of the before and after works and to certify that plants are locally native stock.

During works:

5. Tool Box talk to all on-site regarding no material to move into the riparian area and only permitted works to occur in that zone.
6. Effective site management to ensure sediment doesn't enter the waterway
7. Riparian area to be delineated from remaining landscaping such that it is clear that the riparian zone and agreed off-set areas are for native plants and habitat retention and creation.
8. Approved tree removal to retain She-oak trunk pieces in 2-3m lengths (4mm total) for use as a natural boarder and habitat use in the riparian zone.
9. Riparian area within the private property to be vegetated as per this plan and be undertaken by suitably qualified people and signed off by the ecologist that it fulfills the approved plan (this plan). Including habitat log placement.

After completion of works:

10. Ongoing maintenance of the riparian area to ensure the native species grow well and canopy trees are retained (at least 2 mature in the zone and 5 young at any time) and heavily vegetated in the mid and understorey. Minimum 12 months assisted maintenance by Bush regeneration personnel. Sign-off off on riparian works completion at the time of future OCs.
11. Exotic vegetation (with the exception of trees) will be removed from the riparian area. Exotic grass will be killed and replaced with native grasses and shrubs. Native vegetation will be retained. NB: area of species mix A extends along the side of dwellings to ensure a minimum area of 80m² is vegetated with Swamp Oak Forest community. This will be certified as having been achieved pre OC or pre CC of future dwellings.
12. Management of the sites interface with Careel Creek to monitor stormwater inflow and assist, where appropriate, with removal of with rubbish / sediment build.
13. Monitor for erosion and get professional advice when needed and notify council when problematic erosion is occurring on the public land.

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1 Purpose of this report

Ecological Consultants Australia (ECA) has been contracted to provide a Riparian Plan in association with proposed development at 12A John Street Avalon. This Plan specifically focuses on the riparian zone, its location, creation and management. SEPP Coastal Management 2018 has been extracted from the original Flora and Fauna report (now BDAR) and included in this report in Section 4.

1.1 Site Location

The study area is 12 John St, Avalon Beach NSW 2107, Australia (see Figure 1).



Figure 1. Location of the site. Source: Six Maps 2021

1.2 Water Way Order

Careel Creek by definition of the Water Management Act 2000

http://www.water.nsw.gov.au/_data/assets/pdf_file/0004/547222/licensing_approvals_controlled_activities_riparian_corridors.pdf (see extract below) is a first order waterway as there are no other waterways leading into the creek. While there are fully enclosed pipes delivering stormwater to the creek, in the area of the Skate Park this is questionable whether that constitutes a waterway and in similar previous works in NSW the equivalent has not been deemed a waterway by NRAR. Figure 1.2 shows the full extent of open water Careel Creek. That is the part of the creek that would meet the definition of a waterway for the purposes of the WM Act 2000.

Riparian corridor widths

The Officer of Water recommends a VRZ width based on watercourse order as classified under the Strahler System of ordering watercourses and using current 1:25 000 topographic maps (see Figure 2 and Table 1). The width of the VRZ should be measured from the top of the highest bank on both sides of the watercourse.

Figure 2. The Strahler System

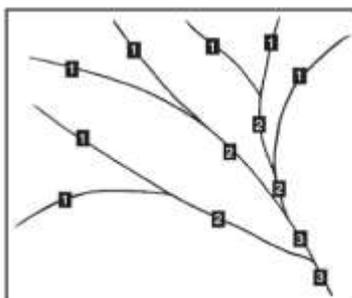


Table 1. Recommended riparian corridor (RC) widths

Watercourse type	VRZ width (each side of watercourse)	Total RC width
1 st order	10 metres	20 m + channel width
2 nd order	20 metres	40 m + channel width
3 rd order	30 metres	60 m + channel width
4 th order and greater (includes estuaries, wetlands and any parts of rivers influenced by tidal waters)	40 metres	80 m + channel width

Note: where a watercourse does not exhibit the features of a defined channel with bed and banks, the Office of Water may determine that the watercourse is not waterfront land for the purposes of the WM Act

Extract from Riparian Corridors Guideline under the Water Management Act 2000.

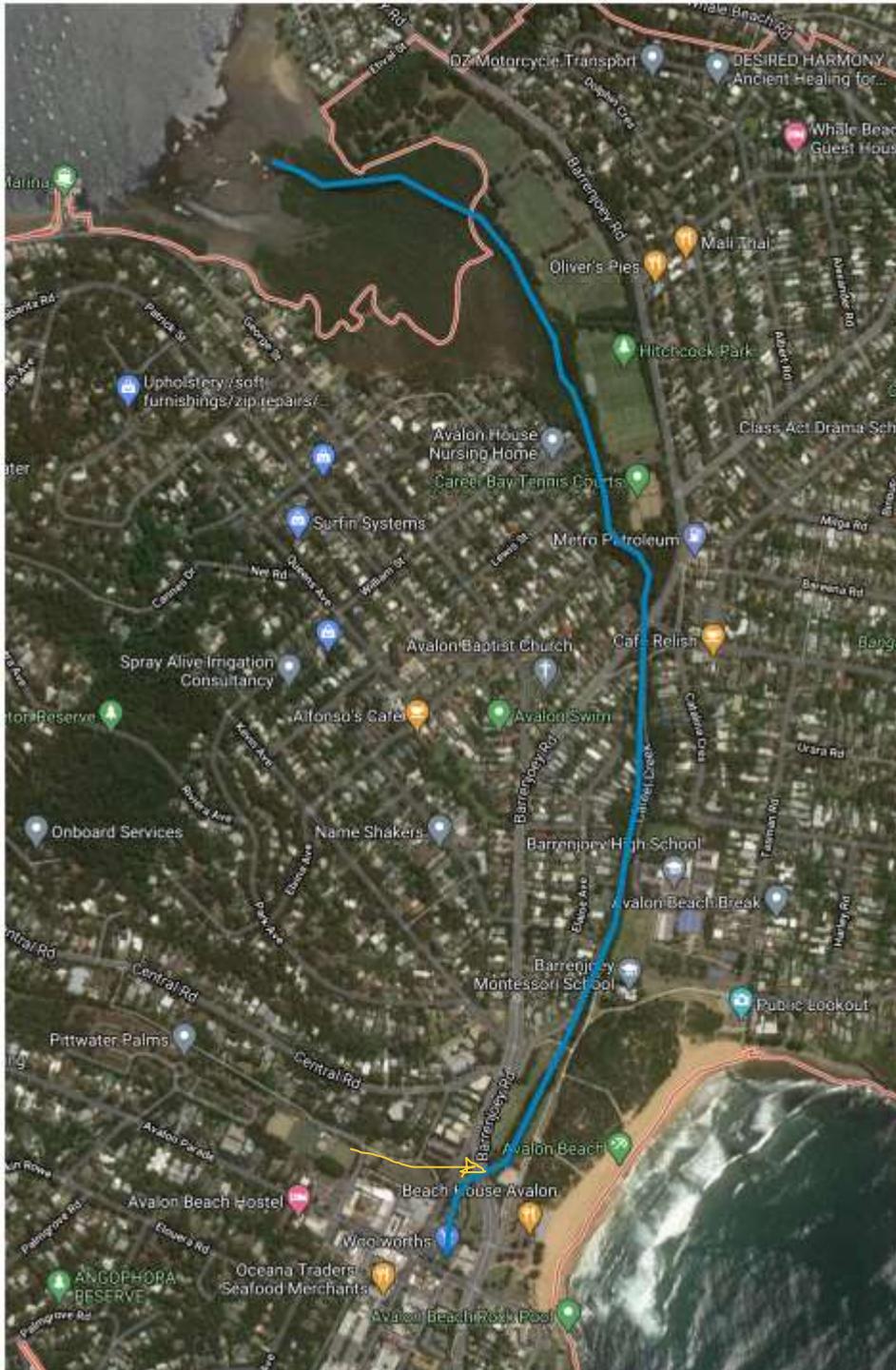


Figure 1.1 Careel Creek – full extent of open water. Source based map Google Maps accessed 2021.

Orange arrow is the point for the main stormwater input that continues up past Pittwater Palms and through Toongabbie Reserve. This pipe system does not meet the definition of a water way under the act. Given this the blue line on Figure 1.1 is a first order waterway. It is also noted that Council has built the new netball courts within 10m of the top of bank including encroachment into the inner 50% (deemed core riparian zone).



Careel Creek high-tide December 2020



Low-tide Careel Creek. Riparian zone with *C. glauca*

2 Proposed Actions

The proposed actions involve the land subdivision with the view to future construction of two new residential dwelling (See Figure 2.1 and 2.2).

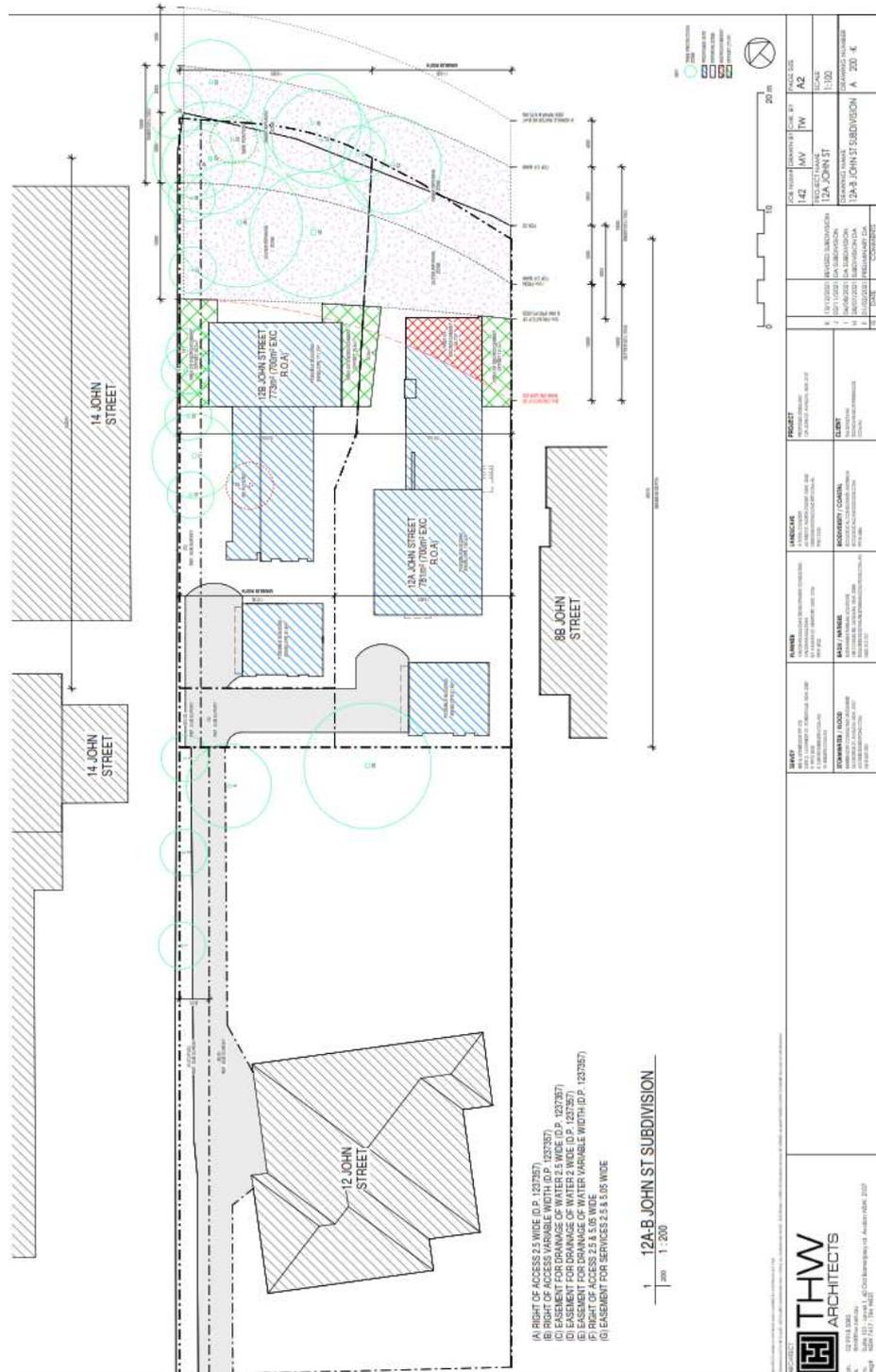


Figure 2.1 . Site Plan for the proposal at 12A John Street, Avalon Beach NSW. Source – THW Architects, 1st Feb 2021



Figure 2.2 Plan showing boundaries, relative heights & physical features of existing things over Lot 1 DP 1237357. Source: Bee Lethbridge Pty Ltd, 2018 (still relevant Feb 2021).

3 Riparian Zone

3.1 Location

The riparian zone is planned in accordance with the guiding document for riparian corridors in NSW - *Guidelines for riparian corridors on waterfront land*; DPI - Office of Water (July 2012) and updates of the document. The author, along with knowing the local environment well, is experienced with the requirements of riparian zones having completed many large-scale projects throughout NSW.

Careel Creek will require a vegetated riparian zone. It is the authors opinion that this section of creek is 1st order (requiring a 10m setback) as there are no 1st other order waterways entering this part of Carrel Creek. NB Council has requested the Creek be deemed a 2nd order waterway and a 20m riparian corridor be established. The riparian zone proposed here is in excess of what would usually be required by NRAR given the creek is first order however the property owner has agreed to maximise the width if the riparian zone and full structured native vegetation planting within a zone of as close to 20m as practical.

Location

The proposal has been redesigned to include a 20m riparian zone. Figure 3.1 shows the 20m setback, 10m line, top of bank and property boundary. The blue line of Careel Creek is not to scale as the creek is between 1m and 4m wide in this area depending on the tidal condition.



Figure 3.1. 20m riparian zone.



Riparian Zone in area of proposed rehabilitation (public land)



Central waterway at low-tide and mudflat that is covered in high-tides. *C. glauca* on edge.

Encroachments

The proposed building is wholly outside the inner 50% of the riparian zone. Built form has been reduced in extent, from original plans, so that the encroachment is now under 24.7m² and the original porous decks and steps have been relocated out of the riparian area. The build form encroachment is in the outer 50% of the riparian zone and is in accordance with DPI - Office of Water (2012) guidelines providing there is an off-set of that area.

An area of 80m² (10.9 + 16.9 + 24.2m² = 52 m²) outside the 20m riparian corridor and contiguous with it will be revegetated with appropriate species and layout to provide the objectives of a riparian corridor. Additional planting areas are shown on the plan below with dark green outside of the riparian zone. The riparian planting, as well as the off-set planting, are included in this plan. See Figure 3.2 for the riparian planting areas (inner 50% in light green, outer 50% in yellow), area of encroachment (red hatch is built form encroachment). The porous decks and stairs is no longer needed in the riparian area) and off-set planting areas are dark green. All light yellow (outer riparian) and light green (inner riparian) will be planted according to this plan.

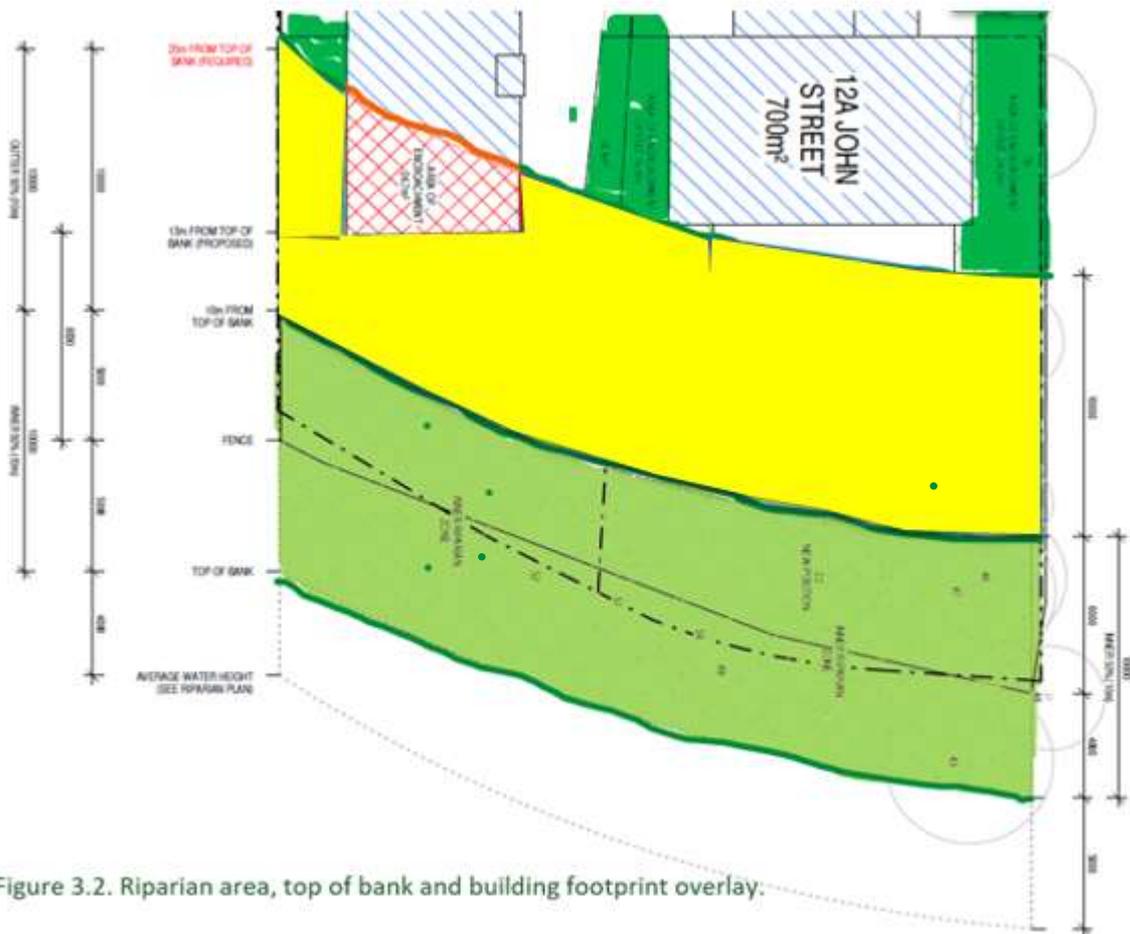


Figure 3.2. Riparian area, top of bank and building footprint overlay.

3.1 Riparian Zone re-creation

The riparian zone will be fully vegetated with locally native species characteristic of the two vegetation communities. Planting will occur within the private property boundary, and with council permission, on

the bank of Careel Creek. Works on public land will be by Council approved Companies (Total Earth Care or Dragonfly Environmental).

	<p>Area to be riparain area within the property boundary. NB fence on RHS of photo</p>
	<p>Area to be converted for fully vegetated riparian zone (currently exotic grass and garden).</p> <p>Looking directly to Careel Creek.</p> <p>Tape measure showing the 20m point to the top of bank.</p>

Riparian Tree Retention and Removal

The figure below summarises trees to be retained. It is noted that 15, 16, 21, 37 are not native and 38 and 39 are planted and not part of this original community. Trees proposed to be removed are numbers 37 and 39 (both exotic). All native trees growing in the riparian area are being retained. The main trees are the two Swamp Mahoganies (*E. robusta*).

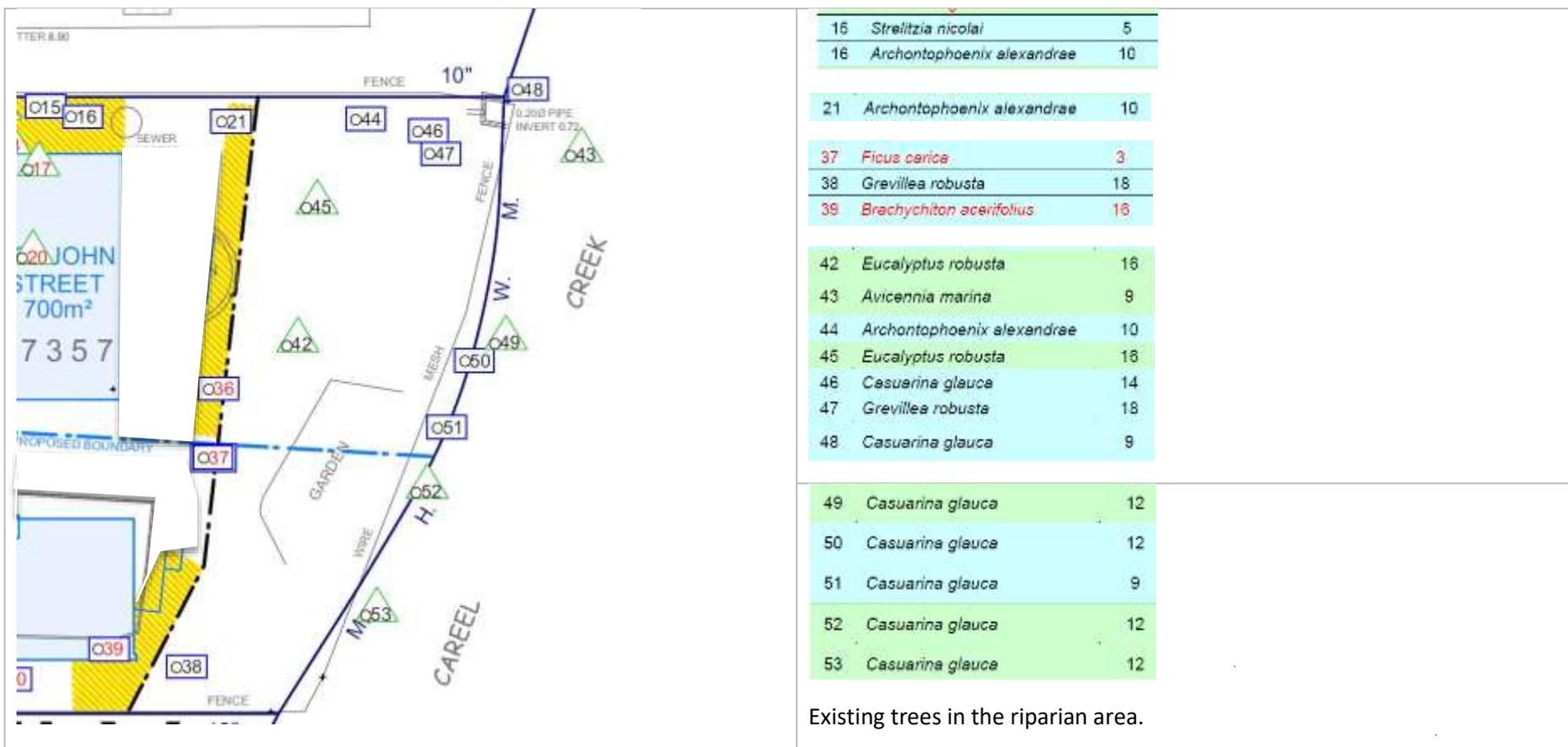
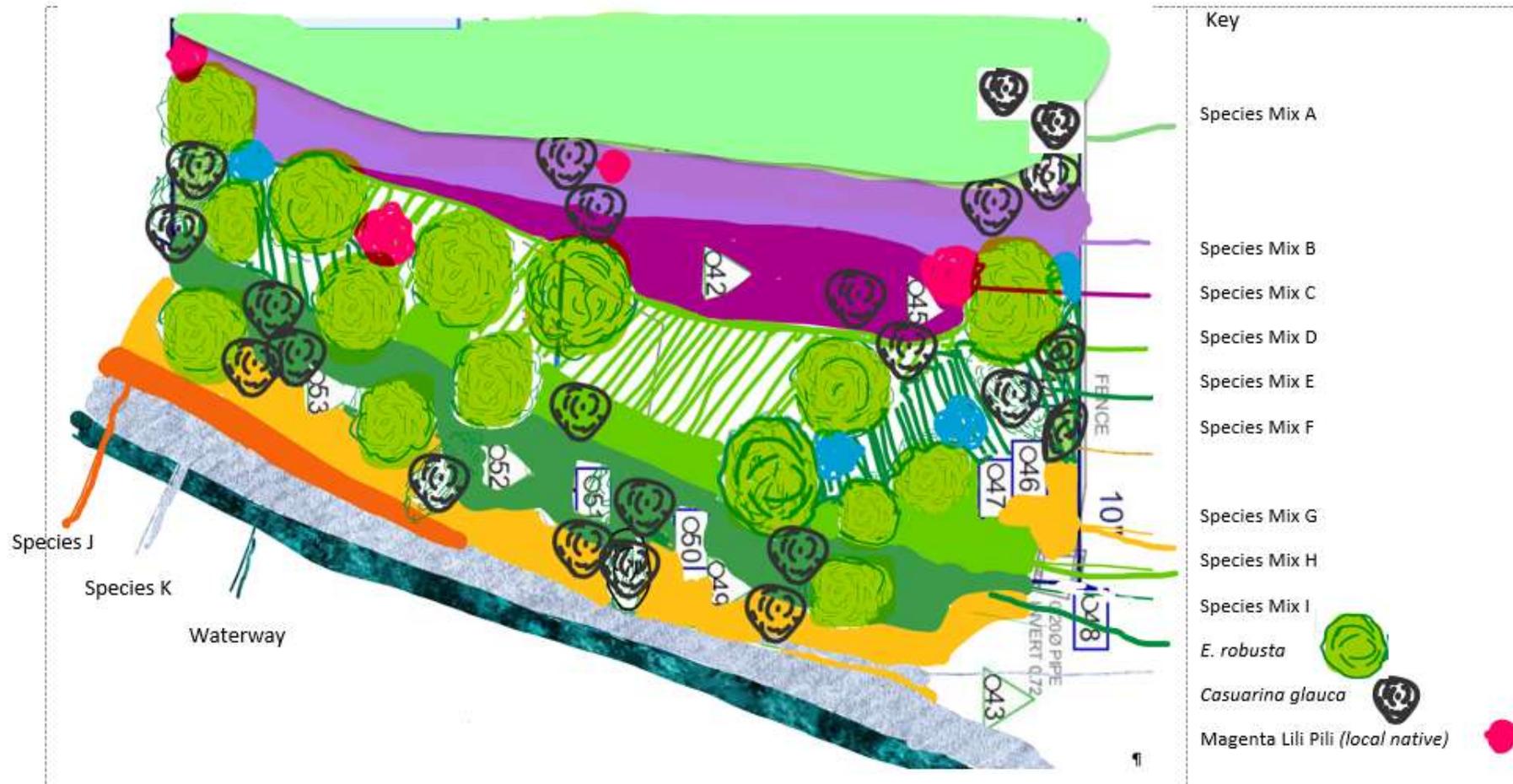


Figure 3.3 Tree retention and removal in the riparian zone. Source Arborist Report Feb 2021.

Vegetation Retention and Removal

Patches of native ground plants are growing within the riparian area through it is dominated by exotic grasses. Exotic vegetation (with the exception of trees) will be removed from the riparian area. Exotic grass will be killed and replaced with native grasses and shrubs. Native vegetation will be retained. NB: area of species mix A extends along the side of dwellings to ensure a minimum area of 80m² is vegetated with Swamp Oak Forest community (full strata). This will be certified as having been achieved pre OC. Species Mix A extends along the boundary fencing on the right hand side of this drawing to the extent that there is at least 50m² of riparian vegetation outside the 20m riparian zone.





Species

Table 1.0 (below) is the recommended planting list for the site. The following list is a mixture of species which form the Swamp Oak Floodplain Forest EEC and other species which are known to occur in the area and commonly used in riparian revegetation programs. Species Mixes are given at the end.

Table 1.0. Recommended planting list for the site.

Trees for planting within riparian zone. Species Mix B, C, D, E, F, G, H	
<p>Swamp she-oak <i>Casuarina glauca</i></p> 	<p>Swamp Mahogany <i>Eucalyptus robusta</i></p> 
<p>White Bottlebrush <i>Callistemon salignus</i> C, D, E</p> 	<p>Prickly Paperback <i>Melaleuca styphelioides</i> C, D, E</p> 
<p>Cheese Tree <i>Glochidion ferdinandi</i> A, C, D, E</p> 	<p>Swamp Paperbark <i>Melaleuca ericifolia</i> C, D, E</p> 

 <p>Species Mix A, C, D, E</p> <p>Lilly Pilly <i>Syzygium smithii</i></p> <p>Local provenance – large-leave form.</p>	 <p>Species Mix A, C, D, E</p> <p>Magenta Lilly Pilly <i>Syzygium paniculatum</i></p> <p>Seed to be from known local source of original and not nursery hybrids</p>
<p>Broad-leaved Paperbark <i>Melaleuca quinquenervia</i> Species Mix , D, E, F</p> 	
<p>Shrubs and large sedges:</p> <p>Shrubs are to be mass planted in clumps of at least 8 plants per clump. Shrubs will support insects as well as insectivorous birds such as Blue Wrens.</p> <p>Species Mix B, C, D, E, F</p> <p>Hop Goodenia <i>Goodenia ovata</i></p>  <p>Edges and boundaries can be planted with Lomanda and Dianella noting that Lomandra is to not make up more the 10% of the planting areas.</p>	<p>Leafy Twig Rush <i>Cladium procerum</i></p> <p>Species Mix F, G, H and J</p>  <p>Tall Sedge <i>Carex appressa</i> Species Mix C, D, E, F</p> 

<p>Both species are to be locally native stock. See images below. Species Mix A, B, C</p>	
<p>Blue Flax-lily <i>Dianella caerulea</i></p> 	<p>Spiky-headed Mat-rush <i>Lomandra longifolia</i></p> 
<p>Ground covers and grasses suitable for the riparian zone and around the houses. Species Mix A, B, C</p>	
<p>Indian Pennywort <i>Centella asiatica</i></p> 	<p>Scurvy Weed <i>Commelina cyanea</i></p> 
<p>Bordered Panic Grass <i>Entolasia marginata</i></p> 	<p>Creeping Beard Grass <i>Oplismenus imbecillis</i></p> 

Vines – native vines will be planted over the fence and among sedges and logs. Three species that are part of the vegetation community are recommended for planting – see below. Zones B, C, D, F, G

		
Common Silkpod <i>Parsonsia straminea</i>	Lawyer Vine <i>Smilax australis</i>	Snake Vine <i>Stephania japonica</i>

3.1 Swamp Oak Floodplain Forest EEC Species List

Swamp Oak Floodplain Forest EEC species are more suitable for the area on the public property boundary including in the high ‘saltmarsh’ area (expected to be 4-6 times per year). **All Species Mix G, H, I, J, K**

Table 1.1. Swamp Oak Floodplain Forest (only species not already covered in the above list).

Trees that are suitable for the riparian zone between the property fence and the top of bank.	
 Waterbush <i>Myoporum acuminatum</i>	Rushes and sedges for top of the bank back to the property fence. High Saltmarsh – may be occasionally inundated. Salt tolerant. Zone all public land and around stormwater outlet. All species provided below are growing in the local area (within 500m) and seed / pieces would come from those populations. NB: License needed to collected as saltmarsh is an Endangered ecological Community.
Bare Twig-rush <i>Baumea juncea</i> 	Salt Marsh Rush <i>Juncus kraussii</i> 

<p>Austral Seablite <i>Suaeda australis</i></p>  A photograph of Austral Seablite, a low-growing, green, succulent plant with small, fleshy leaves, growing in a sandy or saline environment.	<p>Creeping Bushweed <i>Samolus repens</i></p>  A photograph of Creeping Bushweed, a low-growing, green plant with small, white flowers, growing in a sandy or saline environment.
<p>Seashore Dropseed <i>Sporobolus virginicus</i></p>  A photograph of Seashore Dropseed, a grass-like plant with long, thin leaves and small, brown, cylindrical flower heads, growing in a sandy or saline environment.	<p>Glasswort <i>Sarcocornia quinqueflora</i></p>  A photograph of Glasswort, a succulent plant with small, green, fleshy leaves and small, white flowers, growing in a sandy or saline environment.
<p>New Zealand Spinach <i>Tetragonia tetragonioides</i></p>  A photograph of New Zealand Spinach, a succulent plant with large, green, fleshy leaves, growing in a sandy or saline environment.	
<p>Bermuda Grass <i>Cynodon dactylon</i></p>  A photograph of Bermuda Grass, a grass-like plant with long, thin leaves and small, brown, cylindrical flower heads, growing in a sandy or saline environment.	<p>Native Orache <i>Atriplex australasica</i></p>  A photograph of Native Orache, a succulent plant with small, green, fleshy leaves and small, white flowers, growing in a sandy or saline environment.

Support requirements

3.1.1 Weed management, bush regeneration and planting

Weed management will occur post planting of the riparian zone. The riparian zone will only have native species of these EECs. Maintenance is required for at least 12 months post planting.

3.1.2 Seed Collection

Native seed stock has been collected from this community and will be available for planting. If seeds are present on She-Oaks when removed they will be collected and used on/off-site. Excess seed will be given to council.

3.1.3 Planting size and density

Size and density provided here is minimum. A final detailed count of plants required will be submitted as part of the conditions for this DA.

Type	Density	Size
Canopy	Average 1 per 4m ²	Tube stock
Shrub	Average 2 per 4m ²	Tube stock
Ground	Average 4 per m ²	Tube stock
Vines	Average 1 per 20m ²	Tube stock
Off-site if approved		
Canopy	Average 1 per 4m ²	Tube stock
Sedges/rushes on top-of-bank 5 per linear meter		

4 Coastal Management Act

The following addresses the considerations of the Coastal management Act with respect to the proposed development.

- *Coastal Management Act 2016*

The Coastal Management SEPP <https://legislation.nsw.gov.au/#/view/EPI/2018/106/id23> replaced the State Environmental Planning Policy No 71—Coastal Protection (SEPP 71). The Coastal Management SEPP divides every part of the ‘coastal zone’ into one of four management areas. These are:

- (a) the coastal wetlands and littoral rainforests area,
- (b) the coastal vulnerability area,
- (c) the coastal environment area,
- (d) the coastal use area.

The purpose of a coastal management program is to ‘set the long-term strategy for the coordinated management of land within the coastal zone’. The focus of a program is to achieve the objectives of the Coastal Management Act. These objectives are wide-ranging and include:

- *to protect and enhance natural coastal processes and coastal environmental values including natural character, scenic value, biological diversity and ecosystem integrity and resilience;*
- *to recognise the coastal zone as a vital economic zone and to support sustainable coastal economies;*
- *to facilitate ecologically sustainable development in the coastal zone and promote sustainable land use planning decision-making;*
- *to promote integrated and co-ordinated coastal planning, management and reporting; and*
- *to facilitate the identification of land in the coastal zone for acquisition by public or local authorities in order to promote the protection, enhancement, maintenance and restoration of the environment of the coastal zone.*

Proposed works were also assess based on the objective in the *Coastal Management Manual*.

Relevant Clauses of the Act have been addressed:

4.1.1 Division 1 Coastal wetlands and littoral rainforests area

The site is within the Coastal Wetlands Mapping (Figure 5.1) and within 10m of the nearest Mangrove

10 Development on certain land within coastal wetlands and littoral rainforests area

(1) The following may be carried out on land identified as “coastal wetlands” or “littoral rainforest” on the Coastal Wetlands and Littoral Rainforests Area Map only with development consent:

- (a) the clearing of native vegetation within the meaning of Part 5A of the [Local Land Services Act 2013](#),

(b) the harm of marine vegetation within the meaning of Division 4 of Part 7 of the [Fisheries Management Act 1994](#),

(c) the carrying out of any of the following:

(i) earthworks (including the depositing of material on land),

(ii) constructing a levee,

(iii) draining the land,

(iv) environmental protection works,

(d) any other development.

Note.

Clause 17 provides that, for the avoidance of doubt, nothing in this Part:

(a) permits the carrying out of development that is prohibited development under another environmental planning instrument, or

(b) permits the carrying out of development without development consent where another environmental planning instrument provides that the development may be carried out only with development consent.

(2) Development for which consent is required by subclause (1), other than development for the purpose of environmental protection works, is declared to be designated development for the purposes of the Act.

(3) Despite subclause (1), development for the purpose of environmental protection works on land identified as “coastal wetlands” or “littoral rainforest” on the Coastal Wetlands and Littoral Rainforests Area Map may be carried out by or on behalf of a public authority without development consent if the development is identified in:

(a) the relevant certified coastal management program, or

(b) a plan of management prepared and adopted under Division 2 of Part 2 of Chapter 6 of the [Local Government Act 1993](#), or

(c) a plan of management approved and in force under Division 6 of Part 5 of the [Crown Lands Act 1989](#).

(4) A consent authority must not grant consent for development referred to in subclause (1) unless the consent authority is satisfied that sufficient measures have been, or will be, taken to protect, and where possible enhance, the biophysical, hydrological and ecological integrity of the coastal wetland or littoral rainforest.

(5) Nothing in this clause requires consent for the damage or removal of a priority weed within the meaning of clause 32 of Schedule 7 to the [Biosecurity Act 2015](#).

(6) This clause does not apply to the carrying out of development on land reserved under the [National Parks and Wildlife Act 1974](#) if the proposed development is consistent with a plan of management prepared under that Act for the land concerned.

11 Development on land in proximity to coastal wetlands or littoral rainforest

Note.

The Coastal Wetlands and Littoral Rainforests Area Map identifies certain land that is inside the coastal wetlands and littoral rainforests area as “proximity area for coastal wetlands” or “proximity area for littoral rainforest” or both.

(1) Development consent must not be granted to development on land identified as “proximity area for coastal wetlands” or “proximity area for littoral rainforest” on the Coastal Wetlands and Littoral Rainforests Area Map unless the consent authority is satisfied that the proposed development will not significantly impact on:

(a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest.

Development will not significantly impact on the integrity of the biophysical, hydrological and ecological features of the adjacent coastal wetland. The biophysical and hydrological integrity can be maintained through the retaining of key on-site native flora and the revegetation of removed native plants. The installation of a living retainer wall established with native vegetation to stabilize the wetland environment/ development site interface will assist ecological integrity. Additionally, the planting of native trees felled and not revegetated on-site at a similar but separate habitat at another location will ensure no net loss of habitat.

(b) the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.

Development will not significantly impact on the quantity and quality of surface and groundwater flows to and from the adjacent coastal wetland or littoral rainforest. Pre-existing council approved drain outlets are in operation and public awareness on the best practice management of healthy drains will prevent significant impacts to surface and groundwater flows. Public awareness of Landcare and Bushcare groups that work at Careel Creek will also mitigate significant impact caused by higher density development.

(2) This clause does not apply to land that is identified as “coastal wetlands” or “littoral rainforest” on the Coastal Wetlands and Littoral Rainforests Area Map.

The development site is not identified as coastal wetlands on the Coastal Wetlands and Littoral Rainforests Area Map. Additionally, there is no littoral rainforest present.

4.1.2 Division 3 Coastal environment area

(NB Coastal Area has been used as the site is not Coastal wetlands and littoral rainforests area and this division is the next highest category. NB Vulnerability areas are not yet official.

13 Development on land within the coastal environment area

(1) Development consent must not be granted to development on land that is within the coastal environment area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following:

(a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,

The ecological environment is considered in this report. Concluded: no significant impact.

(b) coastal environmental values and natural coastal processes,

The coastal environmental values and natural coastal processes will not be significantly altered from current conditions. Concluded: no significant impact.

(c) the water quality of the marine estate (within the meaning of the Marine Estate Management Act 2014), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1, No change expected. No coastal lakes.

(d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,

Assessed in this report including EPBC Act and BC Act and locally native species. Concluded: no significant impact.

(e) existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,

There will be no change in accessibility and an overall increased desire to be in this space.

(f) Aboriginal cultural heritage, practices and places,

None specifically listed for this location. The whole of the Estuary is a place of resources and spiritual connection, there are middens within the estuary banks and areas of importance to The First People – this site however has no middens or obvious meeting, cultural area or caves/ overhangs or trees of specific importance. AHIMS Search shown no specific places within the site or immediate surrounds.

(g) the use of the surf zone.

NA

(2) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:

(a) the development is designed, sited and will be managed to avoid an adverse impact referred to in subclause (1), or

(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

The development is designed and will be managed to avoid and/or minimize any adverse impact.

4.1.3 Division 4 Coastal use area

14 Development on land within the coastal use area

(1) Development consent must not be granted to development on land that is within the coastal use area unless the consent authority:

(a) has considered whether the proposed development is likely to cause an adverse impact on the following:

(i) existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,

No impact

(ii) overshadowing, wind funnelling and the loss of views from public places to foreshores,

No impact

(iii) the visual amenity and scenic qualities of the coast, including coastal headlands,

No impact

(iv) Aboriginal cultural heritage, practices and places,

No impact

(v) cultural and built environment heritage, and

No impact

(b) is satisfied that:

(i) the development is designed, sited and will be managed to avoid an adverse impact referred to in paragraph (a), or

Satisfied

(ii) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or

Satisfied

(iii) if that impact cannot be minimised—the development will be managed to mitigate that impact, and

Satisfied

(c) has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development.

Been accounted for

(2) This clause does not apply to land within the Foreshores and Waterways Area within the meaning of [Sydney Regional Environmental Plan \(Sydney Harbour Catchment\) 2005](#).

4.1.4 Division 5 of the Coastal Act

15 Development in coastal zone generally—development not to increase risk of coastal hazards

Development consent must not be granted to development on land within the coastal zone unless the consent authority is satisfied that the proposed development is not likely to cause increased risk of coastal hazards on that land or other land.

The development does not increase coastal hazards – the installation of the living retainer wall and public awareness of best practice waterway management mitigates erosion and water pollution respectively thus maintaining the integrity of the coastal zone.

16 Development in coastal zone generally—coastal management programs to be considered

Development consent must not be granted to development on land within the coastal zone unless the consent authority has taken into consideration the relevant provisions of any certified coastal management program that applies to the land.

No certified coastal management programs were identified on this land.

17 Other development controls not affected

Subject to clause 7, for the avoidance of doubt, nothing in this Part:

(a) permits the carrying out of development that is prohibited development under another environmental planning instrument, or

(b) permits the carrying out of development without development consent where another environmental planning instrument provides that the development may be carried out only with development consent.

a) the development is permitted

b) development consent is being sought



Figure 4.1 The activity site sitting within the Proximity Area for Coastal wetlands and the Coastal environment Area Map and sitting adjacent to coastal wetlands. Source: SEED Portal, Department of Planning and Environment (DPE), State Environment Planning Policy (Coastal Management) 2019

- Fisheries Management Act 1994 (FM Act).

No altering of the geomorphology of the waterway will occur that results in altered flow or volume of water. The installation of a retaining wall will protect mangrove (Figure 5.6) and seagrass vegetation (Figure 5.7) that populations and ecological communities of fish and marine life live in. Additionally, it will enable ecosystem processes to occur that support the health of these ecological communities. Stormwater from on-site will be managed such that there is to be a positive or neutral impact on the receiving water. See Stormwater Plan Figure 4.2 for details (below).



Main saltmarsh within 300m of the site.

- *Water Management Act*

The development site adjoins Careel Creek (Figure 5.). Careel Creek is a first order waterway (as a result of town drainage systems). A 20m riparian corridor has been aimed for and all works are outside the core 10m and most outside the outer 50% (10m). Off-set planting has been proposed for the 30m² built form encroachment and the <50m² raised, porous, decking/step area.

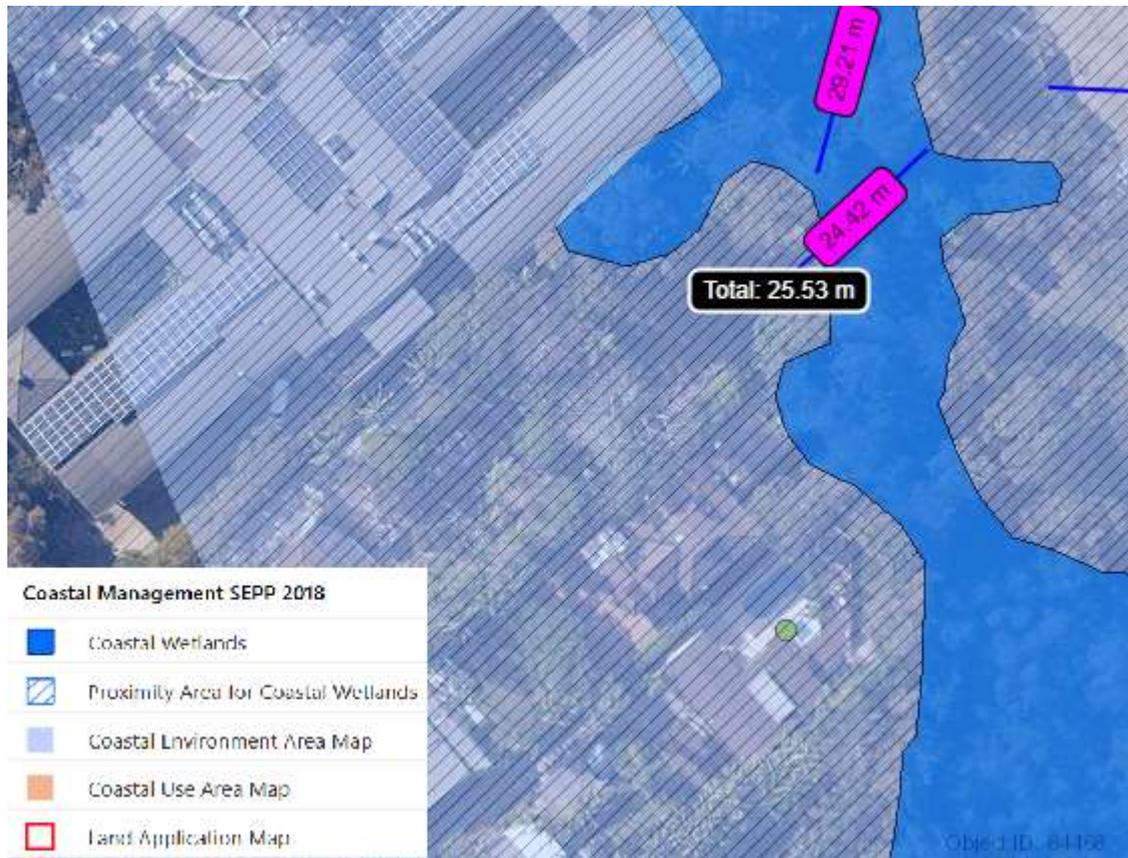


Figure 4.3 Setback from waterway. Source: SEED Portal, Department of Planning and Environment (DPE), State Environment Planning Policy (Coastal Management) 2019.



Figure 4.4. Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion. Source: SEEDPortal The Native Vegetation of the Sydney Metropolitan Area - Version 3.1 (OEH, 2016) VIS_ID 4489



Figure 4.5. Proximity to Seagrass. Source: SEEDPortal The Native Vegetation of the Sydney Metropolitan Area - Version 3.1 (OEH, 2016) VIS_ID 4489

4.2 Commonwealth Legislation and Policy – all address in original Flora and Fauna report

The implications for the proposal were assessed in relation to key biodiversity legislation and policy including:

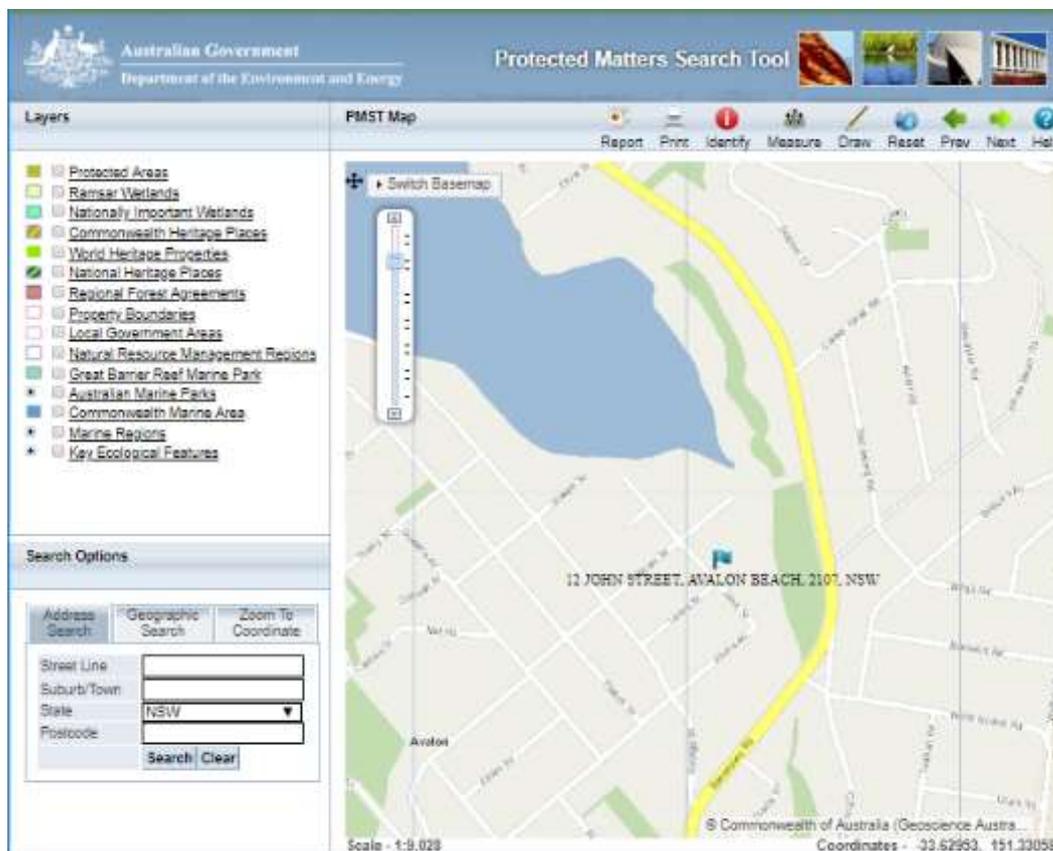
- *Cwlth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).*

A Protected Matters Search was conducted.

[Coastal Swamp Oak \(Casuarina glauca\) Forest of New South Wales and South East Queensland ecological community](#)
[Coastal Upland Swamps in the Sydney Basin Bioregion](#)
[Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion](#)
[Subtropical and Temperate Coastal Saltmarsh](#)

- 1) Coastal Swamp Oak Forest is onsite and adjoining (Figure 6.4)
- 2) Coastal Upland Swamps Sydney – adjacent to the site
- 3) Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion– Site sits up stream of the zone (Figure 7)
- 4) Subtropical and temperate Coastal Saltmarsh near the site

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Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that relate to, the area you nominated. Further information is available accessed by scrolling or following the links below. If you are concerned about a significant impact on one or more matters of national environmental significance, see [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	67
Listed Migratory Species:	57

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community may occur within area
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Isopodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New	Vulnerable	Species or species

- *Environmental Planning and Assessment Act 1979 (EP&A Act).*

The EPA Act requires that the assessing body, in this case local government, consider the impact of the development on the surroundings – with respect to this ecology report the impacts on the environment are assessed. No significant impact on threatened species, populations or communities is indicated if recommendations are followed