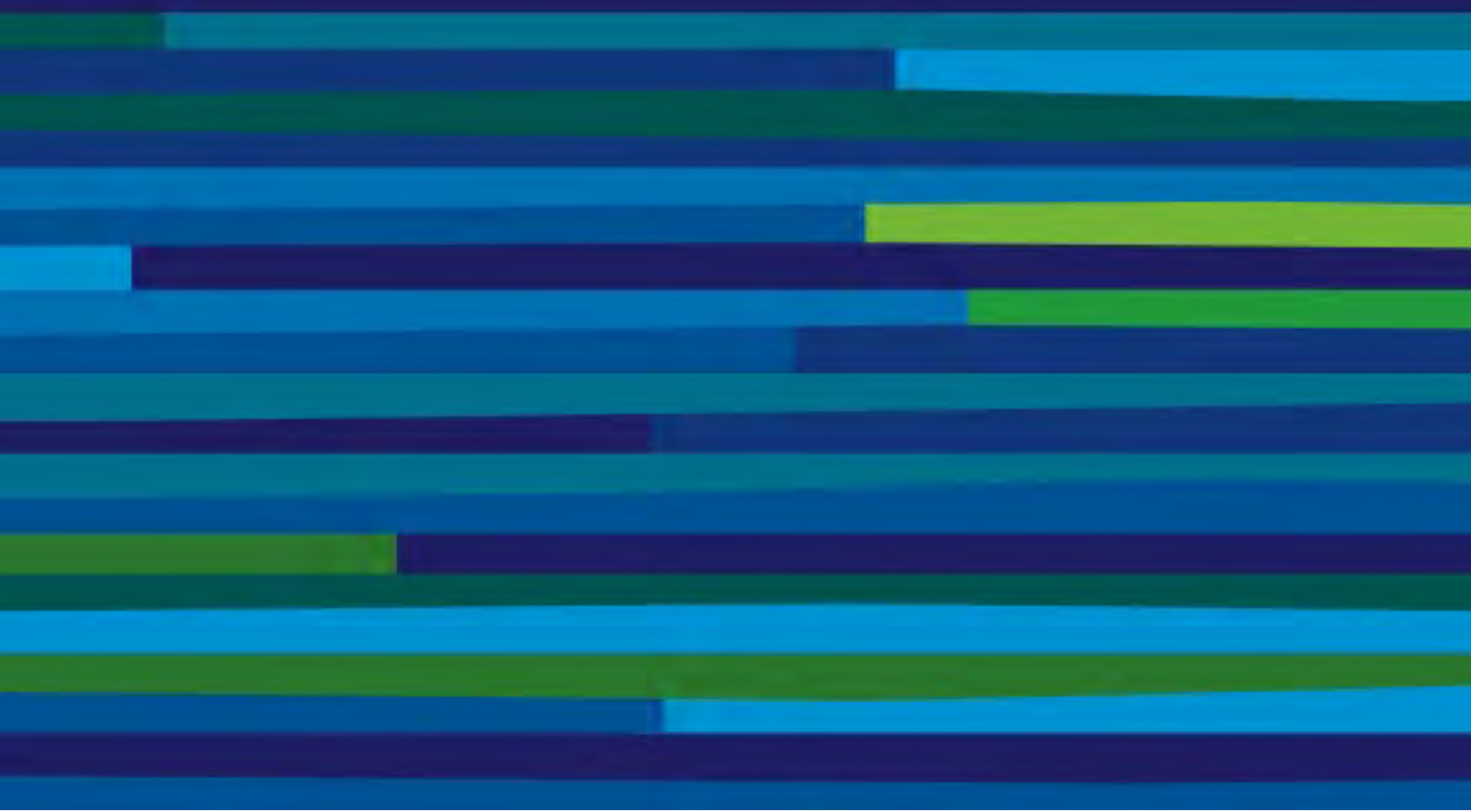


Urban Creek Recovery: Panalatinga & Serpentine Creeks restoration concept

Report for City of Onkaparinga

Version 1.2

DesignFlow & TCL
27 May 2026



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Summary

This project aims to restore 5.3 km of Serpentine and Panalatinga Creeks in the City of Onkaparinga. The waterways currently experience erosion, have exotic weeds and provide limited ecological function.

This project, funded through the Australian Government's *Urban Rivers and Catchments Program*, aims to address existing creek structural issues, restore aquatic and riparian ecological functions and to improve water quality along the waterways.

Earlier work identified 12 target native fauna species for the restoration efforts. A variety of habitats along the creeks are to be created that will support the 12 species – which include insects, fish, amphibians, reptiles and birds.

The concept design follows two years of engagement with Kurna Traditional Owners and local community members as well as detailed technical investigations to identify community and cultural values and the critical issues facing the waterways, and to outline approaches for restoration and ongoing management.

This report describes a concept design for the two creeks. Works proposed include removing concrete sections of the waterways, installing natural stabilisation techniques, establishing pollution control ponds and wetlands, weed removal and extensive revegetation with indigenous plants.

The project aims to create and improve habitats along the creek for:

- Grassy woodlands
- Native grasslands
- Vegetated riparian areas
- Wetlands and swamps (permanent and ephemeral)
- Freshwater streams.

Another objective of the project is to improve community access to and connection with the creeks so that people can appreciate nature, enjoy the linear green and blue spaces and connect with Country.

The design responds sensitively to a series of project principles developed via the community engagement processes mentioned above (see Section 2).

Figure 1 and Figure 2 show overviews of the planned works for the concept designs for Serpentine and Panalatinga Creeks respectively. The designs followed the design principles set out for the project (Section 2.1) and are also considered to be consistent with the funding grant objectives (Section 1). Table 1 outlines the key features of the concept design and how they relate to the funding objectives and design principles.



Figure 1 Restoration concept design for Serpentine Creek



Figure 2 Restoration concept design for Panalatinga Creek

Table 1 Concept design elements and how they relate to the funding objectives and design principles

Design element	Design principle(s)	Funding grant objective(s)	Comments
Sedimentation ponds	3. Support biodiverse waterways	2. Improve water quality	Located at strategic locations to capture piped stormwater inflows to the creeks, they will reduce pollutant loads along the waterways.
Seasonal (ephemeral) wetlands	3. Support biodiverse waterways 4. Support biodiversity hotspots	1. Improve riparian and aquatic habitat 2. Improve water quality	Planting out natural boggy areas with native plants will promote stormwater filtration and provide habitat for key fauna.
Creek naturalisation	1. First Nations connections 2. Aim to heal Country 3. Support biodiverse waterways 5. Create spaces to connect with nature	1. Improve riparian and aquatic habitat 2. Improve water quality & in-stream connectivity	Removing concrete invert channels and extensive revegetation aims to heal Country to support biodiversity outcomes.
Woody weed removal	6. Holistic approach to managing waterways 7. Long-term thinking for creek restoration	1. Improve riparian and aquatic habitat 2. Improve water quality	Removal of weeds will enable revegetation with native species that enhances local biodiversity.
In-stream native plantings	3. Support biodiverse waterways 4. Support biodiversity hotspots	1. Improve riparian and aquatic habitat 2. Improve water quality	Improves water quality, stream stabilisation and in-stream habitat and biodiversity.
Riparian native plantings	3. Support biodiverse waterways 5. Create spaces to connect with nature	1. Improve riparian and aquatic habitat 3. Improve urban green space	Stabilises the banks, provides habitat connectivity along the waterways.
Education (environmental) areas	5. Create spaces to connect with nature 7. Long-term thinking for creek restoration	3. Improve urban green space	Creating a learning space near to the college and other education facilities on the edge of an ephemeral wetland provides environmental learning opportunities.
Interactive creek areas (nature play)	5. Create spaces to connect with nature	3. Improve urban green space	Creating interesting nature play using natural materials and native plantings will encourage interaction with the creek environment.
Erosion stabilisation	3. Support biodiverse waterways	2. Improve water quality	Addresses existing eroding sections of waterway to prevent further scour, vegetation losses and reduce sediment loads in the creeks
Wildlife friendly culvert crossings	3. Support biodiverse waterways	2. Improve in-stream connectivity	Providing wildlife pathways through existing culverts to provide possible connectivity along the waterway.
Walking paths in key areas	5. Create spaces to connect with nature	3. Improve urban green space	Improving pedestrian connectivity (and maintenance access) provides opportunities for passive recreation and ability to connect with nature.

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1 Introduction

This project is part of the *Urban Creek Resilience and Recovery project* that embodies a progressive and restorative approach to managing urban waterways. It is managed by the City of Onkaparinga and funded by the Australian Government's Urban Rivers and Catchments Program.

The project aims to go beyond conventional environmental waterway remediation and engineering solutions. It embraces a design philosophy that aligns with natural systems and cycles, drawing on contemporary best practices in landscape restoration as well as respecting traditional Kaurna Meyunna knowledge and approaches to the management of land, water and seasonal change.

The aims of the project are to address existing creek structural issues, restore aquatic and riparian ecological functions and to improve water quality along the waterways for the purpose of providing habitat for 12 target native fauna species using biodiversity sensitive urban design (BSUD) principles.

It seeks to restore the health and ecological resilience of Panalatinga and Serpentine Creeks, along with key tributaries, across a 5.3 kilometre stretch through the suburbs of Happy Valley, O'Halloran Hill, Reynella East, Old Reynella and Woodcroft.

The main objectives for the project are to:

1. Improve riparian and aquatic habitat along the waterways to benefit native species
2. Improve water quality, hydrology and in-stream connectivity to benefit native aquatic species
3. Improve urban green space and provide community access to nature.

This document describes a concept design for the reaches of Serpentine and Panalatinga Creeks that delivers the objectives.

The reaches of creek included in this project are shown in Figure 3.



Figure 3 Serpentine and Panalatinga Creek areas included in the project

1.1 Background material

Considerable previous work has provided a platform to develop a concept design to restore the waterways. Of particular importance was the work of ICON Science, Centre for Urban Research, RMIT University ¹ that went through an extensive stakeholder engagement process to set *Biodiversity Sensitive Urban Design* (BSUD) principles for the project.

In particular, RMIT University nominated 12 fauna species that could become the target for this restoration project. The habitat requirements for the 12 species provide the template of the restoration initiatives. It should be noted these species represent a range of fauna and while not exhaustive, if habitat can be created for these 12 species it would also be suitable to support many other species.

Council has intimate knowledge of the creeks, including extensive fauna and flora data, and considerable experience in restoring similar waterways, particularly with woody weed removal and revegetation. Council's early observations highlighted many opportunities for this restoration concept.

1.1.1 Target fauna species

It is important to recognise that these 12 fauna species represent potential targets for the creek restoration works. They include birds, reptiles, amphibians, fish and insects. It is not a comprehensive list of species, but rather, a collection of recommendations to guide the ecological restoration (RMIT University, 2025). It is highly likely that creating habitats for these species will also benefit other native wildlife from similar taxonomic groups.

The 12 species are (refer to RMIT University, 2025 for more details):

1. Short-beaked echidna
2. White-striped freetail-bat
3. Black-shouldered kite
4. Black-chinned honeyeater
5. Australian spotted crane
6. Sacred kingfisher
7. Eastern long-necked turtle
8. Bibron's toadlet (Brown's toadlet)
9. Common galaxias
10. Chequered copper butterfly
11. Blue-banded bees
12. Water penny beetles.

1.1.2 Site observations

This concept design is the result of years of consideration. These reaches of waterways have been inspected by many groups to identify restoration opportunities. Council officers, experienced in stream restoration, identified a number of works that could be implemented. In addition, Kaurua Traditional Owners, community members as well as technical consultants have all contributed to the restoration thinking that has informed the concept designs.

¹ ICON Science Centre for Urban Research RMIT University, 2025, *Urban Creek Recovery and Restoration via Biodiversity Sensitive Urban Design: A report for the City of Onkaparinga*

2 Approach to design

The design approach adopted to develop the concept builds on from previous work identifying issues and opportunities for the two creeks. In particular:

- *Urban Creek Recovery and Restoration via Biodiversity Sensitive Urban Design* (RMIT University, 2025)
- *Initial site observations* (City of Onkaparinga, 2025)
- *Erosion assessment report*² (Water Technology, 2025)
- *Cultural Heritage Surveys*³ for both creeks (Stenhouse Heritage, 2024).

2.1 Design principles

The BSUD report describes principles for the design that were developed through thorough consultation as well as highlighting 12 fauna species mentioned in the previous section.

The design principles developed are:

1. First Nations connections respected and celebrated
2. Aim to heal Country using understanding of the pre-colonial landscape
3. Support biodiverse waterways with free-flowing, clean water
4. Support the creeks to become biodiversity hotspots
5. Create a variety of spaces to connect with nature
6. Take a holistic perspective to managing the land and waterways – not constrained by boundaries
7. Engage long-term thinking for the creek restoration and ongoing management.

2.2 Design logic

The design team adopted these principles and digested the previous work to develop a hierarchy of design interventions to restore and enhance the waterways. The logic for the concept design includes:

1. **Stabilise the waterways** where there is active erosion – use natural stream stabilisation techniques address existing eroding areas. If erosion is not stabilised it could compromise future revegetation initiatives.
2. **Provide stormwater pollutant treatment** in critical locations to better protect downstream waterways from pollution (using GPTs, ponds and wetlands).
3. **Remove and replace concrete channels** where feasible to create streams that support ecological functions.
4. **Remove woody weeds** to enable indigenous plant species the space and sunlight to thrive and to continue previous Council initiatives to remove exotic pest plants that negatively impact waterway health.
5. **Revegetation** to support a range of habitats for different areas of the creek that complement the 12 target fauna species.

² Water Technology, 2025, *Urban Creek Resilience Recovery Project – Erosion Assessment Report*, report for the City of Onkaparinga

³ Stenhouse Heritage, 2024, *Cultural Heritage Survey reports* – for Panalatinga and Serpentine Creeks

6. **Create a variety of spaces** that respond to local conditions, including some areas that promote interaction to experience nature, others for conservation and include passive recreation along the linear corridors.

3 Proposed works

Below is a brief description of the proposed works and the rationale for the interventions. Refer to Figure 1 and Figure 2 for plans that show the locations of these works.

3.1 Stabilisation

An erosion assessment report (Water Technology, 2025) investigated the reaches of waterways for the existing erosion. Interpretation of the main conclusions from the report suggest there is some bed erosion, isolated areas of bank erosion and areas where existing hard structures (e.g. concrete) are being undermined. There does not appear to be any mass failure risks of banks or built infrastructure.

The majority of the erosion 'hot spots' can be treated in isolation and remedial works would include using natural stone stabilisation and revegetation to arrest the erosion. Figure 4 shows an example location on the upper reaches of Panalatinga Creek.

Typically stabilisation will involve keying in large toe rocks and then back filling with angular inter-locked rocks to form a stable slope. Following rock installation, topsoil would be spread around the rocks and be planted.



Figure 4 Example of isolated bank erosion (Panalatinga Creek)

3.2 Stream naturalisation

The focus of stream naturalisation is proposed to be along Panalatinga Creek as it flows around Reynella East College. The channel in this reach is a formed trapezoidal shaped that includes a concrete low flow channel (1m wide) in the base.

There is active erosion around the concrete invert as well as along parts of the banks of the main channel. The proposed intervention is to remove the concrete channel and form a (slightly meandering) natural channel to convey low flows. The new low flow channel will be two metres wide and be densely planted (and will incorporate erosion control matting for the vegetation establishment period).

The layout of the new channel has been carefully aligned to avoid as many of the existing trees as possible. These trees were planted as part of the channel establishment and form a valuable corridor of vegetation.

In addition, as part of detailed design, small rock chutes that transverse the entire channel are being considered as a method to arrest any bed erosion from moving upstream if it establishes. Given the longitudinal slope of this reach is approximately 3%, the chutes may not be required.

Figure 5 shows an example of the concrete invert and erosion.

There are also other reaches of the waterway with concrete invert channels such as along Victoria Avenue. However, the Victoria Avenue reach is generally stable and has allotments backing directly on the waterway, limiting interventions possible. Therefore, given the limited budget for this project it was decided to focus the concrete channel naturalisation effort around Reynella East College.



Figure 5 Reynella East College concrete lined channel (with erosion)

3.3 Stormwater sediment ponds

There are several point inputs of stormwater (i.e. pipes) from lateral catchments into the creeks, (refer to Water Technology, 2025 for more details) and these inputs carry large quantities of sediment and debris.

Where there is available space at these inputs, it is proposed to install sediment collection ponds. The ponds are typically 1.5m deep and are used to settle out sediments. The ponds will be installed with a hard base and access ramps to facilitate cleaning activities. The perimeter of the ponds will

be vegetated to provide fauna habitat. An example of a sediment pond with maintenance access is shown in Figure 6.

Ponds are proposed for areas along Candy Road, Braeside Avenue, Malbeck Drive and Bordeaux Drive.



Figure 6 Example of sediment pond with maintenance access

3.4 Wetland inlet ponds

Stormwater is conveyed into the Byards wetland from two locations at the eastern end of the wetland. Flow from two reaches of Panalatinga Creek pass through a diversion structure and Gross Pollutant Trap (GPT) before entering the wetland. Both diversion structures are prone to blockage with debris and this limits inflow to the wetlands.

Part of this project intends to construct sediment ponds in these locations, to capture debris, and then increase the capacity of transfer culverts to the wetland. These ponds should increase flow into the wetland and thus increase the stormwater treatment it provides and amount of treated water available for reuse.

These ponds are also located on the vegetated channels and will provide habitat for aquatic wildlife in the linear corridors.

3.5 Seasonal wetlands

There are two areas along the waterway that are currently very boggy during the winter and spring months. They receive side spills from the (ill defined) creek beds. Water spreads out over the areas and creates an area that is inundated on a seasonal basis.

The areas currently support some native aquatic plants species, but also many introduced species (such as Kikuyu grass).

It is proposed to do minimal earthworks in these areas (as flow naturally spreads out) and create a more biodiverse area with weed removal and extensive native plantings of aquatic species.

These areas are:

- Just south of Scouts SA (Happy Valley) site on Candy Road (Serpentine Creek)
- West end of Byards wetlands (Panalatinga Creek and Glenloth Creek junction).

Species will be selected that suit the areas ephemeral hydrology, i.e. the areas are likely to be inundated during winter and spring and then fully dry out during the drier months. An example of shown in Figure 7.



Figure 7 Example of a 'seasonal wetland'

3.6 Gross pollutant traps

To capture litter and debris from within stormwater flowing to the southern inlet into Byards Road wetland, a series of litter nets are proposed. The nets will be installed in two rows and be located within an existing large concrete apron leading to culverts under Byards Road.

Maintenance of these nets can be undertaken from a large hardstand area off the road and adjacent to the apron.



Figure 8 Typical litter net arrangement and the concrete apron at Byards Road

3.7 Weed removal

Tree weed species are a major issue along some sections of these creeks, which smother native vegetation (both trees and understory) and provide minimal value habitat for native fauna (or their food sources).

The tree species include desert ash, willow, date palm, olive, poplar and swamp sheoak.

Removing these weedy "bullies" from the ecosystem is a major undertaking. Council has been proactive over many years by progressively removing woody weeds and replacing with native

riparian species to reduce potential negative impacts on native fauna and nearby residents. This project will continue this work, particularly in the lower reaches of the target waterways.

Completely removing the weed species is a long-term target (beyond the life of this project). This project will, however, continue to tackle the woody weeds and follow with revegetation for as long as the project budget stretches.

The following approach will be used to prioritise the extent and timing of weed control:

Target priority and declared weeds for eradication at all project sites by June 2028: date palms, Spiny rush (*Juncus acutus*), African boxthorn, Wild olive, Briar Rose.

All woody weeds are to be removed in areas where the design proposes construction works, including creek stabilisation or naturalisation and construction of ponds or wetland areas.

In other areas where no earthworks or landscape treatments are proposed as part of the Urban Creek Recovery Project, the following approach will be undertaken:

Panalatinga Creek between Panalatinga Road and Bridge St, Old Reynella:

- Commence staged removal of woody weeds that are smaller than 10cm trunk diameter including Swamp Sheoak (*Casuarina glauca*), Desert ash and Poplar. Priority for woody weed removal around built infrastructure, native River Red Gums and colonial heritage sites.
- Staged control of Kikuyu starting from key locations, such as the historic ford adjacent to the Coast to Vines trail bridge.
- Remove any large exotic trees that have died or present a risk to public safety due to poor structure and health.
- Retain large pine trees near watercourse as they provide habitat/food for Yellow-tail Black-cockatoos.
- Protect significant trees, including heritage pines.
- Create native planting zones (habitat islands) to improve habitat, increase canopy cover and screening.
- Temporary retention of any large ash and willow trees until native vegetation plantings can provide replacement habitat.

Serpentine Creek, West of Triploli Road, Happy Valley to Fountain Valley Pond:

- Commence staged removal of woody weeds that are smaller than 10cm trunk diameter including Swamp Sheoak (*Casuarina glauca*), Desert ash and Poplar.
- Remove any large exotic trees that have died or present a risk to public safety due to poor structure and health.
- Undertake infill planting with local native species after tree removal to improve habitat, increase canopy cover and screening.
- Retain any large willows until native vegetation can provide replacement habitat.
- Continue to remove any large exotic trees that have died or present a risk to public safety due to poor structure and health.

An example of the scale of the woody weed invasion is shown in Figure 9, from the lower reaches of Panalatinga Creek.



Figure 9 Woody weeds in the lower reaches of Panalatinga Creek

3.8 Revegetation

The BSUD report (RMIT University, 2025) nominated habitat types that are likely to support the 12 target fauna species. Areas along the two creeks that can support each habitat type have been selected on the basis of the hydrologic regime of the area and the locations relative to other landscape features.

Suitable plant species for each habitat type were then selected from indigenous species that were local to the area pre-colonisation.

The habitat types are:

- Grassy woodlands
- Native grasslands
- Riparian areas
- Wetlands and swamps (permanent and ephemeral)
- Freshwater streams.

Plant species that have been selected for the different habitat types are shown in the tables below. During further design, species will be selected from these lists that are commercially available; and planting designs developed for each area.

Table 2 Grass woodland species

GRASSY WOODLAND	
<i>Acacia pycnantha</i>	Golden Wattle (LS 5-8m)
<i>Acacia acinacea</i>	Gold Dust Wattle (MS 2-2.5m)
<i>Acacia paradoxa</i>	Kangaroo Thorn (MS 2-5m)
<i>Acacia victoriae</i>	Elegant Wattle (MS 2-5m)
<i>Allocasaurina verticillata</i>	Drooping Sheoak (ST)
<i>Atriplex semibaccata</i>	Berry Saltbush
<i>Austrostipa</i> spp.	Spear grass
<i>Banksia marginata</i>	Silver Banksia
<i>Billardiera cymosa</i>	Sweet Apple Berry
<i>Bulbine bulbosa</i>	Native leek
<i>Burchardia umbellata</i>	Milkmaids (Herb)
<i>Bursaria spinosa</i>	Christmas Bush (MS 2-4m)
<i>Callistris gracilis</i>	Southern Cypress Pine (ST 8m)
<i>Calytrix tetragona</i>	Common Fringe Myrtle (SS 1-2m)
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting
<i>Correa reflexa</i> var. <i>scabridula</i>	Common Correa
<i>Cullen australasicum</i>	Native Scurf-Pea (S-MS 2.5m)
<i>Dianella longifolia</i>	Sedge lily
<i>Dianella revoluta</i>	Sedge lily
<i>Dodonaea viscosa</i>	Sticky Hop-bush (MS 3m)
<i>Enardia nutans</i>	Groundcover
<i>Enchlyeana tomentosa</i>	Ruby Salt-bush
<i>Eucalyptus leucoxylon</i>	SA Blue Gum (15+m)
<i>Eucalyptus microcarpa</i>	Grey Box (15m)
<i>Eutaxia diffusa</i>	Spreading Eutaxia
<i>Eutaxia microphylla</i>	Mallee Bush-pea
<i>Gahnia</i> spp.	Saw-sedge
<i>Goodenia</i> spp.	Goodenia (S-MS)
<i>Hakea rugosa</i>	Dwarf Hakea (MS)
<i>Hakea</i> spp.	Hakea
<i>Hardenbergia violacea</i>	Native Lilac
<i>Leptospermum continentale</i>	Prickly Tea-tree
<i>Lomandra densiflora</i>	Soft Tussock Mat-Rush
<i>Lomandra multiflora</i>	Hard Mat-rush
<i>Melaleuca lanceolata</i>	Dryland Tea Tree (5-8m)
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Rice-grass
<i>Olearia ramulosa</i>	Twiggy Daisy Bush (SS)
<i>Oxalis perennans</i>	Native Sorrel
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush
<i>Rytidosperma</i> spp.	Wallaby-grass
<i>Senecio</i> spp.	Bare Twig-rush
<i>Themeda triandra</i>	Kangaroo Grass
<i>Vittadinia blackii</i> (cunneata)	New Holland Daisy (herb)
<i>Wahlenbergia stricta</i>	Tall Bluebell

Table 3 Native grasslands species

NATIVE GRASSLAND	
<i>Allocasaurina verticillata</i>	Drooping Sheoak (ST)
<i>Amphipogon caricinus</i> var. <i>caricinus</i>	Long Grey-beard Grass
<i>Austrostipa</i> spp.	Spear-grass
<i>Bulbine bulbosa</i>	Native leek
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting
<i>Cullen australasicum</i>	Native Scurf-Pea (S-MS 2.5m)
<i>Cymbopogon ambiguus</i>	Lemon Scented Grass
<i>Dianella revoluta</i>	Sedge lily
<i>Eucalyptus microcarpa</i>	Grey Box (15m)
<i>Eutaxia diffusa</i>	Spreading Eutaxia
<i>Eutaxia microphylla</i>	Mallee Bush-pea
<i>Leptorhynchus squamatus</i>	Scaly Buttons (Herb)
<i>Melaleuca lanceolata</i>	Dryland Tea Tree (5-8m)
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Rice-grass
<i>Microseris lanceolata</i>	Yam Daisy
<i>Oxalis perennans</i>	Native Sorrel
<i>Pimelea</i> sp.	Riceflower
<i>Poa poiformis</i> var. <i>poiformis</i>	Coast Tussock Grass
<i>Rytidosperma</i> spp.	Wallaby-grass
<i>Senecio</i> spp.	Bare Twig-rush
<i>Themeda triandra</i>	Kangaroo Grass
<i>Vittadinia blackii</i> (cunneata)	New Holland Daisy (herb)
<i>Wahlenbergia stricta</i>	Tall Bluebell

Table 4 Riparian species

RIPARIAN AREAS	
<i>Acacia melanoxylon</i>	Blackwood
<i>Acacia paradoxa</i>	Kangaroo Thorn (MS 2-5m)
<i>Acacia provincialis</i>	Swamp wattle
<i>Allocasaurina verticillata</i>	Drooping Sheoak (ST)
<i>Atriplex semibaccata</i>	Berry Saltbush
<i>Bursaria spinosa</i>	Christmas Bush (MS 2-4m)
<i>Callistemon sieberi</i>	River Bottlebrush
<i>Carex appressa</i>	Tall sedge
<i>Correa reflexa</i> var. <i>scabridula</i>	Common Correa
<i>Cullen australasicum</i>	Native Scurf-Pea (S-MS 2.5m)
<i>Dianella revoluta</i>	Sedge lily
<i>Enadia nutans</i>	Groundcover
<i>Eucalyptus camaldulensis</i>	Red Gum (15+m)
<i>Gahnia</i> spp.	Saw-sedge
<i>Goodenia</i> spp.	Goodenia (S-MS)
<i>Hakea rugosa</i>	Dwarf Hakea (MS)
<i>Hardenbergia violacea</i>	Native Lilac
<i>Imperata cylindrica</i>	Blady Grass
<i>Leptospermum continentale</i>	Prickly Tea-tree
<i>Leptospermum lanigerum</i>	Woolly Tea-tree
<i>Leptospermum myrsinoides</i>	Heath Tea-tree
<i>Lomandra densiflora</i>	Soft Tussock Mat-Rush
<i>Muehlenbeckia florulenta</i> (TBC)	Tangled Lignum
<i>Olearia ramulosa</i>	Twiggy Daisy Bush (SS)
<i>Poa labillardieri</i> ssp. <i>labillardieri</i>	Tussock Grass
<i>Poa poiformis</i> var. <i>poiformis</i>	Coast Tussock Grass
<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>	Sea-berry Saltbush
<i>Senecio</i> spp.	Bare Twig-rush

Table 5 Permanent water wetland species

PERMANENT WATER WETLANDS	
<i>Baumea rubiginosa</i> (TBC)	
<i>Bolboschoenus caldwellii</i>	Salt Club-rush
<i>Carex appressa</i>	Tall sedge
<i>Carex fascicularis</i>	Tassel Sedge
<i>Cynogeton procerum</i>	Water-ribbons
<i>Cyperus gymnocaulus</i>	Spiny Flat-sedge
<i>Cyperus vaginatus</i>	Flat-sedge
<i>Eleocharis acuta</i>	Common Spike-rush
<i>Eleocharis sphacelata</i> (TBC)	Giant Spike-rush
<i>Eucalyptus camaldulensis</i>	Red Gum (15+m)
<i>Imperata cylindrica</i>	Blady Grass
<i>Indigofera australis</i>	Australian Indigo
<i>Juncus</i> spp.	Rush
<i>Lycopus australis</i>	Australian Gypsywort
<i>Machaerina juncea</i>	Bare Twig-rush
<i>Marsilea drummondii</i>	Common Nardoo
<i>Myriophyllum</i> spp.	Mitfoil
<i>Persicaria decipiens</i>	Slender Knotweed
<i>Schoenoplectus validus</i>	Tall rush
<i>Thyridia repens</i>	Creeping Monkey-flower

Table 6 Ephemeral wetland species

EPHEMERAL WETLANDS	
<i>Baumea rubiginosa</i> (TBC)	
<i>Bolboschoenus caldwellii</i>	Salt Club-rush
<i>Carex appressa</i>	Tall sedge
<i>Carex bichenoviana</i>	Plains Sedge
<i>Carex tereticaulis</i>	Rush Sedge
<i>Cyperus gymnocaulus</i>	Spiny Flat-sedge
<i>Cyperus vaginatus</i>	Flat-sedge
<i>Eleocharis acuta</i>	Common Spike-rush
<i>Eucalyptus camaldulensis</i>	Red Gum (15+m)
<i>Gahnia</i> spp.	Saw-sedge
<i>Juncus</i> spp.	Rush
<i>Leptospermum continentale</i>	Prickly Tea-tree
<i>Leptospermum lanigerum</i>	Woolly Tea-tree
<i>Leptospermum myrsinoides</i>	Heath Tea-tree
<i>Machaerina arthropophylla</i>	Swamp Twig-rush
<i>Machaerina juncea</i>	
<i>Marsilea drummondii</i>	Common Nardoo
<i>Mentha australis</i>	Slender Mint
<i>Muehlenbeckia florulenta</i> (TBC)	Tangled Lignum
<i>Persicaria decipiens</i>	Slender Knotweed
<i>Poa labillardieri</i> ssp. <i>labillardieri</i>	Tussock Grass
<i>Thyridia repens</i>	Creeping Monkey-flower

Table 7 Freshwater streams species

FRESHWATER STREAMS	
<i>Baumea rubiginosa</i>	Soft Twig-rush
<i>Bolboschoenus caldwellii</i>	Salt Club-rush
<i>Carex appressa</i>	Tall sedge
<i>Carex fascicularis</i>	Tassel Sedge
<i>Carex tereticaulis</i>	Rush Sedge
<i>Cynogeton procerum</i>	Water-ribbons
<i>Cyperus gymnocaulus</i>	Spiny Flat-sedge
<i>Cyperus vaginatus</i>	Flat-sedge
<i>Eleocharis acuta</i>	Common Spike-rush
<i>Eleocharis gracilis</i>	Slender Spike-rush
<i>Imperata cylindrica</i>	Blady Grass
<i>Juncus spp.</i>	Rush
<i>Leptospermum lanigerum</i>	Woolly Tea-tree
<i>Machaerina arthropphylla</i>	Sw amp Tw ig-rush
<i>Marsilea drummondii</i>	Common Nardoo
<i>Mentha australis</i>	Slender Mint
<i>Persicaria decipiens</i>	Slender Knotweed
<i>Schoenoplectus validus</i>	Tall rush
<i>Thyridia repens</i>	Creeping Monkey-flower

3.9 Wildlife habitat features

Another component of the project is to explore and implement habitat design elements for native fauna. These include wildlife friendly road crossings/culverts at critical nodes along the waterways, placing nesting boxes in trees, providing habitat logs in riparian areas (that won't impede flows), considering fish passage continuity along waterways and designing structured vegetation communities to suit habitat requirements.

3.10 Passive recreation and interaction

A key objective for this project is to create opportunities for the community to safely connect and interact with the waterways and to experience nature.

Site interpretation led to different character zones being created that invite varying levels of interaction depending on the local characteristics. Different areas along the creeks invite and encourage nature play, education, reflection, Aboriginal cultural activities and active (structured) recreation. This builds on, and complements, the existing colonial heritage zones around the Old Reynella township.

Defined character zones include opportunities for:

- Conservation
- Structured recreation (and interaction)
- Education
- Walking trails
- Cultural (First Nations and colonial).

Figure 10 and Figure 11 show the layout of different character zones for the two creeks that guided the concept design.

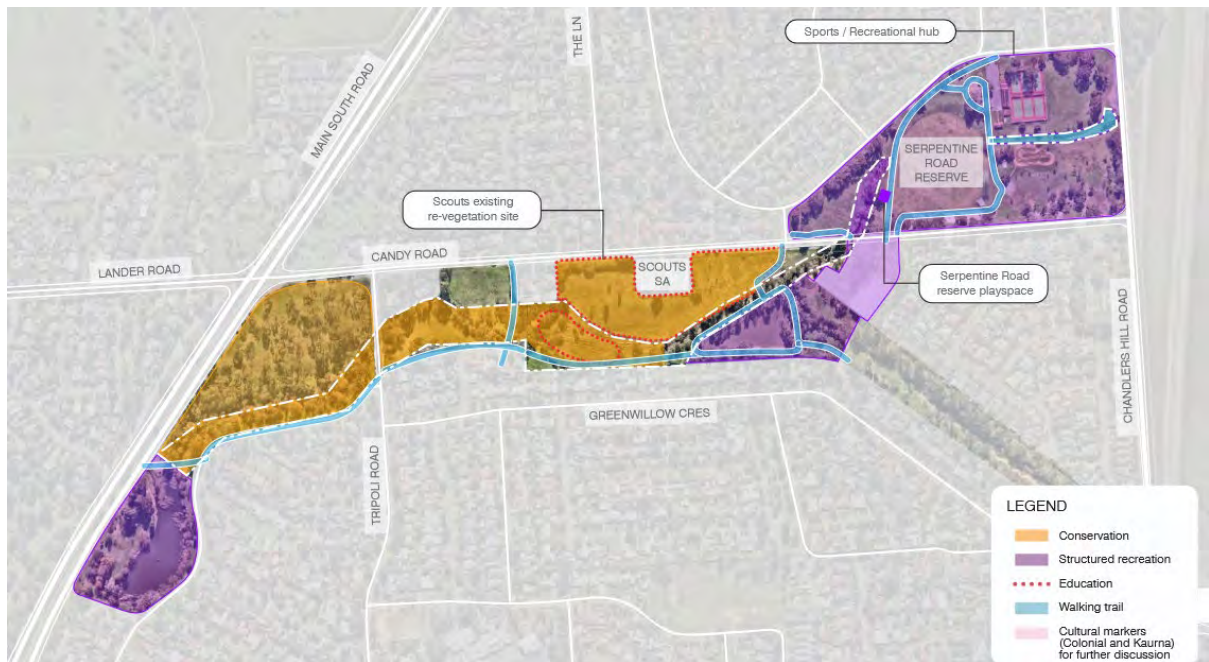


Figure 10 Character zones for Serpentine Creek

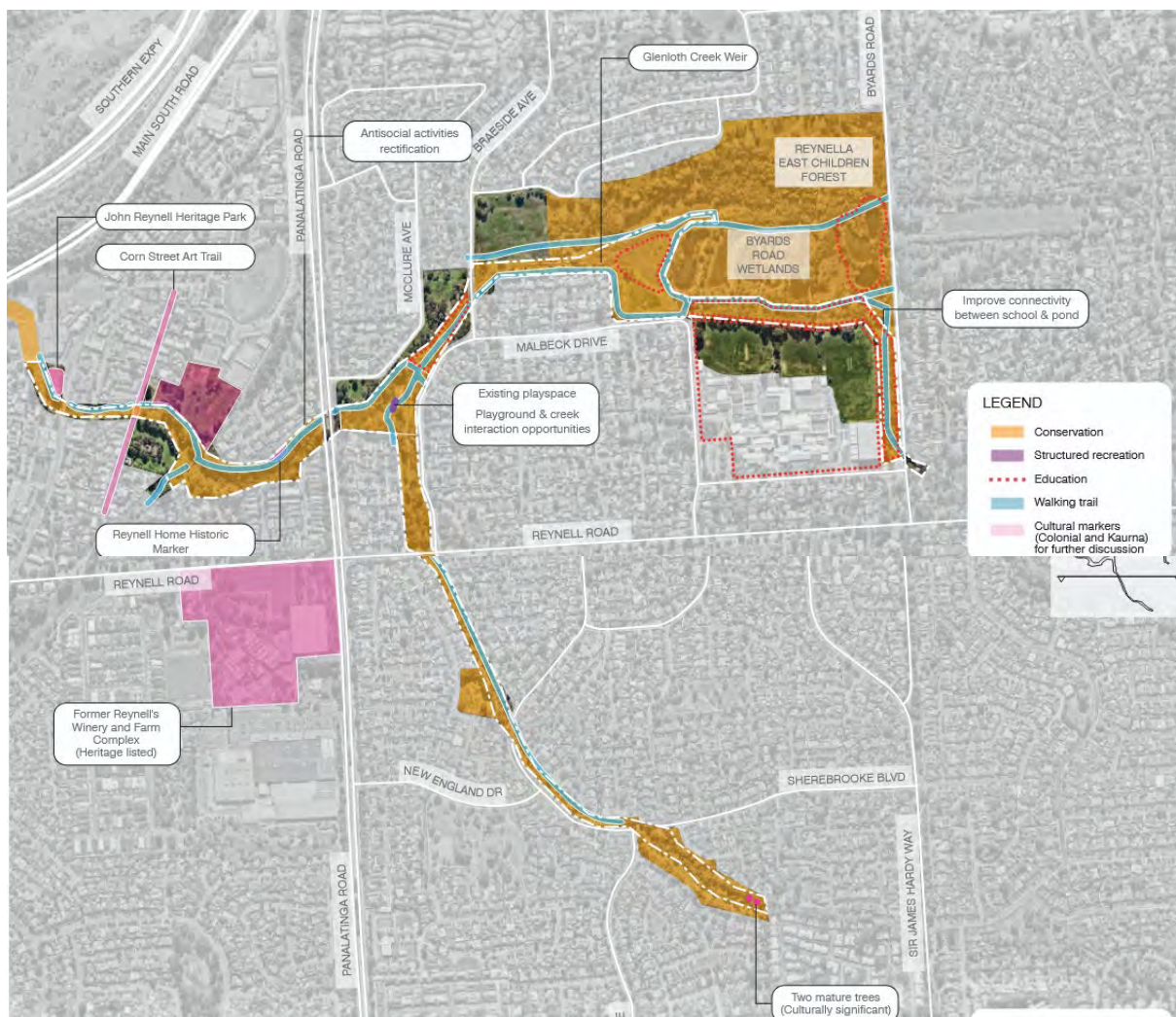


Figure 11 Character zones for Panalatinga Creek

4 Engagement

The community engagement process is a fundamental and ongoing part of this project. The proposed concept design builds on feedback gathered from two previous rounds of Traditional Owner, community, and stakeholder engagement workshops and site meetings.

The first round of consultation, between August 2024 and February 2025, informed the development of the Biodiversity Sensitive Urban Design (BSUD) report. The second round occurred between October 2024 and December 2025. The 2024 engagement process and outcomes are described in detail by RMIT University (2025).

In 2024, targeted workshops and site visits were held with Kurna Traditional Owners. The focus was to outline the vision for the project and aspirations for the outcomes.

Community engagement was also conducted at ‘creek meet’ events, workshops and school events in 2024 to promote awareness of the project and to receive ideas and aspirations for project outcomes.

In late 2025, targeted sessions (workshop and site walks) were held with Kurna Traditional Owners where the approach to design was discussed and the process of delivery outlined. In addition, the habitat types, particular plant species and sites where significant interventions are planned were visited. Outcomes from those sessions was general support for the project, the need to continue engagement as the project progresses, and the need for longer-term thinking regarding the management of the waterways and surrounds over a longer time scale.

More recent community engagement for this draft concept design was undertaken in March and April 2026, including two community drop-in sessions. Invitations to the drop-in sessions were also extended to Kurna Traditional Owners and other key stakeholders. The sessions were well attended, with a total of 53 community members participating, demonstrating strong community interest in and support for the proposed ecological restoration works.

All feedback from the March–April 2026 engagement has been reviewed and incorporated into the concept design, where feasible and appropriate.

5 Concept designs

Concept designs for the two creeks are shown in Figure 1 and Figure 2. The designs followed the design principles set out for the project (Section 2.1) and are also considered to be consistent with the funding grant objectives (Section 1). Table 8 outlines the key features of the concept design and how they relate to the funding objectives and design principles.

In addition to the concept design plans, renders of three areas were produced for consultation purposes to provide an artist’s impression of what the areas will look like once the project is complete. These were developed for:

- Pond at Serpentine Reserve in O’Halloran Hill
- Pond at Braeside Avenue, Reynella East
- Pond at Malbeck Park in Reynella East.

These images are shown in Figure 12, Figure 13 and Figure 14.



Figure 12 Artist impression of a pond in Serpentine Reserve



Figure 13 Artist impression of a pond in Braeside Avenue



Figure 14 Artist impression of a pond in Malbeck Park

Table 8 Concept design elements and how they relate to the funding objectives and design principles

Design element	Design principle(s)	Funding grant objective(s)	Comments
Sedimentation ponds	3. Support biodiverse waterways	2. Improve water quality	Located at strategic locations to capture piped stormwater inflows to the creeks, they will reduce pollutant loads along the waterways.
Seasonal (ephemeral) wetlands	3. Support biodiverse waterways 4. Support biodiversity hotspots	1. Improve riparian and aquatic habitat 2. Improve water quality	Planting out natural boggy areas with native plants will promote stormwater filtration and provide habitat for key fauna.
Creek naturalisation	1. First Nations connections 2. Aim to heal Country 3. Support biodiverse waterways 5. Create spaces to connect with nature	1. Improve riparian and aquatic habitat 2. Improve water quality & in-stream connectivity	Removing concrete invert channels and extensive revegetation aims to heal Country to support biodiversity outcomes.
Woody weed removal	6. Holistic approach to managing waterways 7. Long-term thinking for creek restoration	1. Improve riparian and aquatic habitat 2. Improve water quality	Removal of weeds will enable revegetation with native species that enhances local biodiversity.
In-stream native plantings	3. Support biodiverse waterways 4. Support biodiversity hotspots	1. Improve riparian and aquatic habitat 2. Improve water quality	Improves water quality, stream stabilisation and in-stream habitat and biodiversity.
Riparian native plantings	3. Support biodiverse waterways 5. Create spaces to connect with nature	1. Improve riparian and aquatic habitat 3. Improve urban green space	Stabilises the banks, provides habitat connectivity along the waterways.
Education (environmental) areas	5. Create spaces to connect with nature 7. Long-term thinking for creek restoration	3. Improve urban green space	Creating a learning space near to the college and other education facilities on the edge of an ephemeral wetland provides environmental learning opportunities.
Interactive creek areas (nature play)	5. Create spaces to connect with nature	3. Improve urban green space	Creating interesting nature play using natural materials and native plantings will encourage interaction with the creek environment.
Erosion stabilisation	3. Support biodiverse waterways	2. Improve water quality	Addresses existing eroding sections of waterway to prevent further scour, vegetation losses and reduce sediment loads in the creeks
Wildlife friendly culvert crossings	3. Support biodiverse waterways	2. Improve in-stream connectivity	Providing wildlife pathways through existing culverts to provide possible connectivity along the waterway.
Walking paths in key areas	5. Create spaces to connect with nature	3. Improve urban green space	Improving pedestrian connectivity (and maintenance access) provides opportunities for passive recreation and ability to connect with nature.