

COASTAL WALKWAY UPGRADE

CONCEPT DESIGN - DRAFT

PREPARED FOR:
CITY OF MARION

DOC. NO.	ADL20043-LA-SK007
ISSUE	P1
DATE	14.10.2020
PREPARED BY	KL
APPROVED BY	TC



Bondi to Bronte Coast Walk Extension. Calga Reserve & Waverley Cemetery
Sydney NSW, 2010-2018

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Introduction



Background

The Marion Coastal Walkway covers an 8km section from Marino to Hallett Cove and was constructed in the mid-late 1990's. The City Of Marion's Coastal Walkway Plan provides a renewal plan that priorities sections for upgrade and repair. A high priority has been placed on Cell 5 (Grey Rd Gully), Cell 6 (Kurnabinna Gully) and Cell 10 (Field River).

This walkway has strategic importance as a key link in the 70km Coast Park Trail from North haven to Sellicks Beach vision. The upgrade works will enable it to become an important and iconic connecting piece to other major open space networks, including Marino Conservation Park, Hallett Cove Conservation Park and Glenthorne National Park. Additionally, the walkway upgrade will contribute to the social and economic prosperity of the region, while improving the health and wellbeing of the community by providing more opportunities for people to connect with nature.



Site Assessment

Cell 5 – Grey Rd Gully

Site Context

Access: 250m section of walkway between Grey Rd and Nungamoora Street that crosses Grey Rd Gully. Access to walkway from Grey Rd and Nungamoora St.

Flora and Fauna:

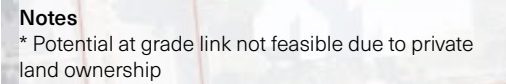
- Weeds: Vegetation is heavily impacted by weeds, including grass and forb species, with seven species of declared weeds spread widely throughout.
- Native Vegetation: Four native Vegetation Associations occur, ranged in condition from poor to fair.
- Threatened Flora: Two threatened flora species occur at the northern end of Cell 5.

Cultural Heritage: There were no Aboriginal archaeological sites, objects and remains, or sites of significance according to Aboriginal tradition, archaeology, anthropology or history identified during the cultural heritage survey. It is recommended that all staff and contractors are provided with a stop work/site discovery procedure in the event of an unexpected find. A copy of the procedure should also be on display in the site office. Refer Appendix A: Draft Cultural Heritage Report.

Geotechnical: The Gully is steep with erosion concerns and topsoil loss due to stormwater pipe outlets, hard surface runoff and residential development adjacent gully edge. Some uncontrolled fill exists at the “upstream” origin of the gully.



Opportunities & Constraints



Site Assessment

Cell 6 – Kurnabinna Gully

Site Context :

Access: 450m section of walkway from Nungamoora Street to The Esplanade adjacent Peera Street.

Flora and Fauna:

- Weeds: Vegetation is heavily impacted by weeds, including grass and forb species, with seven species of declared weeds spread widely throughout.
- Native Vegetation: Three native Vegetation Associations occur, which ranged in condition from poor to fair.
- hreatened Flora: No threatened flora were recorded in this Cell during the field survey. However, it is possible that four species may occur that were not detected due to survey limitations.

Cultural Heritage: There were no Aboriginal archaeological sites, objects and remains, or sites of significance according to Aboriginal tradition, archaeology, anthropology or history identified during the cultural heritage survey. It is recommended that all staff and contractors are provided with a stop work/site discovery procedure in the event of an unexpected find. A copy of the procedure should also be on display in the site office. Refer Appendix A: Draft Cultural Heritage Report.

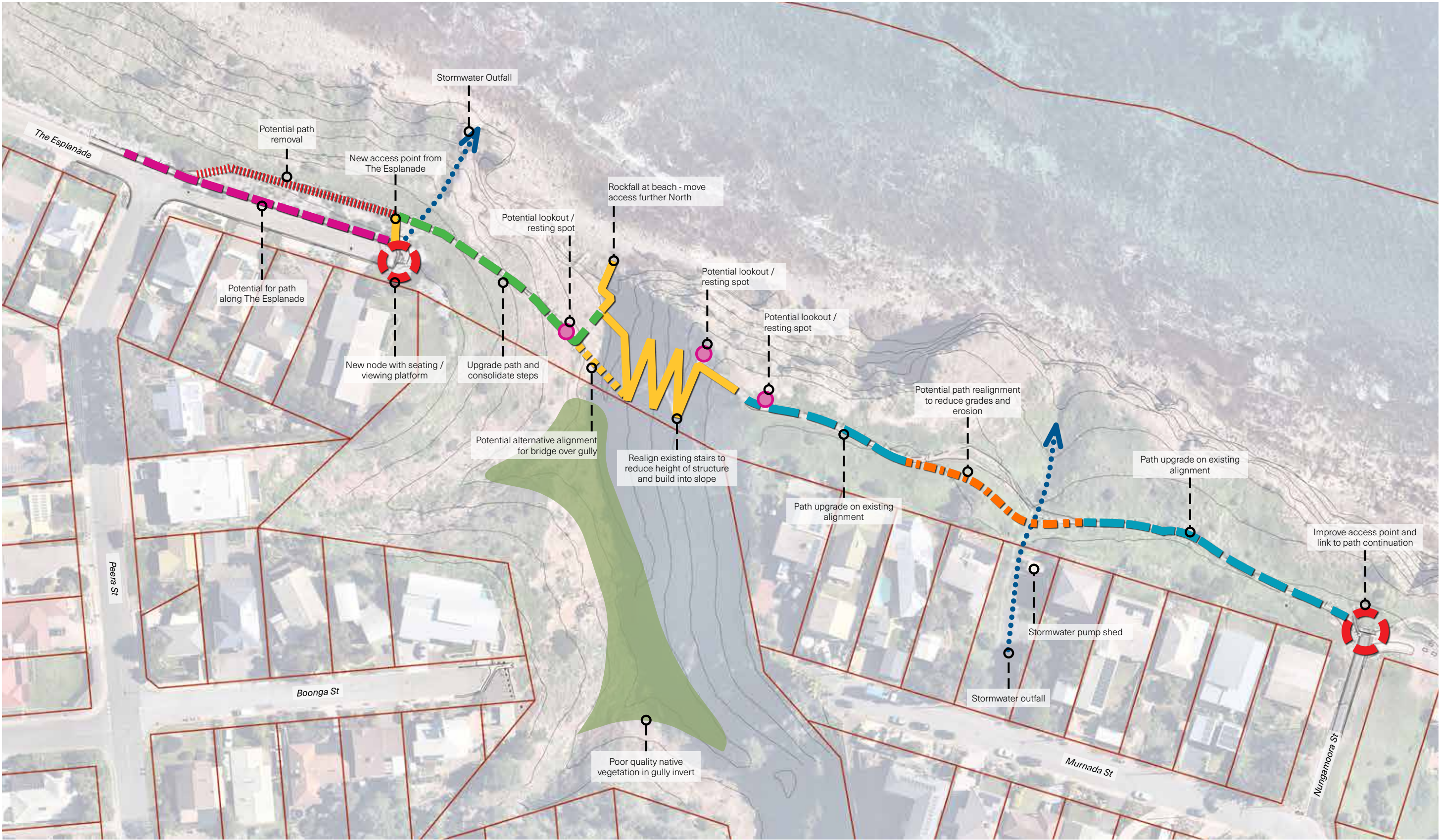
Geotechnical: The Gully is steep with erosion concerns due to stormwater pipe outlets and hard surface runoff. Sections of the southern cliff face near wave cut platform show signs of instability.



Site Assessment

Cell 6 – Kurnabinna Gully

Opportunities & Constraints



Site Assessment

Cell 10 – Field River

Site Context:

Access: 850m walkway that links Grand Central Avenue to River Parade, around Field River via Osprey Court and Cormorant Drive and connecting back to existing Coastal Walkway link south of Field River.

Flora and Fauna:

- Weeds: Vegetation is impacted by weeds, including grass and forb species, with seven species of declared weeds spread widely throughout.
- Native Vegetation: Seven native Vegetation Associations occur, with the remainder of the area composed of non-native grassland or woodland and revegetation areas.
- Threatened Flora: Two threatened flora species occur at the northern end of Cell 5.
- Threatened and migratory fauna: Nine species of threatened or migratory species are known to or possibly utilise the beach area. Three threatened species are known to or possibly utilise mature, flowering trees in Cell 10.

Cultural Heritage: Registered Aboriginal sites exist. Refer Cultural Heritage Report commissioned by City of Marion.

Geotechnical: Extensive coastal erosion of the sand dune evident to the south of Field River, with wave action impacting on underlying alluvial clay bench. Imported rock rip rap has been placed along this southern section to assist in controlling erosion of the sand dune toe, which extends northward from an existing boat ramp.

A northern sand dune, between Heron Way and River parade, is quite steep 1V:1H to 1V:1.5H with sand drift fencing located oceanside.



Cell 10 – Field River

Connection to Coastal Walkway

Alternative path above high water through existing vegetation

Extensive rock zone at high water mark

Hooded Plover habitat

Boat ramp crossing to be considered

Pontetial path alignment Option 1 recommended by: Birdlife Aus EBS T + M

Landward dune in poor condition and weed infested

Overlooking, privacy and safety concerns

Foredune in moderate condition with intact Coastal Tussock Grasslands ('Benchmark Community')

Pontetial path alignment Option 2

Existing path to be retained

Path removal recommended by Birdlife Aus

Field River

River Parade

St Vincent Ave

Osprey Ct

Existing path to be retained

Hooded Plover breeding area

2018 Hooded Plover nesting site

Consideration of exposed foredune

Unimpeded wave action down boat channel

Moderate habitat value

Stair access to remain recommended by Birdlife Australia

Lookout / resting spot

Access removal recommended by Birdlife Aus

Hooded Plover breeding area

2018 Hooded Plover nesting site

Potential path alignment Option 1a (Above 2100 sea level rise risk)

Poor to moderate condition with naturally occuring degraded Coastal Wattle

Boardwalk ramp for accessibility

2100 sea level rise risk 4.7m AHD

Hooded Plover habitat

Connection to Coastal Walkway

Potential path alignment Option 1b

Dune in good condition and 91+% native to exotic ratio

Access removal recommended by Birdlife Aus

Formalize access path

Grand Central Ave

Heron Way

Poor condition with high weed cover (including garden scapes from adjacent dwellings) and builder's rubble/fill, erosion and water runoff

Sewer alignment (to be confirmed)

Overlooking, privacy and safety concerns from residents

Access removal recommended by Birdlife Aus

Design Principles



Iconic, Accessible & Robust

- Celebrate the unique geology in the form and materiality of new structures, furniture and interpretive signage
- Provide a walkway that maximise accessibility and allows for safe, convenient and legible movements
- Utilise durable, yet aesthetic materials suitable for marine environments to maximise asset life



Site Specific & Grounded

- Protect the privacy and security of properties directly facing the walkway and encourage passive surveillance
- Address steep and variable grades to minimise long flights of stairs and steep ramps
- Influence visitor behaviour through innovative design solutions and CPTED principles



Environmentally Sensitive

- Establish native revegetation for the benefit of local flora and fauna
- Protect and enhance existing wildlife habitat and design appropriate public interventions to ensure ecosystems thrive and are sustainable
- Minimise vulnerability to erosion, extreme weather events and predicted sea level rise risks



Connecting With Nature

- Provide opportunities for users to learn about the natural environment
- Support and enhance local identity to promote sense of stewardship and ownership for the community
- Provide suitable opportunities to access connecting open space networks and beaches

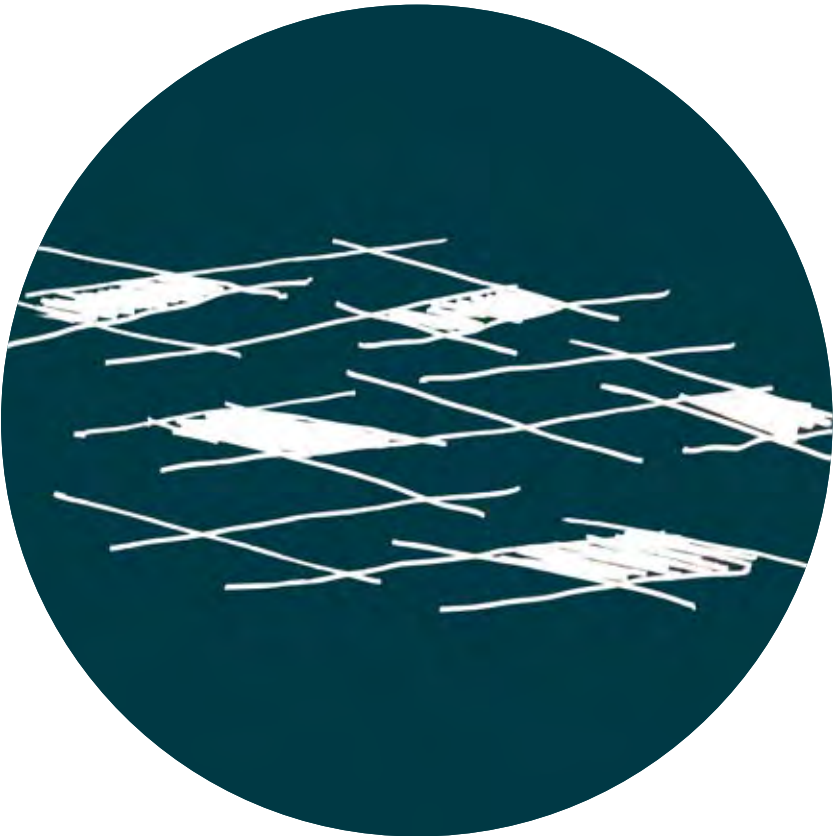


Cultural Values

- Engage with Kaurana Peoples to undertake Cultural Heritage survey of Cells 5 & 6
- Celebrate the rich layers of cultural history through considered and sensitive interpretations

Inspiration

The Coastal Walkway transitions through unique and important cultural and geological heritage as it winds through Hallett Cove.



Striations

Layered platforms and steps

At Black Cliff in the Hallett Cove Conservation Park, the smoothed and striated glacial pavement found in 1875 by Professor Ralph Tate, led to the realisation that South Australia has been subjected to an Ice Age some 280 million years ago. We envision the walkway to crisscross with dramatic, striking angles, working close to the gullies steep slopes to represent the striations.



Erratics

Moments in the landscape

Large quartzite boulders carried in the glacier from the Victor Harbour area and dropped by the melting ice sheet, are found throughout the Conservation Park and beach. The erratics presents an opportunity to breakaway from standard form and materiality, with embellishments of design to add interest and whim.



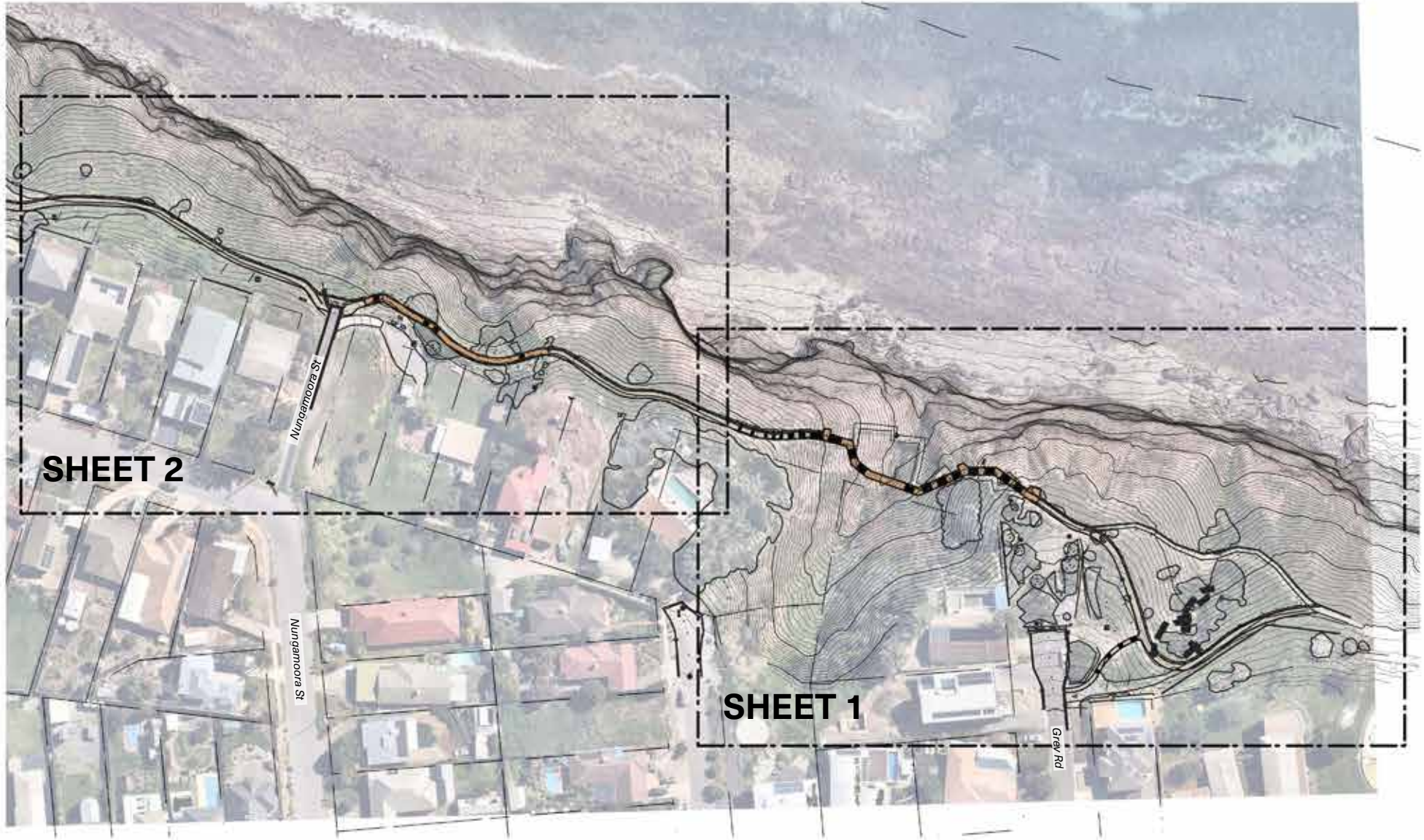
Tjibruke

Connection to Country Tjibruke Dreaming

An important Kaurna Creation Ancestor story, that traverses from Warriparinga in Bedford Park and follows the coastline to Rapid Bay and Cape Jervis. This story and the cultural importance of the area provides opportunities to implement cultural learning and interpretations.

Concept Design

Cell 5: Grey Road Gully



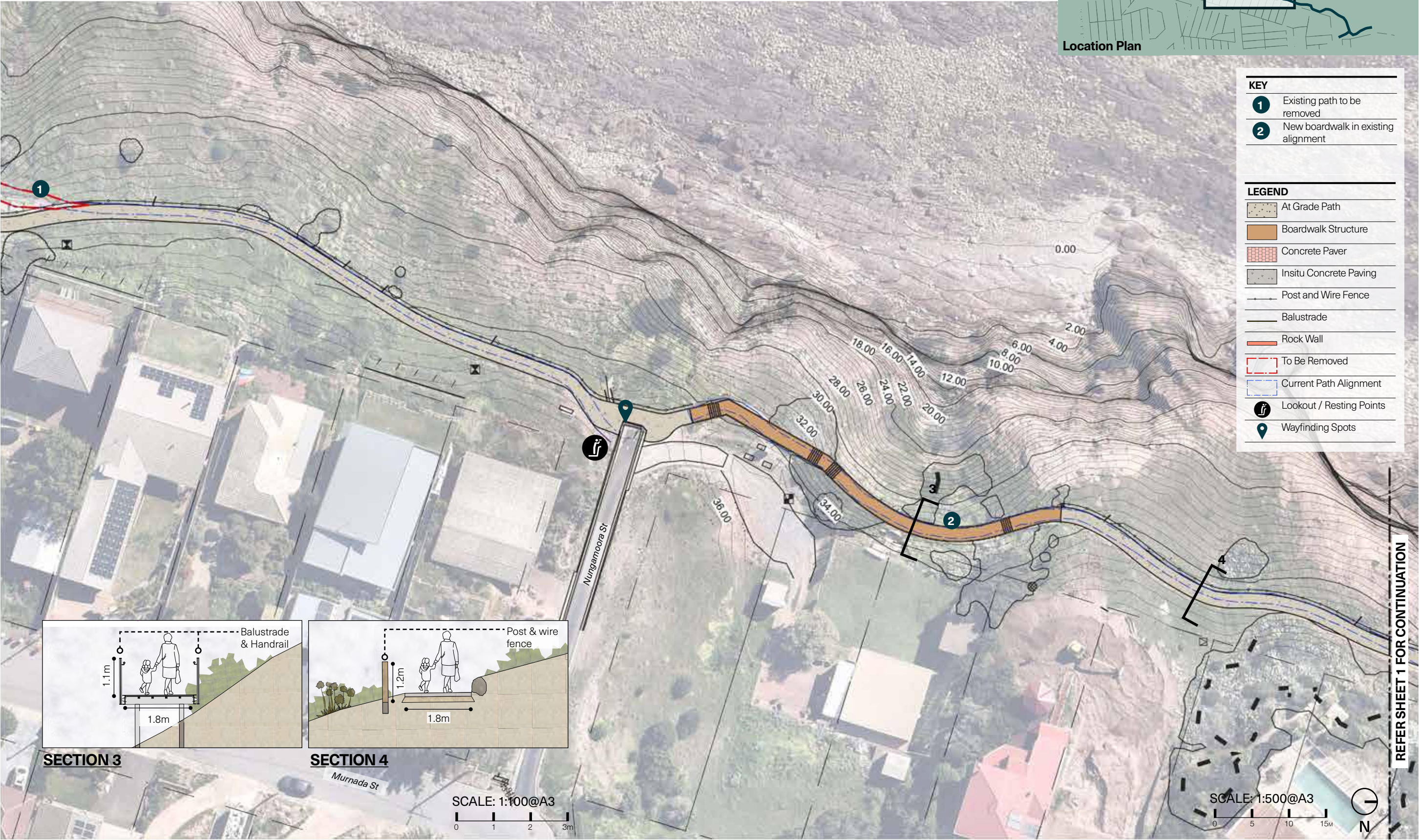
Concept Design

Cell 5: Grey Road Gully - Sheet 1



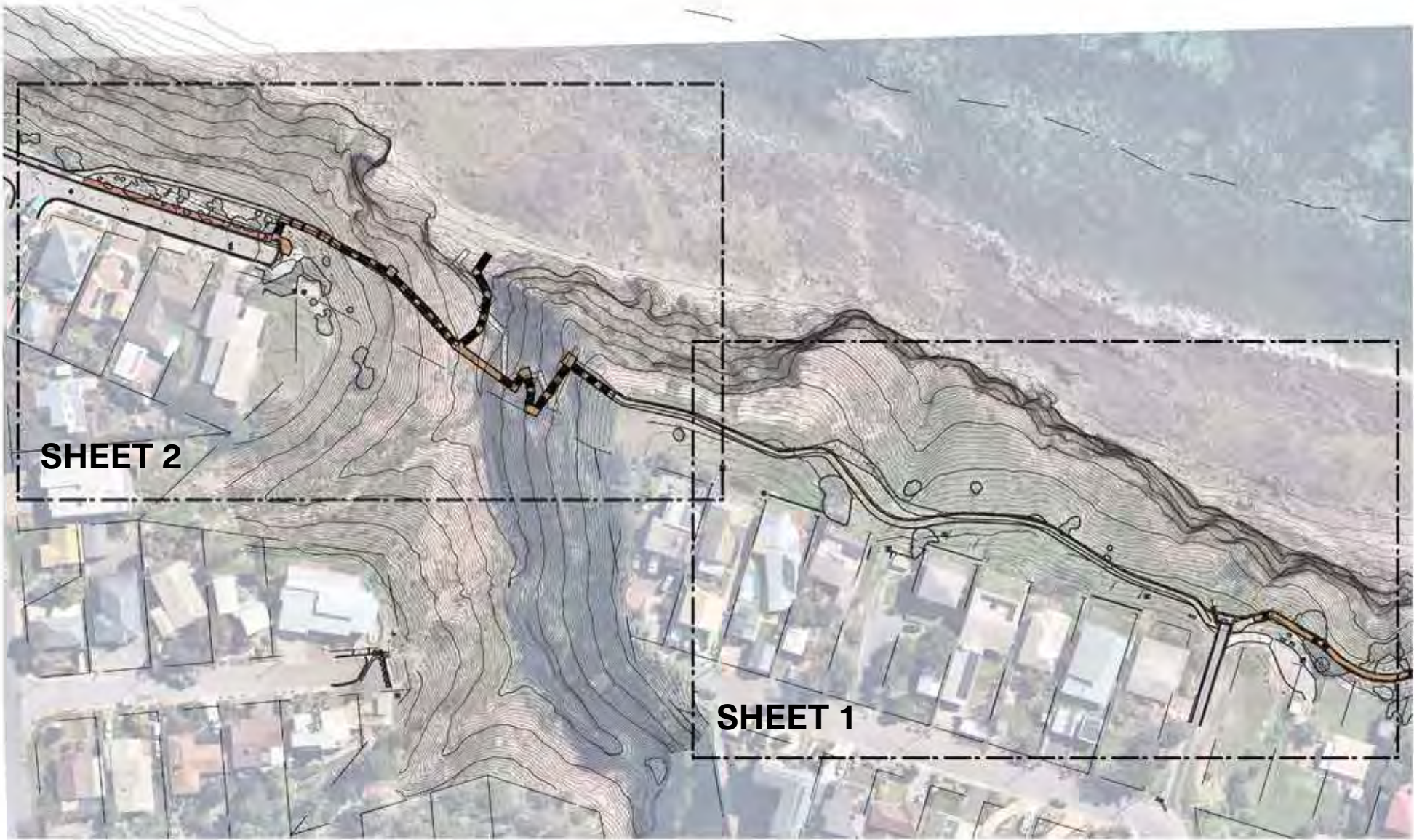
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Cell 5: Grey Road Gully & - Sheet 2



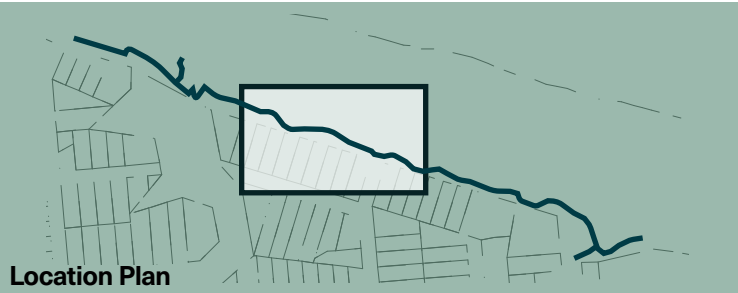
Concept Design

Cell 6: Kurnabinna Gully

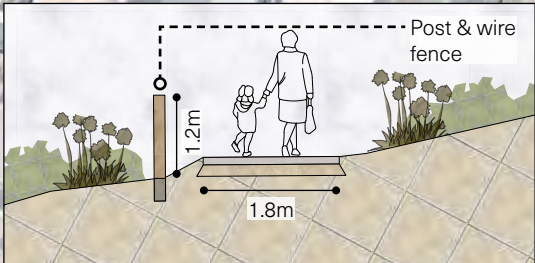


Concept Design

Cell 6: Kurnabinna Gully - Sheet 1

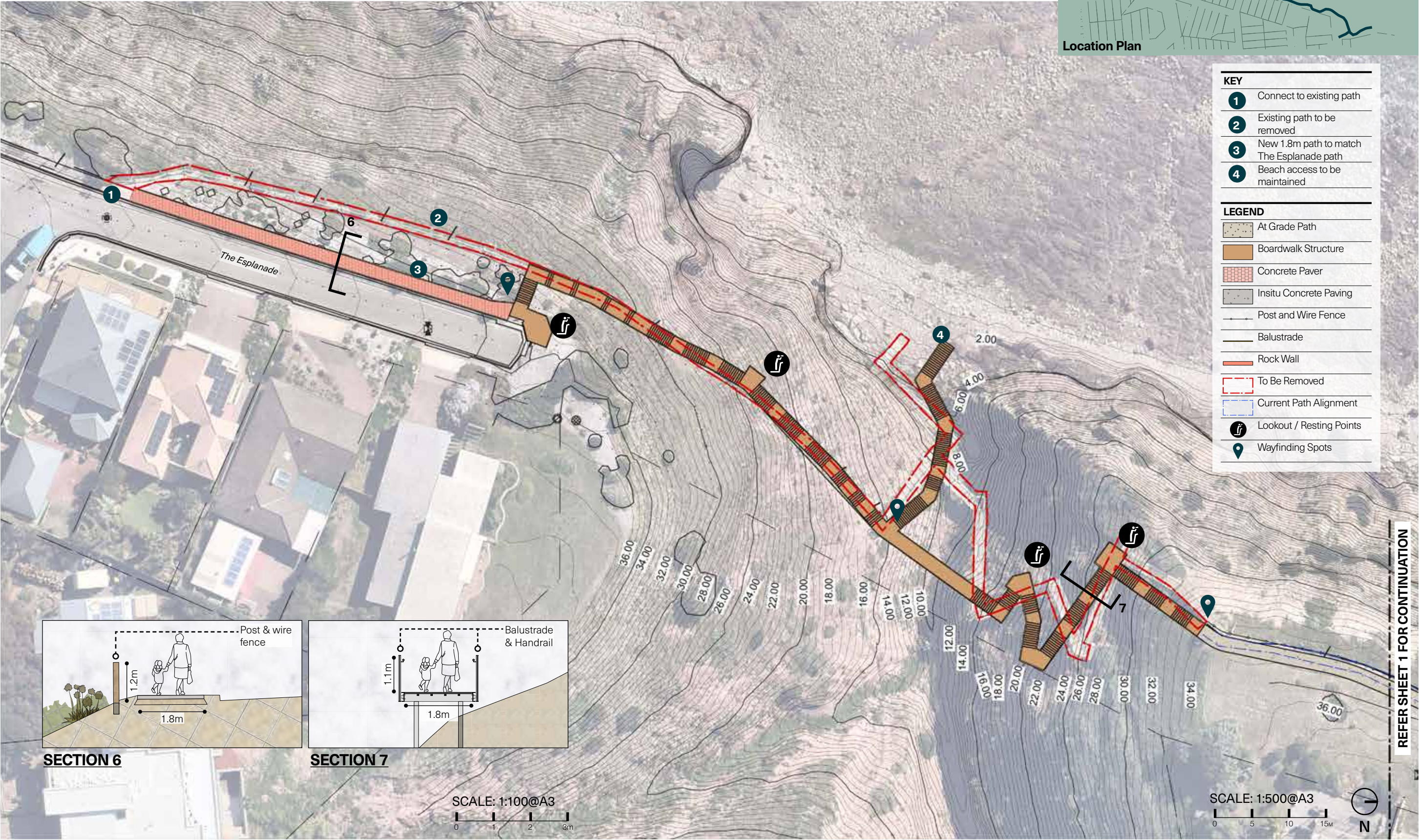


KEY	
1	Existing path to be removed
2	New boardwalk in existing alignment
LEGEND	
	At Grade Path
	Boardwalk Structure
	Concrete Paver
	Insitu Concrete Paving
	Post and Wire Fence
	Balustrade
	Rock Wall
	To Be Removed
	Current Path Alignment
	Lookout / Resting Points
	Wayfinding Spots



Concept Design

Cell 6: Kurnabinna Gully - Sheet 3



Concept Design

Cell 10: Field River



Concept Design

Cell 10: Field River - Sheet 1



Concept Design

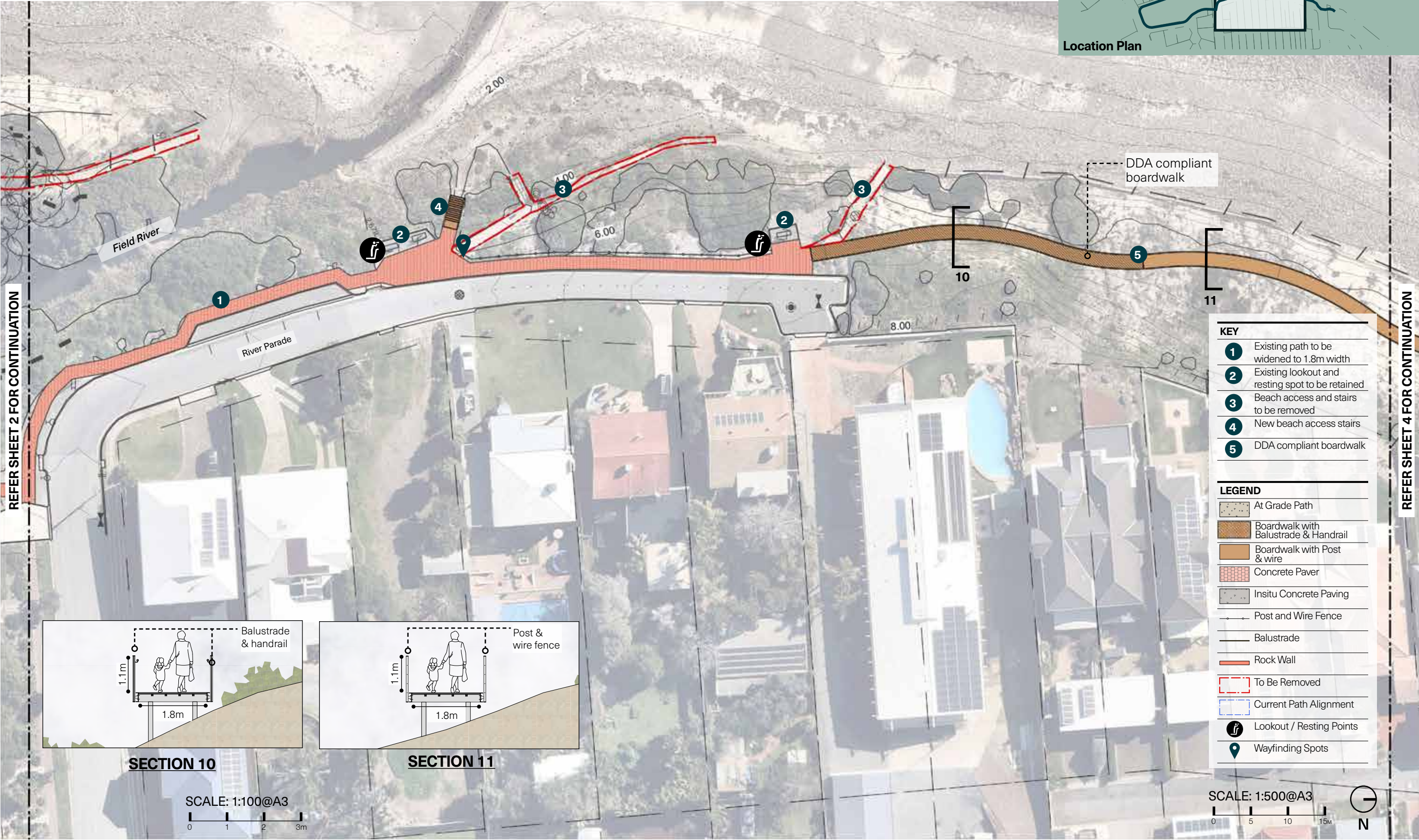
Cell 10: Field River - Sheet 2



Location Plan

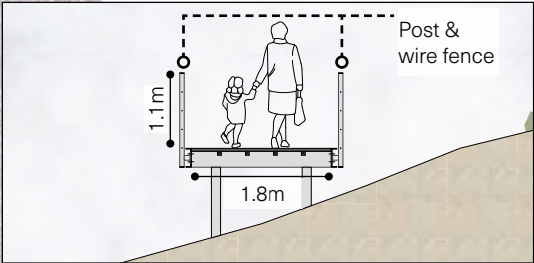
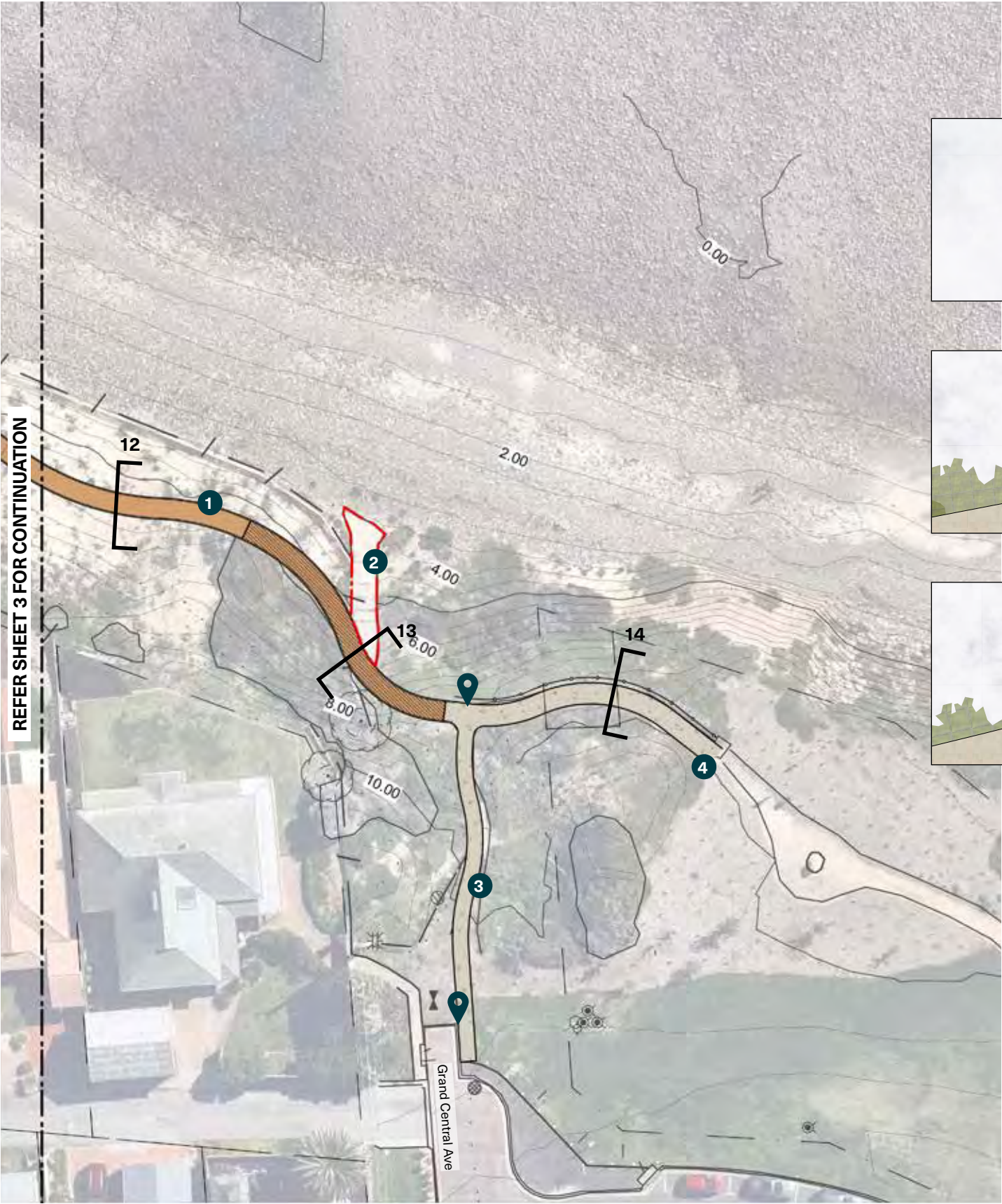
Concept Design

Cell 10: Field River - Sheet 3

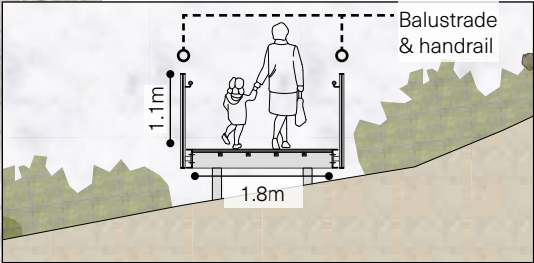


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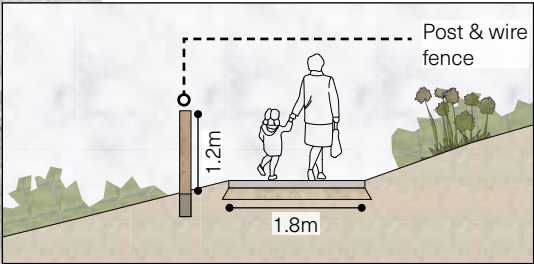
Cell 10: Field River - Sheet 4



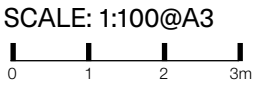
SECTION 12



SECTION 13

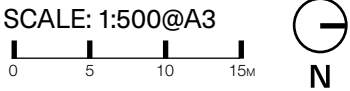


SECTION 14



KEY	
1	DDA compliant boardwalk
2	Beach access and stairs to be removed
3	Formalise access path from Grand Central Ave
4	Connect to existing path

LEGEND	
	At Grade Path
	Boardwalk with Balustrade & Handrail
	Boardwalk with Post & wire
	Concrete Paver
	Insitu Concrete Paving
	Post and Wire Fence
	Balustrade
	Rock Wall
	To Be Removed
	Current Path Alignment
	Lookout / Resting Points
	Wayfinding Spots



Concept Design

Cell 10: Field River - Boardwalk Perspective



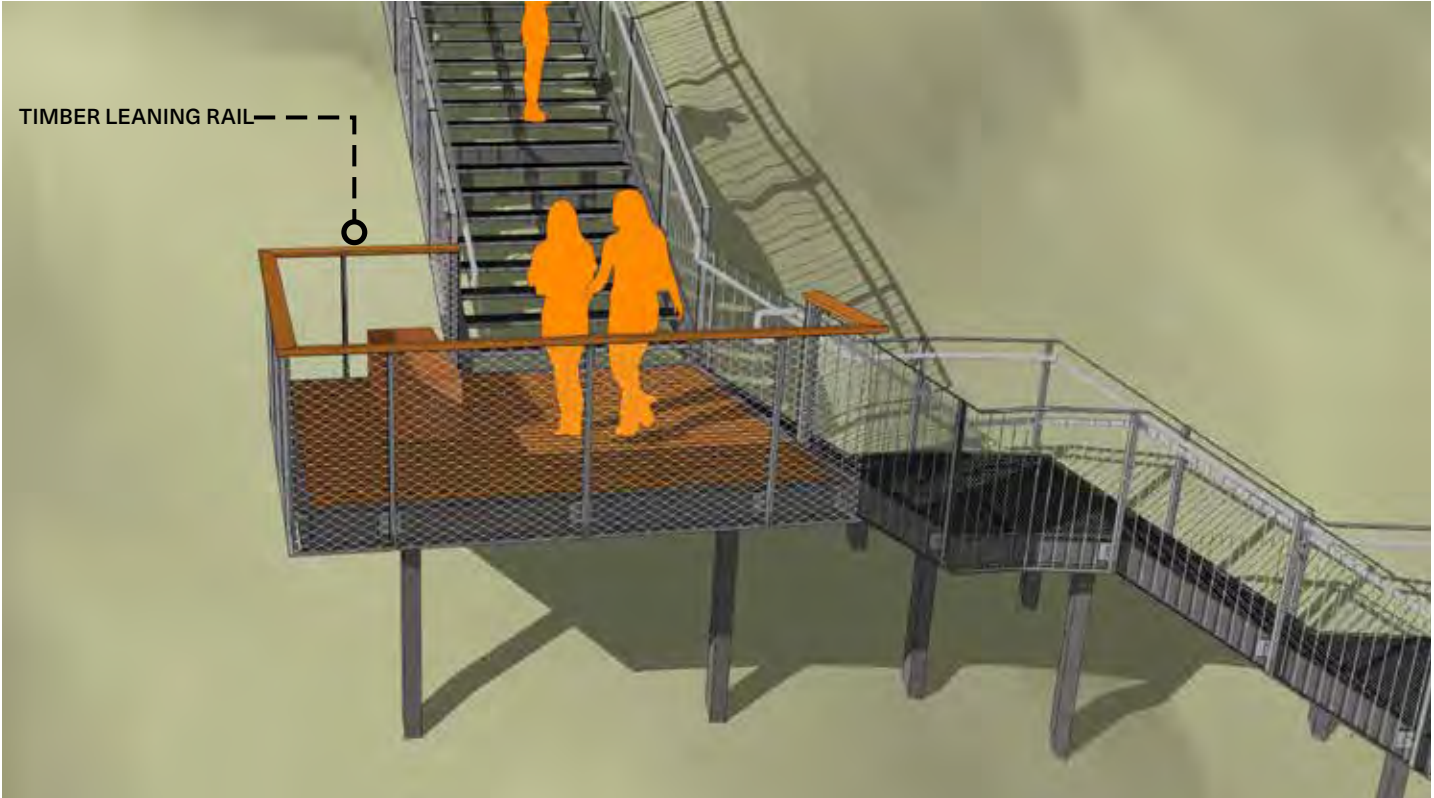
Concept Design

BOARDWALK STRUCTURE

OPTION 1



3D View 1



3D View 2

MATERIALS PALETTE

Balustrade



HOT DIP GALV. STEEL - PAINTED
STAIRS & LANDINGS



GRADE 316 STAINLESS STEEL WIRE MESH
LOOKOUTS

Decking



TIMBER
LOOKOUTS



FIBRE REINFORCED PLASTIC
STAIRS & LANDINGS

Structure



HOT DIP GALV. STEEL - PAINTED

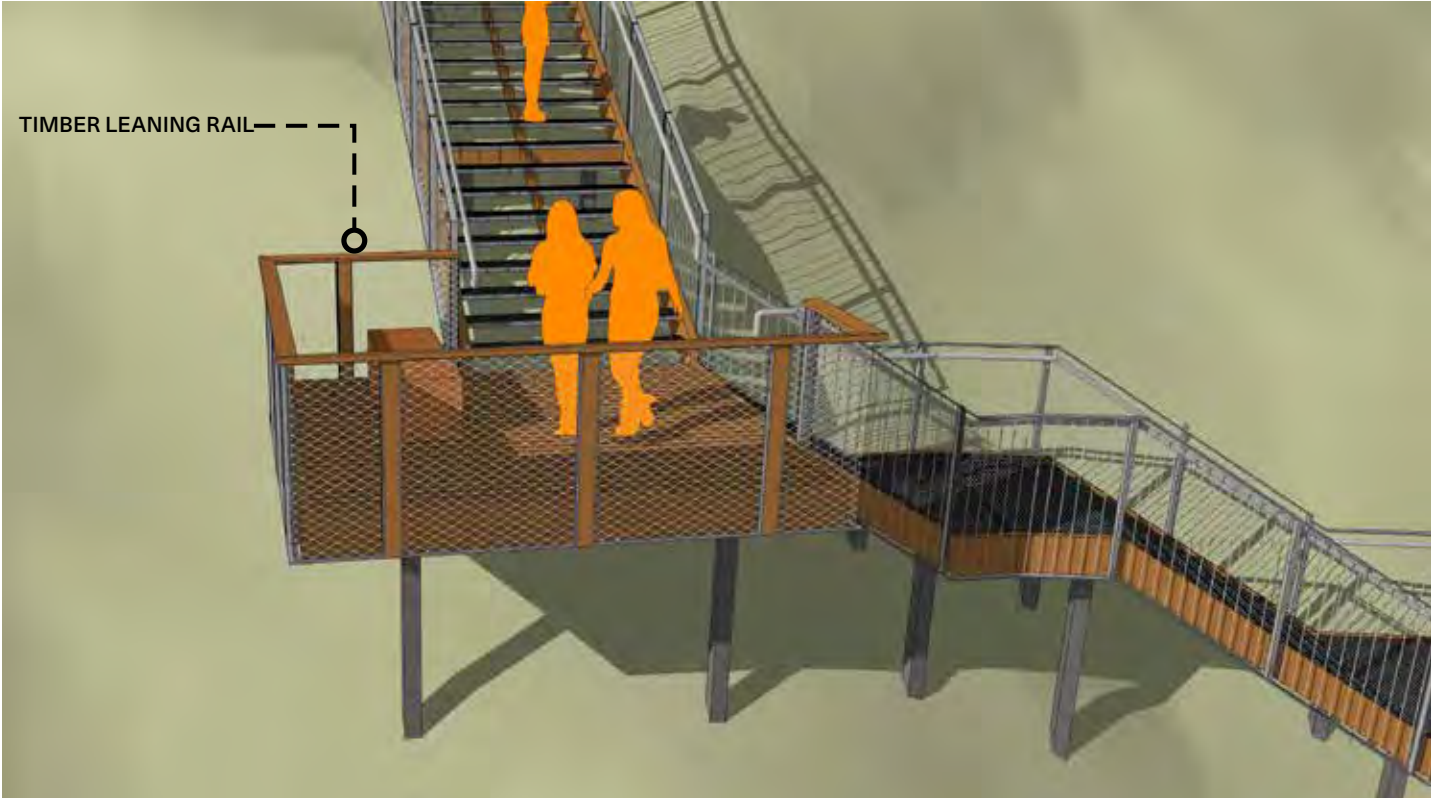
Concept Design

BOARDWALK STRUCTURE

OPTION 2



3D View 1



3D View 2

MATERIALS PALETTE

Balustrade



TIMBER & HOT DIP GALVANISED STEEL
STAIRS & LANDINGS



GRADE 316 STAINLESS STEEL WIRE MESH
LOOKOUTS

Decking



TIMBER
LOOKOUTS



FIBRE REINFORCED PLASTIC
STAIRS & LANDINGS

Structure



FIBRE REINFORCED PLASTIC & TIMBER FACADE

Materials Palette



At Grade Path

Paving Options



Exposed Aggregate Concrete



Compacted Gravel



Concrete Paver



Mortared Stone

Furniture and Fixtures



Timber Post and Wire Fence



Boulder Rock Wall



Seating



Interpretive Signage



Wayfinding Signage



Public Art

Appendix A: Draft Cultural Heritage Report

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Marion Coastal Walkway Upgrade

Aboriginal Cultural Heritage Report

Marion Coastal Walkway Upgrade Aboriginal Cultural Heritage Report

22 September 2020

Version 1

Prepared by EBS Heritage for Aspect Studios

Document Control					
Revision No.	Date issued	Authors	Reviewed by	Date Reviewed	Revision type
1	22/09/2020	L. Salisbury	J. Carpenter	24/09/2020	Draft

Distribution of Copies			
Revision No.	Date issued	Media	Issued to
1	24/09/2020	Electronic	David Guy, Aspect Studios; Shane Wanganeen, RAWsa Pty Ltd.

EBS Heritage Project Number: HX200701

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CITATION: EBS Heritage (2020) Marion Coastal Walkway Upgrade Aboriginal Cultural Heritage Report. Report to Aspect Studios. EBS Heritage, Adelaide.

Cover photograph: View south from Grey Road Gully.

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GLOSSARY AND ABBREVIATION OF TERMS

AH Act	<i>Aboriginal Heritage Act 1988</i>
DEW	Department for Environment and Water
DPC-AAR	Department of the Premier and Cabinet – Aboriginal Affairs and Reconciliation
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
HP Act	<i>Heritage Places Act 1993</i>
ILUA	Indigenous Land Use Agreement
km	kilometre(s)
KNCHA	Kaurna Nations Cultural Heritage Association
m	metre(s)
NT Act	<i>Native Title (South Australia) Act 1994</i>
SA	South Australia(n)
SAM	South Australian Museum
the Council	South Australian Heritage Council

EXECUTIVE SUMMARY

Aspect Studios has been engaged by the City of Marion to undertake a planning investigation, and a concept and detailed design for the Marion Coastal Walk Upgrade. The upgrade has been divided into sections and prioritised. The current priority requires investigation for Grey Road Gully (Cell 5) and Kurnabinna Gully (Cell 6).

EBS Heritage were engaged by Aspect Studios to undertake an Aboriginal cultural heritage desktop assessment and field survey as the project has now moved to the Design Phase. The aim of the desktop assessment and cultural heritage survey is to identify any Aboriginal sites or objects that may be within the two project areas and protected by the South Australian *Aboriginal Heritage Act 1988* (AH Act). The cultural heritage report will inform the planning process and assist the City of Marion and their contractors to identify and appropriately manage sites protected by the AH Act.

The Kurna Nations Cultural Heritage Association (KNCHA), as the Traditional Owners of the land on which the project will be undertaken, participated in the cultural heritage survey of Cell 5 and Cell 6.

Desktop Results

Hallett Cove is within the Kurna Peoples native title determination and the principal Aboriginal heritage legislation for the Marion Coastal Walk Upgrade is the *Native Title Act 1993*, *Native Title Act* (South Australia) 1994 (the NT Act) and the *Aboriginal Heritage Act 1988* (the AH Act).

Hallett Cove and the surrounding region has been shown to have a long history of Aboriginal land use with a large number of sites and objects being recorded throughout the greater area. In the project areas though, no Aboriginal sites, objects, cultural and/or spiritual histories have been listed on the Register of Aboriginal Sites and Objects. The closest registered site is approximately two kilometres (km) away at Field River.

The South Australian Museum Database contained 316 records for Hallett Cove, but only sparse details on their locations were provided. It was not possible to determine if any of the items were recovered from the two project areas.

Cultural Heritage Survey Results

Grey Road Gully (Cell 5)

No Aboriginal archaeological sites, objects and remains, or sites of significance according to Aboriginal tradition, archaeology, anthropology or history were identified during the cultural heritage survey.

Kurnabinna Gully (Cell 6)

No Aboriginal archaeological sites, objects and remains, or sites of significance according to Aboriginal tradition, archaeology, anthropology or history were identified during the cultural heritage survey.

Recommendations

In consultation with KNCHA representatives, the following recommendations are made for the Project:

Recommendation 1: Stop work/site discovery procedure

It is recommended that all staff and contractors are provided with a stop work/site discovery procedure in the event of an unexpected find. A copy of the procedure should also be on display in the site office. An example procedure has been provided in Appendix 1.

Recommendation 2: Aboriginal monitoring during ground works

It is recommended that Aboriginal Monitors should be engaged during ground works if the Grey Road Gully is cut into to provide a potential new link or potential alternative at grade link as shown in Figure 3. Although the AH Act does not mandate the requirement for monitoring during ground works, the survey area lies across a landscape that is considered culturally significant for the Kaurna people.

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1 INTRODUCTION

The Marion Coastal Walk is an approximately 8 km section between Marino and Hallett Cove and is part of the broader Adelaide Metropolitan Coast Park which extends along the coastline from Sellicks Beach to North Haven.

The Coastal Walk is to be upgraded with The City of Marion's Coastal Walkway Plan (2020) dividing the upgrade work into sections and prioritised. The current priority requires investigation for two sections; Grey Road Gully (Cell 5) and Kurnabinna Gully (Cell 6). An Aboriginal cultural heritage survey is required for each cell to assist with informing the project design. It is noted that the route for the walkway has not been determined at this stage, but the walkway route shall be entirely within public land such as designated Coastal or Road Reserve or in adjacent Council reserve land subject to consistency with relevant Community Land Management Plans.

1.1 Scope of works

The aims of the desktop research and cultural heritage survey are to:

- Engage and consult with all interested and available parties;
- Conduct a cultural heritage survey within the proposed Project Areas, in collaboration with identified and available stakeholders;
- Identify and record any Aboriginal sites or objects of heritage or potential heritage/cultural significance;
- Provide recommendations in relation to any potential impacts the proposed activities could have on locations of heritage significance in light of the City of Marion's responsibilities under the AH Act;
- Provide clearance for works to progress within the proposed project areas;
- Provide detailed management measures for acknowledging and protecting the cultural significance of any specific areas within the project area;
- Prepare a report and maps detailing the project findings.

1.2 Project location

Grey Road Gully (Cell 5)

The project area is between Grey Road and Nungamoora Street including the Grey Road Gully and currently consists of 250 metres (m) of shared use trail. The trail consists of the natural ground surface with timber steps and a large timber structure bridge network across Grey Road gully (Refer to Figure 1).

Kurnabinna Gully (Cell 6)

The project area is between Nungamoora and Peera Streets including Kurnabinna Gully and consists of 450 m of shared use trail. The trail consists of the natural ground surface with a large timber structure bridge network across Kurnabinna Road gully (Refer to Figure 2).

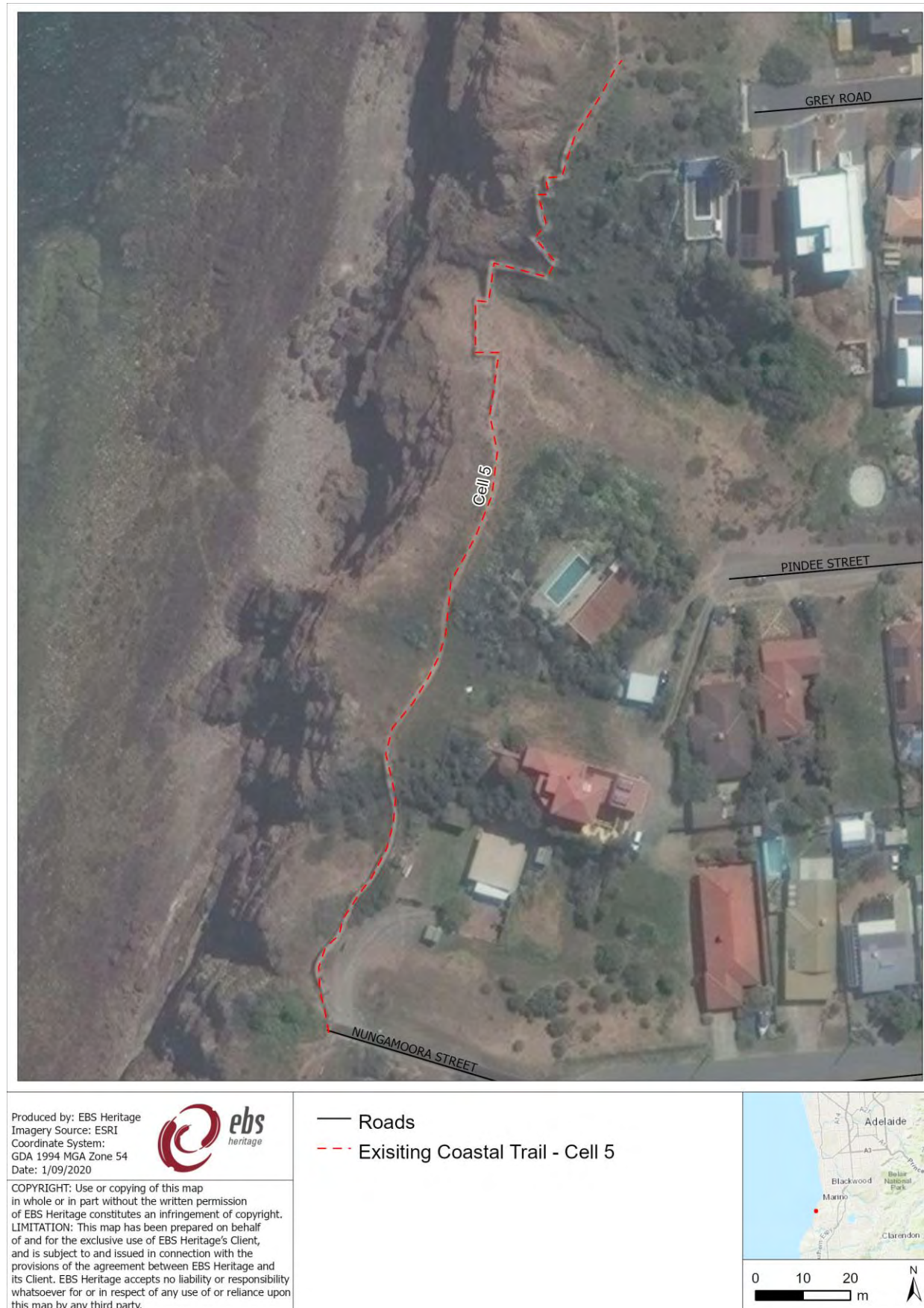


Figure 1. Existing coastal trail – Grey Road to Nungamoora Street (Cell 5).



Figure 2. Existing coastal trail – Nungamoora to Peera Streets (Cell 6).

1.3 Limitation of the report

This report was undertaken to the best archaeological practice and its conclusions are based on professional opinion. However limitations in historical documentation and archaeological methods make it difficult to accurately predict subsurface deposits. The findings expressed by EBS Heritage are based solely upon information in existence at the time of the assessment. It does not therefore warrant that there is no possibility that archaeological material will be located on site.

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2 COMPLIANCE AND LEGISLATIVE SUMMARY

2.1 Commonwealth legislation

2.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Environment Protection and Biodiversity Conservation Regulations 2000* provide a national scheme of environment and heritage protection and biodiversity conservation. Under the Act, a National Heritage List (for places outside of Commonwealth land) and a Commonwealth Heritage List (for places within Commonwealth land) have been established.

The EPBC Act specifies that any action that has, will have, or is likely to have a significant impact on a place of national culture and/or environmental significance must be referred to the Australian Government Minister for the Environment for approval.

2.1.2 *Native Title Act 1993*

The Commonwealth *Native Title Act 1993* provides a national system for the recognition and protection of native title. The Act recognises the existence of Indigenous land ownership tradition where connections to country have been maintained and where acts of government have not extinguished this connection.

Not all land is subject to native title and native title may be partly or wholly extinguished (Table 1).

Table 1. Native title land types.

Indicative land types which may be subject to native title:	
Vacant Crown land	Beaches and foreshores
State forests and national parks	Land held by the government agencies
Some pastoral leases	Land held in trust for Aboriginal communities
Unalienated Crown land public reserves	Seas, reefs, rivers and other waters that are not privately owned
Native title may be extinguished by:	
Privately owned freehold land including family homes and freehold farms	Valid grants of private freehold land or water
Residential or commercial leases	Exclusive possession of leases
Public works built before 23 December 1996	Mining dissection lease
Community purpose leases	Pastoral or agricultural leases that grant exclusive possession

2.2 SA State legislation – Aboriginal heritage

2.2.1 *Native Title Act (South Australia) 1994*

The *Native Title Act (South Australia) 1994* (NT Act) establishes a legal framework to manage and resolve the diversity in the rights and interests in lands and waters within South Australia and requires that a Register be kept of records of native title and claims to native title on land in the State. When certain activities or development is undertaken in areas where native title exists or may exist, the developer will need to consider the possible impacts of their actions on native title rights and interests.

2.2.2 Aboriginal Heritage Act 1988

The South Australian *Aboriginal Heritage Act 1988* (AH Act) is administered by the SA Department of Premier and Cabinet - Aboriginal Affairs and Reconciliation (DPC-AAR). The legislation ensures that any Aboriginal site, object of significance, or remains are protected, whether previously recorded or not.

The most applicable sections of the AH Act are detailed below:

- Section 21 - A person must not, without the authority of the Premier, excavate land for the purposes of uncovering any Aboriginal site, object or remains;
- Section 23 - It is an offence to 'damage, disturb or interfere' with an Aboriginal site, object or remains unless written authorisation is obtained from the Premier;
- Section 29(1)(b) – A person must not, without the authority of the Premier, remove an Aboriginal object from the State;
- Section 35 - Except as authorised or required by the Act, a person must not divulge information relating to an Aboriginal site, object, remains or Aboriginal tradition.

2.3 SA State legislation – Historical heritage

2.3.1 Heritage Places Act 1993

The *Heritage Places Act 1993* (HP Act) makes provision for the identification, recording and conservation of places and objects of historical heritage significance in SA and the SA Heritage Register documents places that are protected.

The HP Act is governed by the Department for Environment and Water (DEW) and the South Australian Heritage Council (the Council).

It is an offence to carry out the following without a permit from the Council:

- Section 26 - Excavate or disturb a State Heritage Place designated as a place of archaeological significance; or remove archaeological artefacts from such a place;
- Section 27 - Excavate or disturb any land (not designated as a place of archaeological significance) for the purpose of searching for or recovering archaeological artefacts of heritage significance; or excavate or disturb any land (not designated as a place of archaeological significance) knowing or having reasonable cause to suspect that the excavation or disturbance will or is likely to result in an archaeological artefact of heritage significance being discovered, exposed, moved, damaged or destroyed; and/or
- Section 28 - Damage, destroy or dispose of an archaeological artefact removed from a State Heritage Place designated as a place of archaeological significance (whether removed before or after the entry of that place in the Register) and to damage, destroy or dispose of an object entered in the Register (either as a provisional or confirmed entry).

The Act further stipulates that:

Section 36 - A person who intentionally or recklessly damages a heritage place or engages in conduct knowing that it will or might destroy or reduce the significance to a State Heritage Place can be fined. There is no penalty if damage results from an action authorised by an approval or authorisation under the *Development Act 1993*.

2.3.2 Planning, Development and Infrastructure Act 2016

The South Australian *Planning, Development and Infrastructure Act 2016*, often used in conjunction with the *Planning, Development and Infrastructure (General) Regulations 2017*, provides for matters that are relevant to the use, development and management of land and buildings, including by providing a planning system to regulate development within the State, rules with respect to the design, construction and use of buildings, and other initiatives to facilitate the development of infrastructure, facilities and environments that will benefit the community.

The Act requires a planning authority to refer a development application affecting a State Heritage Place or State Heritage Area to the Minister responsible for the HP Act. This can include applications relating to non-listed properties in the vicinity of a State Heritage Place where the work is considered to 'materially affect the context within which the State Heritage Place is situated'.

As per Part 8, Division 1, Section 129(3) of the Act, the following provisions may apply in relation to proposed development to be undertaken for the purposes of essential infrastructure -:

- (a) if the proposed development is to be undertaken within an infrastructure reserve—an assessment against the Planning Rules, and planning consent, are not required; and
- (b) if the proposed development is consistent with a standard infrastructure design and to be undertaken within an infrastructure reserve where that design is recognised as being permitted within that reserve—an accredited professional may (if qualified under this Act) act as a relevant authority for the purposes of granting any relevant development authorisation.

Essential infrastructure means —

- (a) Transport networks or facilities (including roads, railways, busways, tramways, ports, wharfs, jetties, airports and freight-handling facilities).

Infrastructure reserve means —

- (a) land identified in the Planning and Design Code as having a land use that is specified as being suitable for infrastructure; or
- (b) land that is subject to a statutory easement; statutory easement means an easement under an Act that is brought within the ambit of this definition by the regulations.

3 METHODOLOGY

3.1 Desktop assessment

3.1.1 *DPC-AAR Register of Aboriginal Sites and Objects search*

A search of the Register of Aboriginal Sites and Objects, maintained by DPC-AAR, was undertaken for both the project areas. The search identified the presence, or lack of, any reported or recorded sites as defined under Part 1, Section 3 of the AH Act;

Aboriginal site is an area of land;

- a) That is of significance according to Aboriginal tradition; and/or
- b) That is of significance according to Aboriginal archaeology, anthropology or history.

Aboriginal object means an object—

- a) of significance according to Aboriginal tradition; or
- b) of significance to Aboriginal archaeology, anthropology or history, and includes an object or an object of a class declared by regulation to be an Aboriginal object but does not include an object or an object of a class excluded by regulation from the ambit of this definition.

3.1.2 *Archival research*

Searches were conducted of the Australian Heritage Database, the South Australian Heritage Places Register, Australian Museum Anthropologic database, South Australian Museum database, and archives for images, newspaper clippings, journal entries and other primary sources that may contain information about the early uses of the area and early interactions between Aboriginal people and others.

3.1.3 *Previous work/consultancy reports*

A review of available heritage reports for the general region was undertaken, where applicable. These studies can provide a broad background of the region and provide information on the types and location of sites previously identified near the project area. Some reports remain restricted through confidentiality agreements so are unable to be accessed.

3.2 Archaeological survey

The survey objective is to locate and record any sites of significance to Aboriginal heritage and/ or tradition and if found sites will be recorded to a detail required for site cards to be lodged with DPC-AAR.

Prior to the survey, geographic information system data was uploaded to a handheld Global Positioning System unit for orientation in the field and for identification of the Project Area boundaries. Field maps illustrating the proposed development were created and distributed to the Traditional Owner groups prior to the survey commencing and hard copies were brought to site. A discussion on the background of the Project and proposed works was undertaken prior to the survey beginning.

Marion Coastal Walkway Upgrade Aboriginal Cultural Heritage Report

The archaeological component was carried out using a pedestrian survey, involving survey participants systematically inspecting the Project Areas on foot (Figure 3 and Figure 4), looking for archaeological sites and objects.

The survey commenced in Cell 6 at The Esplanade and Peera Street intersection and followed the trail north to the Kurnabirra Gully. Due to safety concerns the participants proceeded by vehicle to Nungamoora Street then walked south back along the trail to Kurnabirra Gully. Starting at Nungamoora Street the participants then walked north to Grey Gully. Again due to safety concerns the participants walked to Grey Road Gully then proceeded by vehicle to Grey Road walking south back along the walkway to Grey Road Gully.

On completion of the survey discussions were held with the KNCHA representatives to consider the results of the survey and to provide an opportunity for any concerns or issues to be raised and recommendations for the Project moving forward were noted.

DRAFT

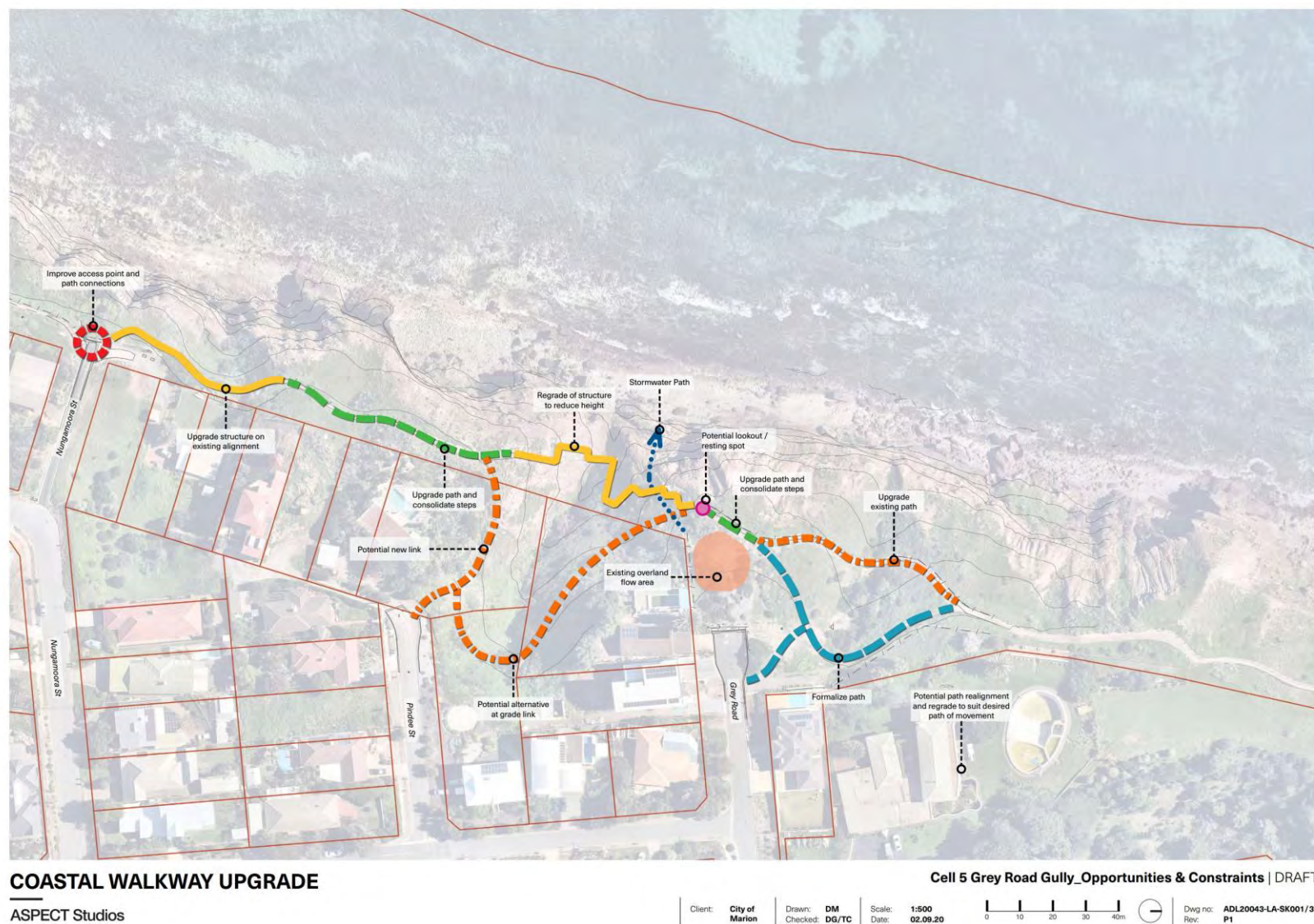


Figure 3. Proposed route for coastal walk - Grey Road to Nungamoora Street (Cell 5). Image provided by ASPECT studios.



Figure 4. Proposed route for coastal walk - Nungamoora Street to Peera Street (Cell 6). Image provided by ASPECT studios.

4 RESULTS

4.1 Native Title Claim

The National Native Title Register is established under Section 192 of the *Native Title Act 1993* and contains determination of native title made by the High Court of Australia, the Federal Court of Australia, or a recognised body such as South Australia's Supreme Court and the Environment Resources and Development Court. Native title recognises the rights and interests over land or waters where Aboriginal and Torres Strait Islander groups have practiced and continue to practice, traditional laws and customs prior to sovereignty.

The Native Title Register identifies the native title claimants as the Kaurna Peoples (Table 2) with native title rights existing for 17 parcels of land as noted in Schedule 3 of the Determination. None of these parcels are within the two project areas. As per Schedule 4 (5) of the Determination:

Native title rights and interests do not exist over any land and waters within the Determination Area other than those parcels listed at Schedule 3.

Native title is complex, and the City of Marion should seek legal advice if there is any uncertainty whether native title interests may exist over the project areas.

Table 2. Native Title determination.

Name	Tribunal File No.	Status	Determination Outcome	Registered Native Title Body Corporate
Kaurna Peoples Native Title Claim	SCD2018/001	Determined	Native title exists in parts of the determination area	Kaurna Yerta Aboriginal Corporation

Source: Register of Native Title Claims.

4.2 Indigenous Land Use Agreement

The Kaurna Peoples have an Indigenous Land Use Agreement (ILUA) which is a voluntary agreement between the native title group and The Attorney-General for the State of South Australia regarding the use and management of the determination land and waters (Table 5). When registered, ILUAs bind all parties and all native title holders to the terms of the agreement.

The Kaurna ILUA area is all of the land and waters the subject of the Determination and includes both the Native Title Land and the land and waters over which native title does not exist, as set out in the Determination. The ILUA covers about 3,470 square km in the vicinity of Adelaide, extending easterly from Gulf St Vincent to the foothills of the Mount Lofty Ranges.

Table 3. Registered ILUA.

Name	Tribunal file no	Status
Kaurna People Native Title Settlement ILUA	SI2018/004	ILUA registered 19 November 2018

Source: Register of Indigenous Land Use Agreements.

4.3 SA Museum database

The South Australian Museum (SAM) database details Aboriginal cultural material and skeletal remains held by the museum. The database is a valuable tool used to identify former cultural activity and lists the types and numbers of materials previously found in the area. The information helps to assess the potential for sub-surface cultural material to be unearthed in undisturbed soil profiles during works.

Most of the collection represents cultural material that was donated to or purchased/collected by the museum. Where available, the database contains information on how the item(s) came into the collection, the location in which it was found and the date it was acquired. Many of the records are without archaeological context and are often incomplete, therefore the database is used only to inform the risk assessment.

The database contained 316 records for Hallett Cove; 16 entries for stone tools, one entry for fresh water mussel shells from a kitchen midden and one entry for food scraps. The remaining 298 records had no identifying information. Most of the records were also without any location information. One hundred and three entries were described as '*below the railway station*' which is only approximately 400 m from the Cell 6 project area, two entries for '*Field River*' approximately 2.5 km from the Cell 6 project area and eleven entries for '*Curlew Point*', more than 6 km from Cell 6 project area. A skull (no jaw) with a hole drilled through the top was listed for Marino, the suburb located only 130 m north of Grey Road (Cell 5).

Although specific locations for any of the items are not given, the database does show that a large number of artefacts have been found along the length of the Hallett Cove coast indicating constant and prolonged use of the sea and land by Aboriginal people.

4.4 Department of the Premier and Cabinet – Aboriginal Affairs and Reconciliation (DPC-AAR) Register of Aboriginal Sites and Objects search

EBS Heritage requested a search of the Register of Aboriginal Sites and Objects on 13 August 2020. The search request was for a 1.2 km radius from the project area. The wider search parameter can identify whether other sites have been recorded in the district and gives a more robust review of known sites to better inform the risk assessment.

4.4.1 Grey Road Gully (Cell 5)

EBS Heritage was advised that the central archive has no entries within 1.2 km of the requested search area. The results are provided as a guide only and may not be a complete list of all Aboriginal heritage items within an area. Therefore DPC-AAR advises that sites or objects may exist in the development area even though the Register doesn't identify them. Refer to Appendix 1 for the full letter.

4.4.2 Kurnabinna Gully (Cell 6)

EBS Heritage was advised that the central archive has no entries within 1.2 km of the requested search area. The results are provided as a guide only and may not be a complete list of all Aboriginal heritage items within an area. Therefore DPC-AAR advises that sites or objects may exist in the development area even though the Register doesn't identify them. Refer to Appendix 2 for the full letter.

4.4.3 Interested Aboriginal Parties

The DPC-AAR additionally provided the details of Aboriginal groups that may have an interest in the region (Table 4). The Kurna people have native title determination over the project area, therefore they should be consulted prior to any contact with other possible interested groups.

Table 4. Aboriginal Groups that may have an interest in the Project Area.

Name	Chairperson	Phone	Email
Kurna Nation Cultural Heritage Association Inc	Jeffrey Newchurch	0458 973 692	jeffrey.newchurch@outlook.com
Original Southern South Australian Tribes Indigenous Corporation	Mark Koolmatrie	0459 371 515	tribalownerssouthernsa@gmail.com
Ramindjeri Heritage Association Incorporated	Vivienne Greenshields	-	ramindjeri@westnet.com

4.5 Archaeological Site Assessment

The cultural heritage survey was undertaken on 16 September 2020 by EBS archaeologist Lisa Salisbury. Justin Peisley and Madge Wanganeen, representatives of KNCHA the Traditional Owners of the land on which the project will be undertaken, also participated in the survey.

The existing trail in Cell 5 and Cell 6 consists of portions of dirt, bark, blue metal and gravel with sections of boardwalk, steps and bridges, as shown in Figure 5 to Figure 8.



Figure 5. Beginning of walkway from Peera Street looking north.

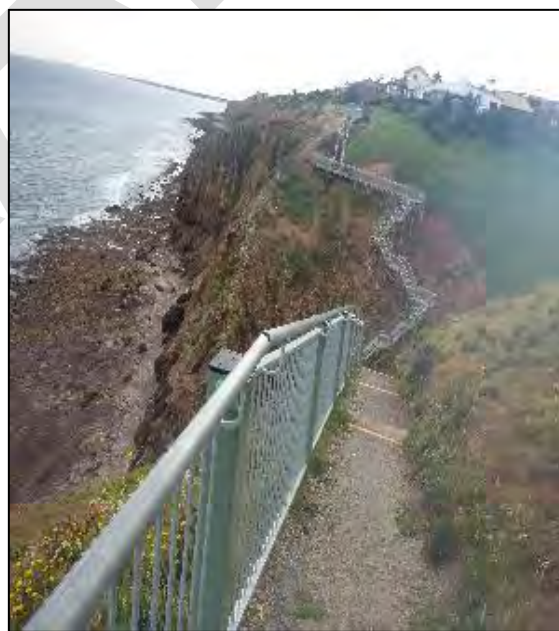


Figure 6. Walkway at Kurnabirra gully crossing looking north.



Figure 7. Grey Road Gully looking south.



Figure 8. Grey Road looking north along informal path.

4.5.1 Grey Road Gully (Cell 5)

There were no heritage sites found as a result of this survey in Cell 5. The KNCHA confirmed that the project area was deemed clear of any cultural material and there were no restrictions to the proposed project from a cultural heritage perspective. It was recommended that Aboriginal Monitors be present for ground disturbance works if the potential new link and the potential alternative at grade link from Pindee Street (Figure 3) requires cutting into the Grey Road Gully.

A few metres north of Nungamoora Street where the steps meet the board walk, is a pirate ship art piece. A Protected Aboriginal Site sign has been attached to the western side of the piece facing the boardwalk (Figure 9 to Figure 11). After reviewing the Register of Aboriginal Sites and Objects and other photos of the art piece, and discussions with the KHCHA representatives it has been concluded that someone not associated with the Department of Premier and Cabinet has added the sign. Therefore the artwork is deemed not an authentically listed Protected Aboriginal Site under the Aboriginal Heritage Act.



Figure 9. Protected Aboriginal Site sign on pirate ship artwork.



Figure 10. Pirate ship artwork with Protected Aboriginal Site sign.



Figure 11. Earlier photo of pirate ship artwork without sign. Photo accessed from Walking SA website (2020).

4.5.2 Kurnabinna Gully (Cell 6)

There were no heritage sites found as a result of this survey in the project area. The KNCHA confirmed that the project area was deemed clear of any cultural material and there were no restrictions to the proposed project from a cultural heritage perspective.

5 FUTURE HERITAGE OBLIGATIONS

5.1 Monitoring by Aboriginal representatives

Although it is not a requirement under the AH Act, having Aboriginal Monitors present during ground works is advisable for the proposed project should it be decided that Grey Road Gully will need to be cut into for a potential new link. Monitoring during ground disturbing works is effective for the early detection of artefacts, objects and burial sites during works. Early detection is crucial for reducing time lost due to unexpected finds. The monitoring program should be developed once the final design for the Project has been completed. Monitoring involves the continuous observation of earthmoving works to:

- Watch the sediments being excavated to see any change;
- Inspect and sieve the removed soil to ensure that no discoveries go unnoticed;
- Ensure that harm to any cultural heritage that may be present is mitigated when and where it cannot be reasonably avoided.

Monitoring of earthworks is recommended until the specified depth required for development is reached. Monitoring should be undertaken by Traditional Owners from the KNCHA.

5.2 On-call archaeologist

If Aboriginal heritage is encountered, the site/object will need to be protected from damage. It is not a requirement that all site works are to be ceased, but work will need to cease in that part of the Project Area where Aboriginal heritage is encountered. Work can continue in other parts of the Project Area provided there is no impact to the site/object. The site/object will need to be assessed by a suitably qualified person and additional requirements will need to be managed should it be deemed an Aboriginal site/object of significance. It is therefore advisable to have an archaeologist on site or on call to provide advice relating to Aboriginal heritage matters on an 'ad hoc' basis.

5.3 *Aboriginal Heritage Act 1988 - Section 21, 23 or 29(1)(b) application*

Authorisation to commence the Project must be obtained from the Premier as it is a breach of the AH Act to disturb known and unknown sites. A permit can be applied for before commencement of works or it can be applied for if heritage is identified or disturbed during Project works.

Section 21 - the proponent requires authorisation from the Premier as the Minister responsible for Aboriginal Affairs and Reconciliation to excavate Aboriginal sites as required.

Section 23 - if a site or object of significance cannot be avoided, the proponent requires authorisation from the Premier as the Minister responsible for Aboriginal Affairs and Reconciliation.

Section 29(1)(b) - the proponent requires authorisation from the Premier as the Minister responsible for Aboriginal Affairs and Reconciliation to send samples out of SA for the purposes of scientific testing.

6 DISCUSSION AND RECOMMENDATIONS

The portions of the Marion Coastal Walk in Cell 5 and Cell 6 between Peera Street and Grey Road, Hallett Cove are predominately an artificially constructed path with much of the construction material brought onto site. There are some small portions of natural ground surface but these have been compacted and eroded from the impact of visitors to the area.

No Aboriginal sites, objects or cultural and/or spiritual histories were identified within either Cell 5 or Cell 6. This result is not unexpected given the disturbed landscape and heavy erosion along the cliff edges and gullies. It does not warrant however that there is no possibility that archaeological material will be located on site, especially as Aboriginal sites have been found elsewhere in the region in similar environments.

As a result of the cultural heritage survey, EBS Heritage established that:

- There are no newly recorded archaeological sites as defined by the AH Act within either Cell 5 or Cell 6;
- There are no previously recorded sites that will be impacted by the proposed upgrade works;
- The project areas have been cleared archaeologically/anthropologically by KNCHA representatives;
- The pirate ship artwork is not an authentically listed Protected Aboriginal Site under the AH Act;
- It is unlikely that unknown sites will be encountered during ground works;

As a result of the Aboriginal heritage survey, and in consultation with KNCHA representatives, the following recommendations are therefore made:

Recommendation 1: Stop work/site discovery procedure

It is recommended that all staff and contractors are provided with a stop work/site discovery procedure in the event of an unexpected find. A copy of the procedure should also be on display in the site office. An example procedure has been provided in Appendix 1.

Recommendation 2: Aboriginal monitoring during ground works

It is recommended that Aboriginal Monitors should be engaged during ground works if the Grey Road Gully is cut into to provide a potential new link or potential alternative at grade link as shown in Figure 3. Although the AH Act does not mandate the requirement for monitoring during ground works, the survey area lies across a landscape that is considered culturally significant for the Kaurna people.

7 REFERENCES

City of Marion (2020). Coastal Walkway Upgrade Design Services Brief, CC202034 Part B Project Brief Coastal Walkway Upgrade.

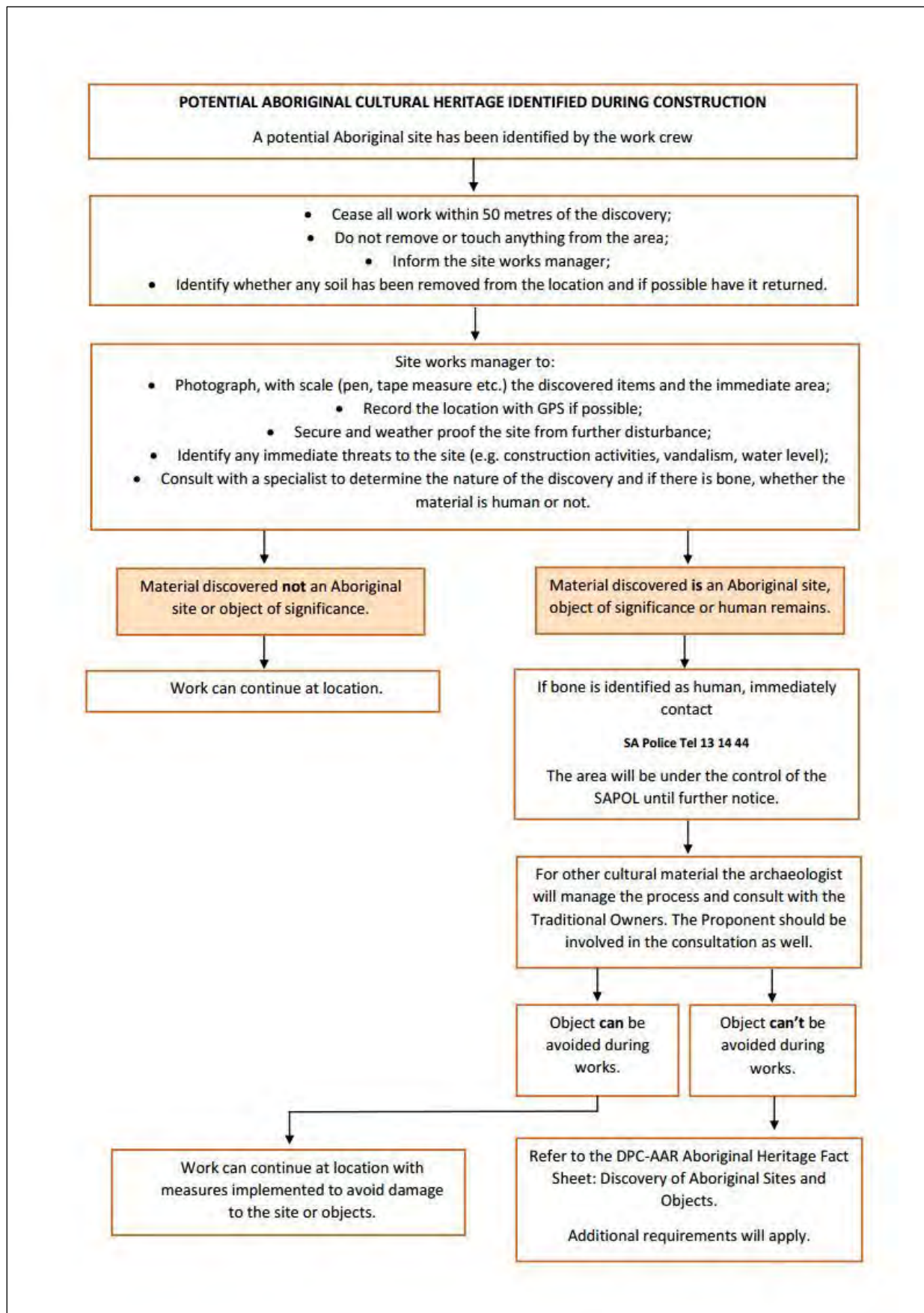
Walking SA (2020). Hallett Cove Boardwalk (Marion Coastal Walking Trail). Viewed 17 September 2020. <https://www.walkingsa.org.au/walk/find-a-place-to-walk/hallett-cove-boardwalk-marion-coastal-walking-trail/>

DRAFT

8 APPENDICES

Appendix 1 – Stop Work Procedure.

DRAFT



Appendix 2 – DPC-AAR Letter for Grey Road Gully (Cell 5).

DRAFT

ABORIGINAL HERITAGE SITES



Lisa Salisbury
EBS Heritage
125 Hayward Terrace
Torrensville 5031 South Australia

Dear Lisa

Thank you for the search request dated 13 Aug 2020. The search was based on the title details - Title Type: CT, Volume: 5790, Folio: 72. There is no address for this parcel. Your reference is 1558.

I advise that the central archive, which includes the Register of Aboriginal Sites and Objects (the Register), administered by Aboriginal Affairs and Reconciliation (AAR), has no entries for Aboriginal sites within 1200m of this location.

The applicant is advised that sites or objects may exist in the proposed development area, even though the Register does not identify them. All Aboriginal sites and objects are protected under the *Aboriginal Heritage Act 1988* (the Act), whether they are listed in the central archive or not. Land within 200 metres of a watercourse (for example the River Murray and its overflow areas) in particular, may contain Aboriginal sites and objects.

Pursuant to the Act, it is an offence to damage, disturb or interfere with any Aboriginal site, object or remains (registered or not) without the authority of the Premier. If the planned activity is likely to damage, disturb or interfere with a site, object or remains, authorisation of the activity must be first obtained from the Premier under Section 23 of the Act. Section 20 of the Act requires that any Aboriginal sites, objects or remains, discovered on the land, need to be reported to the Premier. Penalties apply for failure to comply with the Act. It should be noted that this Aboriginal heritage advice has not addressed any relevant obligations pursuant to the *Native Title Act 1993*.

Please be aware in this area there are Aboriginal groups/organisations/traditional owners that may have an interest. These may include:

Kurna Nation Cultural Heritage Association Inc

Chairperson: Jeffrey Newchurch
Address: 3 Carob Crescent, Craigmore, SA, 5114
Telephone: 0458973692
Email: jeffrey.newchurch@outlook.com
Contact Officer: Lynette Crocker
Telephone:
Email:

Original Southern South Australian Tribes Indigenous Corporation

Chairperson: Mark Koolmatrie
Address: 13 Gillian Close Noarlunga Downs SA 5168
Telephone: 0459371515
Email: tribalownerssouthern@gmail.com
Contact Officer:
Telephone:
Email:

Ramindjeri Heritage Association Incorporated

Chairperson: Vivienne Greenshields
Address: 56 Tilshead Road Elizabeth North SA 5113
Telephone:
Email: ramindjeri@westnet.com.au
Contact Officer: Christine Walker
Telephone: 0418276439
Email: ramindjeri@westnet.com.au

Aboriginal Affairs and Reconciliation | Date: Fri Aug 21 2020 15:07:43 GMT+0930 (ACST)
Level 16, 30 Wakefield Street | GPO Box 2343 Adelaide SA 5001
Tel (+61) 08 8226 8900 | Fax (+61) 08 8226 8999 | www.dpc.sa.gov.au | ABN 83 524 915 929



ABORIGINAL HERITAGE SITES

If you require further information, please contact the Aboriginal Heritage Team on telephone (08) 8226 8900 or send to our generic email address dpc-aar.heritagesites1@sa.gov.au

Yours sincerely,

A handwritten signature in black ink, appearing to read "P. Langeberg".

Perry Langeberg
SENIOR INFORMATION OFFICER (HERITAGE)
ABORIGINAL AFFAIRS & RECONCILIATION

21 August 2020

Aboriginal Affairs and Reconciliation | Date: Fri Aug 21 2020 15:07:43 GMT+0930 (ACST)
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Appendix 3 – DPC–AAR Letter for Kurnabinna Gully (Cell 6).

DRAFT

ABORIGINAL HERITAGE SITES



Lisa Salisbury
EBS Heritage
125 Hayward Terrace
Torrensview 5031 South Australia

Dear Lisa

Thank you for the search request dated 13 Aug 2020. The search was based on the title details - Title Type: CT, Volume: 5701, Folio: 798. There is no address for this parcel. Your reference is 1559.

I advise that the central archive, which includes the Register of Aboriginal Sites and Objects (the Register), administered by Aboriginal Affairs and Reconciliation (AAR), has no entries for Aboriginal sites within 1200m of this location.

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Address: 3 Carob Crescent, Craigmare, SA, 5114
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Telephone:
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Chairperson: Mark Koolmatrie
Address: 13 Gillian Close Noarlunga Downs SA 5168
Telephone: 0459371515
Email: tribelownerssouthernsa@gmail.com
Contact Officer:
Telephone:
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Ramindjeri Heritage Association Incorporated

Chairperson: Vivienne Greenshields
Address: 56 Tilshead Road Elizabeth North SA 5113
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Email: ramindjeri@westnet.com.au
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Telephone: 0418276439
Email: ramindjeri@westnet.com.au

Aboriginal Affairs and Reconciliation | Date: Fri Aug 21 2020 15:15:35 GMT+0930 (ACST)
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ABORIGINAL HERITAGE SITES

If you require further information, please contact the Aboriginal Heritage Team on telephone (08) 8226 8900 or send to our generic email address dpc-aar.heritagesites1@sa.gov.au

Yours sincerely,

Perry Langeberg
SENIOR INFORMATION OFFICER (HERITAGE)
ABORIGINAL AFFAIRS & RECONCILIATION

21 August 2020

Aboriginal Affairs and Reconciliation | Date: Fri Aug 21 2020 15:15:35 GMT+0930 (ACST)
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Appendix B: Draft Flora & Fauna Report



Marino Coastal Walk

Flora and Fauna Assessment

Marino Coastal Walk Flora and Fauna Assessment

02/10/2020

Version 1.0

Prepared by EBS Ecology for Aspect Studios

Document Control					
Revision No.	Date issued	Authors	Reviewed by	Date Reviewed	Revision type
1	02/10/2020	J. Carpenter	A. Derry	01/10/2020	Draft/Final

Distribution of Copies			
Revision No.	Date issued	Media	Issued to
1	02/10/2020	Electronic	David Guy, Aspect Studios

EBS Ecology Project Number: EX200507

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CITATION: EBS Ecology (2020) Marino Coastal Walk Flora and Fauna Assessment. Report to Aspect Studios. EBS Ecology, Adelaide.

Cover photograph: *Ptilotus angustifolius* (Narrow-leaf Yellow-tails), a threatened plant that grows in the Project Area.

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GLOSSARY AND ABBREVIATION OF TERMS

BAM	Bushland Assessment Method
BDBSA	Biological Database of South Australia
CP Act	<i>Coastal Protection Act 1972</i>
DAWE	Department of Agriculture, Water and the Environment
DEW	Department for Environment and Water
DP	City of Marion Development Plan
DV Act	<i>Development Act 1993</i>
EBS Ecology	Environmental and Biodiversity Services Pty Ltd, trading as EBS Ecology
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
km	kilometre(s)
LSA Act	<i>Landscapes South Australia Act 2019</i>
m	metre(s)
MCW	Marion Coastal Walkway
MNES	Matters of National Environmental Significance
NPW Act	<i>National Parks and Wildlife Act 1972</i>
NV Act	<i>Native Vegetation Act 1991</i>
PMST	Protected Matters Search Tool
Project	design investigations and construction a walkway within Cells 5, 6 and 10 of the Marion Coastal Walkway
Project Area	The area within 10 m of the current walkway alignment that is likely to be impacted by the Project.
SA	South Australia(n)
TEC	Threatened Ecological Community
WoNS	Weeds of National Significance

EXECUTIVE SUMMARY

The coastal walkway from Marino to Hallet Cove was constructed in the mid-late 1990s, with the Marion Coastal Walkway (MCW) covering an 8-kilometre (km) section. The City of Marion's Coastal Walkway Plan provides a renewal plan that prioritises sections of the MCW for upgrade and repair. The plan breaks down the walkway into cells, with each cell prioritised. A high priority has been placed on the design investigations and construction of the walkway in Cell 5 (Grey Road Gully), Cell 6 (Kurnabinna Gully) and Cell 10 (Field River) (the Project).

EBS Ecology was contracted by Aspect Studios to undertake a flora and fauna survey of the Project to inform the design process and identify any ecological constraints based on Project design available at the time of writing. The objectives of this survey were to:

- Identify biodiversity constraints (i.e. threatened species and native vegetation) that may influence the design and location of the walkway; and
- Provide broad recommendations that avoid, minimise or mitigate possible impacts on these constraints.

Native vegetation in the Project Area includes shrubland and grassland communities in poor to fair condition. Five native Vegetation Associations were mapped as a result of the field survey in Cells 5 and 6. Previous mapping undertaken in Cell 10 was found to be accurate, with seven native Vegetation Associations recognised. Vegetation is heavily impacted by weeds, including grass and forb species, with seven species of declared weeds spread widely throughout the Project Area.

Four threatened species were recorded during the survey:

- Yellow-tailed Black Cockatoo (NPW Act Vulnerable);
- Sooty Oyster Catcher (NPW Act Rare);
- *Ptilotus angustifolius* (NPW Act Endangered); and
- *Myoporum parvifolium* (NPW Act Rare).

Ten additional species of threatened or migratory species were assessed as likely to occur based on habitat requirements and past records, although they were not recorded during the survey. Of these, the Hooded Plover (EPBC Act and NPW Act Vulnerable) is known to use the beach in Cell 10 as nesting habitat.

Based on the results of the survey, desktop research and the constraints outlined above, the following recommendations have been made:

- Consider advice from Birdlife Australia as far as is practicable in Project design.
- Locate walkway alignment as far to the east as possible in the Cell 10 dunes, closing existing beach access north and east of the Field River outlet.
- Undertake an EPBC Act self-assessment to test the significance of impact of final Project design on Hooded Plover
- Design walkways to follow existing alignment as far as is practicable.

Marino Coastal Walk Flora and Fauna Assessment

- Locate any laydown/construction sites outside areas mapped as native vegetation where possible to do so.
- Develop a Vegetation Management Plan to be incorporated in the Construction Environmental Management Plan.
- Develop a Weed Management Plan to be incorporated in the Construction Environmental Management Plan.
- Avoid removing any mature trees, both native and introduced species.

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1 INTRODUCTION

1.1 Project Background

The coastal walkway from Marino to Hallet Cove was constructed in the mid-late 1990s, with the Marion Coastal Walkway (MCW) covering an 8-kilometre (km) section. The walkway contains various pieces of public infrastructure, including stairways, board walks, pathways, lookouts, bins, interpretive signs and benches.

The City of Marion's Coastal Walkway Plan provides a renewal plan that prioritises sections of the MCW for upgrade and repair. The plan breaks down the walkway into cells, with each cell prioritised. A high priority has been placed on the design investigations and construction of the walkway in Cell 5 (Grey Road Gully), Cell 6 (Kurnabinna Gully) and Cell 10 (Field River) (the Project).

EBS Ecology was contracted by Aspect Studios to undertake a flora and fauna survey of the Project to inform the design process and identify any ecological constraints based on Project design available at the time of writing.

Current Project design includes the upgrading of structures and tracks along the current alignment, additional access points and path realignment in some areas.

1.2 Project Area

The Project Area is within the City of Marion local government area and includes the following Cells of the MCW:

- Cell 5 – MCW between Nungamoora Street and Grey Road and including the Grey Road Gully.
- Cell 6 – MCW between Peera Street and Nungamoora Street and including Kurnabinna Gully.
- Cell 10 – MCW between south of the Field River mouth and River Parade.

The Project Area is shown in Figure 1 and includes a 10 metre (m) buffer around the existing walkway. It falls within the Green Adelaide Landscape Management Region.

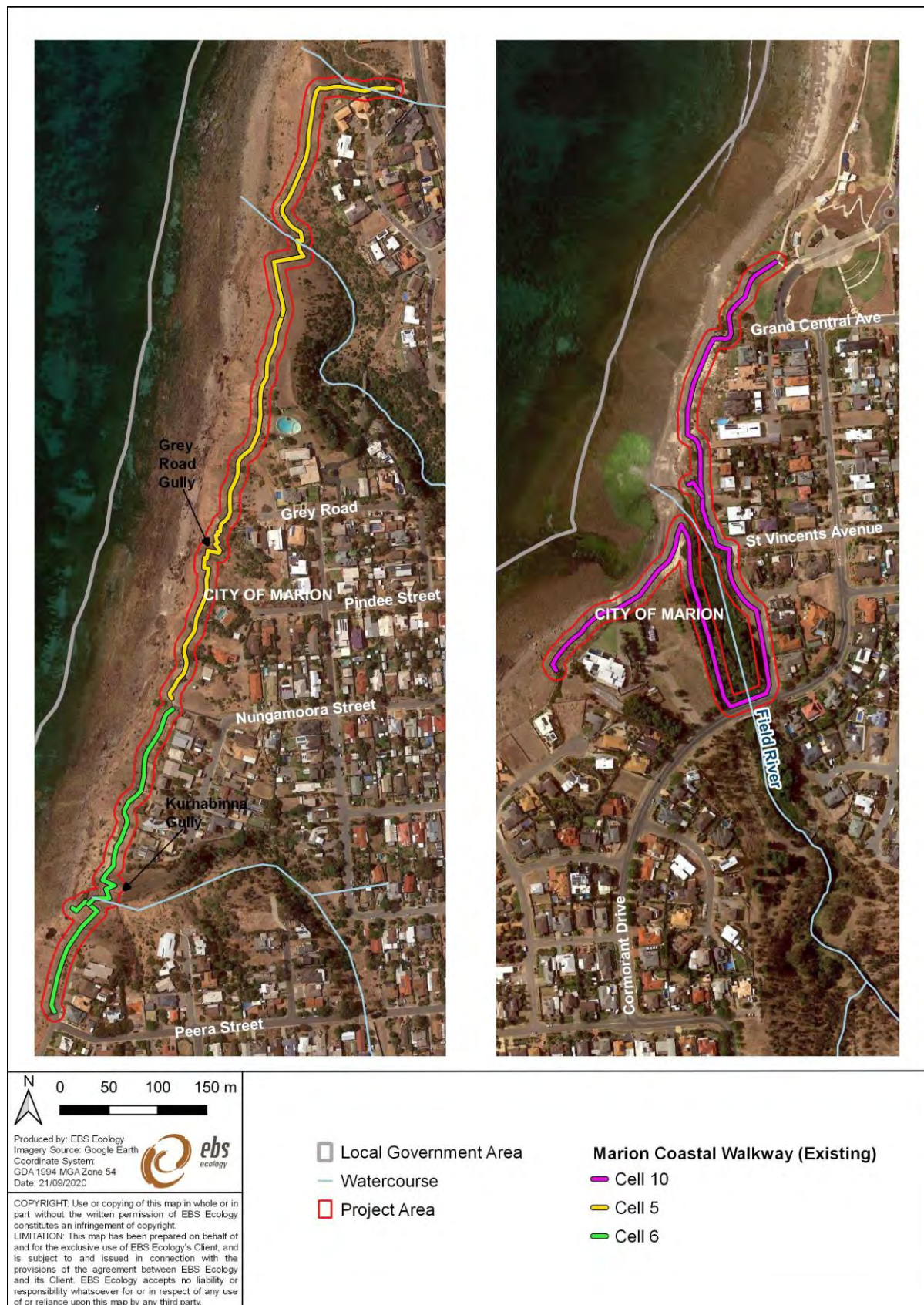


Figure 1. Location of the Project Area.

1.3 Objectives

The Project will create a continuous dedicated walkway for the length of the City of Marion coast, restoring closed sections of walkway and creating a link around the Field River. EBS Ecology was engaged by Aspect Studios to undertake a flora and fauna assessment of the Project Area.

The objectives of the Flora and Fauna Assessment were:

- Identify biodiversity constraints (i.e. threatened species and native vegetation) that may influence the design and location of the walkway; and
- Provide broad recommendations that avoid, minimise or mitigate possible impacts on these constraints.

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2 BACKGROUND INFORMATION

2.1 Compliance and legislative summary

A summary of legislation, policy and guidelines associated with the Project relevant to biodiversity and environmental protection is shown in Table 1.

In addition, the *City of Marion Remnant Vegetation Plan 2018 – 2023* outlines the City of Marion's guidelines, priorities and actions for managing remnant vegetation.

The development of track and trails is identified by this Plan as a threat to native vegetation, stating that:

"Tracks, trails and paths in remnant vegetation areas have a significant impact on the remaining 1% of remnant vegetation. Current theories suggest a minimum of 24% remnant vegetation is required for ecological processes, so any impacts on what remains must be minimised. Trails need to be appropriately placed to minimise damage and offset with appropriate maintenance budgets factored into projects, where this is not possible." (City of Marion, 2018).

Previously, Birdlife Australia has recommended guidelines to reduce impacts to Hooded Plover (*Thinornis rubricollis rubricollis*) from development of the walkway at Cell 10 (Birdlife Australia, 2018). These guidelines are summarised below:

East of Field River

- Situate the walkway as far east as possible on the dunes east of the Field River mouth.
- Situate the walkway at the far eastern side of the dunes to allow for habitat retreat due to climate change.
- Remove the two beach access points at either end of the dunes east of the Field River, channelling walkers onto the new formal walkway and away from nesting areas.
- If revegetating dunes following construction, use local native species that provide habitat for nesting plovers (i.e. avoid dense plantings of shrubs).

West of Field River

- Walkway should closely follow the boundary of Council/private land behind the dunes to connect with the base of the existing walkway at the base of the cliffs.
- Terminate the current track behind the dunes to reduce the funnelling of people onto the beach just south of the Field River outlet.

Table 1. Summary of relevant legislation and policy.

Legislation	Description	Relevance to Project	Report Section
Commonwealth			
<i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	<p>The EPBC Act provides legislative protection for Matters of National Environmental Significance (MNES) as defined under the act.</p> <p>Where a significant impact on a MNES is likely, a Project must be referred to the Minister for approval.</p>	<p>Threatened species No threatened species were recorded during the field survey. However, the Vulnerable Hooded Plover is known to use the beach in Cell 10 as a nesting site.</p> <p>Migratory species Several non-breeding migratory species may occur on the beach in Cell 10 during summer.</p>	Section 4.1
South Australia			
<i>National Parks and Wildlife Act 1972 (NPW Act)</i>	<p>The NPW Act provides provisions for the protection of native flora and fauna.</p> <p>The act lists threatened species of conservation significance in South Australia.</p>	<p>Threatened flora Two flora species listed as Rare under the NPW Act are present in the Project Area. A further two species were not recorded but might possibly occur.</p> <p>Threatened fauna Two NPW Act threatened fauna species was recorded during the field survey. A further seven species might possibly occur in the Project Area.</p>	<p>Section 4.1.2 Section 4.1.3</p>
<i>Native Vegetation Act 1991 (NV Act)</i>	The NV Act controls the clearing of native vegetation in South Australia.	<p>The City of Marion is situated within metropolitan Adelaide and is therefore exempt from clearance controls under the NV Act.</p> <p>Vegetation surveys were undertaken using methodology approved for assessing vegetation subject the NV Act.</p>	<p>Section 3.2.1 Section 4.2</p>
<i>Landscapes South Australia Act 2019 (LSA Act)</i>	<p>The LSA Act recently replaced the <i>Natural Resource Management Act 2004</i>. The act establishes regional landscape boards with the aim of delivering NRM related services to communities.</p> <p>Under the LSA Act, landowners have a legal responsibility to manage declared pest plants and animals</p>	<p>The Project Area is in the Green Adelaide Landscape region.</p> <p>Seven species of pest plants declared under the LSA Act were recorded during the field survey.</p>	Section 4.3.2

Legislation	Description	Relevance to Project	Report Section
Development Act 1993 (DV Act)	<p>The DV Act and <i>Development Regulations 2008</i> provide for proper and efficient planning and development in South Australia.</p> <p>The <i>Development Regulations 2008</i> also determine when a coastal development requires referral to the Coast Protection Board for approval.</p>	Some of the larger planted trees, both native and introduced, may be subject to the DV Act as significant or regulated trees.	Not assessed
Coast Protection Act 1972 (CP Act)	<p>The CP Act establishes the Coast Protection Board. Developments situated on coastal land may require referral to the board for approval under certain circumstances.</p> <p>Under the CP Act, coastal land is defined as: "Land situated in a zone or area defined in the relevant Development Plan where the name of the zone or area includes the word 'coast' or 'coastal', or which indicates or suggests in some other way that the zone or area is situated on the coast."</p>	The Project Area is situated on coastal land as defined by the CP Act. If the development is not subject to the exclusions listed in Schedule 8 of the <i>Development Regulations 2008</i> , it may require referral to the Coast Protection Board for approval.	Not assessed
City of Marion Development Plan (DP)	The DP contains the rules that set out the detailed criteria against which development applications will be assessed.	<p>The Project Area is within the area designated as Coastal Conservation Zone by the DP. The objectives of the Coastal Conservation Zone are:</p> <ol style="list-style-type: none"> 1. To enhance and conserve the natural features of the coast including visual amenity, landforms, fauna and flora. 2. To contribute to the Metropolitan Open Space System. <p>Low-intensity recreational uses located where environmental impacts on the coast will be minimal.</p>	Section 2.3.2

2.2 Project Description

The Project includes the works described in Table 2. The locations of these activities are shown in Figure 1.

Table 2. Description of works associated with the Project.

Location	Description of works
Cell 5	<ul style="list-style-type: none"> Formalisation of informal paths at the end of Grey Road. Upgrading of two sections of path on existing alignment. Upgrading/replacement of existing structures on existing alignment, crossing the Grey Road and Nungamoora Road gullies. The potential for a new link to Pindee Street is being considered.
Cell 6	<ul style="list-style-type: none"> Removal and replacement of the current path parallel to the Esplanade. Upgrading of three sections of path on existing alignment. Realignment of one section of path between Kurnabinna Gully and Nungamoora Street. Realignment and replacement of structure crossing Kurnabinna Gully.
Cell 10	<ul style="list-style-type: none"> Formalisation of informal paths at the end of Grand Central Avenue. Construction of new walkway, including closure of informal beach access, through dunes between Grand Central Avenue and River Parade. Construction of new walkway behind dunes between Field River and Surf Life Saving Club.

2.3 Landscape context

2.3.1 Watercourses and wetlands

Cell 10 is located at the mouth of the Field River, a fourth order stream. The walkway crosses the Field River using the existing Cormorant Drive bridge, although an informal crossing point exists where the river flows across the Cell 10 beach. At times of high rainfall or tides, this crossing may be impassable.

The Field River estuary holds semi-permanent waterholes, although the freshwater section of the river only flows seasonally.

The walkway crosses two un-named watercourses that flow through the Kurnabinna and Grey Road Gullies. These are ephemeral streams and only flow during high rainfall events. They were dry at the time of the survey with no connection to the sea.

Watercourses in the Project Area are mapped in Figure 1.

Other than the Field River estuary, there are no wetlands in the Project Area.

2.3.2 Protected areas

The Project Area falls within the Coastal Management Zone, as mapped in the *City of Marion Development Plan* (City of Marion, 2020). Development in the Coastal Management Zone is subject to development controls with reference to environmental protection and may require referral to the Coast Protection Board for approval.

Both Hallet Cove Conservation Park and Marino Conservation Park are nearby, however the Project Area is outside these two reserves.

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3 METHODS

3.1 Desktop assessment

A desktop assessment was undertaken to determine the potential for any threatened species and ecological communities to occur in the Project Area. Relevant databases were searched using a 5 km buffer of the Project Area for known records of species and communities listed as threatened under the EPBC Act and the NPW Act.

3.1.1 EPBC Act Protected Matters Search Tool

A Protected Matters Search Tool (PMST) report was generated on 28 July 2020 to identify Matters of National Environmental Significance (MNES) under the EPBC Act relevant to the Project Area. The PMST is maintained by the Department of Agriculture, Water and the Environment (DAWE) and was used to identify species or communities of national environmental significance that may occur or have suitable habitat within the Project Area.

3.1.2 Biological Database of South Australia

The Biological Database of South Australia (BDBSA) was searched through NatureMaps, the web portal maintained by the Department for Environment and Water (DEW) and available at <http://spatialwebapps.environment.sa.gov.au/naturemaps/?locale=en-us&viewer=naturemaps>. The BDBSA is comprised of a collection of species records compiled from the South Australian Museum, conservation organisations, Birdlife Australia and other information sources. A 5 km buffer surrounding the Project Area was used to search the BDBSA for known records of threatened species. The search was undertaken on the 28 July 2020.

3.1.3 Previous studies

An ecological assessment of Cell 10 was carried out in 2019 by T & M Ecologists (T&M Ecologists, 2019). This study mapped the Vegetation Association at the mouth of the Field River and identified ecological constraints at this location.

The report was used to inform the relevant sections of this study, with the accuracy of mapping confirmed by field investigation. Vegetation Associations in Cell 10 were only remapped if inaccuracies were found. Likelihood of occurrence assessments for Cell 10 were also taken from this source and updated based on field survey results.

3.1.4 Likelihood of occurrence assessment

Threatened species and communities identified by methods described above were assessed as to the likelihood of its occurrence in the Project Area. Each was assigned a rating to describe the nature of its presence; Known / Highly Likely, Likely, Possible and Unlikely. Criteria such as habitat constraints and date and proximity of most recent records were considered in the context of the features of the Project Area when assigning a likelihood rating. This is described further in Table 3.

Table 3. Likelihood rating and criteria for the presence of threatened species and communities.

Likelihood	Criteria
Known / Highly likely	Recorded in the last 10 years, the species does not have highly specific niche requirements, the habitat is present and falls within the known range of the species distribution; or The species was recorded as part of field surveys.
Likely	Recorded since 1995, the area falls within the known distribution of the species and the area provides habitat or feeding resources for the species.
Possible	Recorded since 1995, the area falls within the known distribution of the species, but the area provides limited habitat or feeding resources for the species. Recorded within 20 – 40 years, survey effort is considered adequate, habitat and feeding resources present, and species of similar habitat needs have been recorded in the area.
Unlikely	Recorded since 1995, but the area provides no habitat or feeding resources for the species, including perching, roosting or nesting opportunities, corridor for movement or shelter. Recorded within 20 – 40 years; however suitable habitat does not occur, and species of similar habitat requirements have not been recorded in the area. No records despite adequate survey effort.

3.2 Field survey

3.2.1 *Vegetation associations and condition*

Vegetation was surveyed according to the Biodiversity Assessment Manual (BAM). The BAM (Native Vegetation Council, 2019a) was developed by the Native Vegetation Management Unit to assess areas of native vegetation requiring clearance and to calculate the SEB requirements. The method is derived from the Nature Conservation Society of South Australia's (NCSSA) Bushland Condition Monitoring methodology and is suitable for native vegetation assessments in South Australia's agricultural regions.

The BAM requires quantitative on ground and desktop assessments of native vegetation and ecological values. When using the BAM, each area to be assessed (i.e. each application area) is termed a 'Block', which is stratified into 'Sites'. Each Site relates to a Vegetation Association found within the Block, which are assessed in representative 1 ha quadrats and compared to NCSSA 'benchmark' vegetation communities.

Three components of the biodiversity value of the Site are measured and scored:

- Landscape context;
- Vegetation condition; and
- Conservation value.

The factors that influence each of these components and their score ranges are described in Table 4. The scores of these three components are combined to provide the Unit Biodiversity Score (per ha) and multiplied by the size (ha) of each Site to provide the Total Biodiversity Score for each Site.

Table 4. Factors that influence the value of the three components used to calculate the total SEB area and value in the BAM (Native Vegetation Council, 2019a).

Component	Factors
Landscape context	<ul style="list-style-type: none"> • Percentage vegetation cover within 5 km • Block shape (cleared perimeter: area ratio) • Native vegetation remnancy of IBRA association • Percentage of native vegetation protected within the IBRA association • The presence of riparian vegetation, swamps or wetlands
Vegetation condition	<ul style="list-style-type: none"> • Native plant species diversity • Number of native lifeforms and their cover • Number of regenerating species • Weed cover and the level of invasiveness of dominant weed species • Mature tree health, fallen timber, hollow-bearing trees and tree canopy • Native: exotic understorey biomass
Conservation value	<ul style="list-style-type: none"> • The presence of federal or state listed threatened ecological communities and their conservation rating • Number of threatened plant species recorded at the site and their conservation rating • Number of threatened fauna species and their conservation rating or potential habitat occurs within the site

3.2.2 Fauna

All native and exotic fauna species opportunistically encountered (directly observed, or tracks, scats, burrows, nests and other signs of presence) during the native vegetation assessment were recorded. Potential fauna refuge sites, such as hollows, were noted as an indication of availability of suitable habitat. Particular attention was paid to identifying habitat for threatened species. For each opportunistic fauna observation, the species, number of individuals, GPS location, detection methodology (sight, sound or sign) and habitat were recorded.

The beach in Cell 10 was actively searched for Hooded Plover and other migratory shorebirds. The search was conducted according to the *Survey guidelines for Australia's threatened birds – guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, 2010). Two methods were used, each carried out by two observers for a period of 20 minutes.

- Observation from vantage points overlooking suitable foraging or roosting habitat at the appropriate period of the tidal cycle; and
- Area search in appropriate habitat on the Cell 10 beach.

3.3 Limitations

Flora and fauna records were retrieved from the PMST and the BDBSA. The BDBSA only includes verified flora and fauna records submitted to Department for Environment and Water (DEW) or partner organisations. It is recognised that information is imperfectly captured and it is possible that significant species may occur in the Project Area that are not reflected by database records. Although much of the BDBSA data has been through a variety of validation processes, the lists may contain errors and should

be used with caution. DEW gives no warranty that the data is accurate or fit for any particular purpose of the user or any person to whom the user discloses the information.

The field survey occurred over a single day in August. a number of flora species recorded could only be identified to genus level due to a lack of distinguishing identification features such as flowers or fruits. This included species such as *Austrostipa* sp.

August is outside the optimal season for detecting migratory shorebirds and the Hooded Plover breeding season. The survey also occurred during low tide, when detecting shorebirds can be more difficult than at other stages of the tidal cycle.

The assessment has been made given the extent of the Project design current at the time of writing. No allowance has been made for any future design changes that might increase the area of the impact footprint.

All information and assessments are based on data available at the time of preparing this report. No allowance is made for additional information that may become available in the future, including detailed Project design.

4 RESULTS

4.1 Matters of national environmental significance

The PMST identified three Matters of National Environmental Significance (MNES) as potentially occurring in the Project Area:

- EPBC Act listed Threatened Ecological Communities (TEC);
- EPBC Act listed Threatened Species; and
- EPBC Act listed Migratory Species.

These MNES are described in more detail in the following Sections.

4.1.1 Threatened ecological communities

The desktop search indicated that one TEC may occur in the Project Area:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EPBC Act Endangered).

The field survey also found some areas of *Lomandra* spp. dominated grassland. Although not predicted to occur by the desktop search, *Lomandra* spp. grassland may also be considered the TEC listed below:

- Iron-grass (*Lomandra*) Natural Temperate Grassland of South Australia (EPBC Act Critically Endangered)

The field survey confirmed that neither TEC occurs in the Project Area, for those reasons summarised in Table 5.

Table 5. Assessment of the presence of Threatened Ecological Communities.

Threatened Ecological Community	EPBC Act Status	Key Diagnostic Features	Assessment
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.	E	<ul style="list-style-type: none"> • The ecological community occurs on low slopes and plains from central NSW, through northern and central Victoria into South Australia. • The vegetation structure of the ecological community is typically a woodland to open forest. • The tree canopy is dominated ($\geq 50\%$ canopy crown cover) by <i>Eucalyptus microcarpa</i> (Grey Box). • The mid layer comprises shrubs of variable composition and cover, from absent to moderately dense. • The ground layer also is highly variable in development and composition, ranging from almost absent to mostly grassy to forb-rich. • Derived grasslands are a special state of the ecological community, whereby the canopy and mid layers have been mostly removed to 	<p>Does not occur in the Project Area.</p> <p>The Project Area is not situated on low slopes and plains, rather situated on coastal cliff tops.</p> <p>The vegetation structure is shrubland and grassland and <i>Eucalyptus microcarpa</i> is not present.</p> <p>Given the landscape position, natural vegetation of the area pre-disturbance would have consisted of similar low shrubland.</p>
Iron-grass (<i>Lomandra</i>) Natural Temperate	CE	Condition Class A – Areas ≥ 0.1 ha and have ≥ 30 native plant species and at least 10	Does not occur in the Project Area.

Threatened Ecological Community	EPBC Act Status	Key Diagnostic Features	Assessment
Grassland of South Australia.		<p>native broad-leaved herbaceous species not on the disturbance resistant list and have \geq five native perennial grass species and at least one native perennial tussock per metre (Threatened Species Scientific Committee).</p> <p>Condition Class B – Areas ≥ 0.25 ha and have ≥ 15 native plant species and at least three native broad-leaved herbaceous species not on the disturbance resistant list and have \geq four native perennial grass species and at least one native perennial tussock per metre (Threatened Species Scientific Committee).</p>	<p><i>Lomandra</i> grassland in the Project Area consists of two disconnected patches, both < 0.25 ha in area.</p> <p>Neither patch has > 15 species of native plants.</p>

4.1.2 Threatened flora

The PMST identified eight plant species listed as threatened by the EPBC Act as known or likely to occur in the Project Area. Seven of these are also listed as threatened under the NPW Act. A search of the BDBSA indicated that 22 species listed as threatened under the EPBC Act and/or the NPW Act have been recorded from within 5 km of the Project Area since 1995 (Appendix 1).

The field survey recorded two species listed as Rare under the NPW Act:

- *Ptilotus angustifolius* (Narrow-leaf Yellow-tails) (Figure 2); and
- *Myoporum parvifolium* (Creeping Boobialla) (Figure 3).

These species were recorded in Cell 5 at the locations shown in Figure 4. Including these species, four threatened plant species have been assessed as possible or likely to occur in the Project Area (Table 6). The full likelihood of occurrence assessment for all threatened flora identified by database searches is provided in Appendix 1.

No species listed as threatened by the EPBC Act were recorded during the survey, nor have they been assessed as possible or likely to occur.

Table 6. Threatened flora species known or likely to occur in the Project Area.

Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Location
		Aus	SA		
<i>Austrostipa densiflora</i>	Fox-tail Spear-grass		R	Likely	Cell 5 Cell 6
<i>Myoporum parvifolium</i>	Creeping Boobialla		R	Known	Cell 5
<i>Podolepis muelleri</i>	Button Podolepis		V	Likely	Cell 5 Cell 6
<i>Ptilotus angustifolius</i>	Narrow-leaf Yellow-tails		E	Known	Cell 5



Figure 2. *Ptilotus angustifolius*, photographed in Cell 5.



Figure 3. *Myoporum parvifolium*, photographed in Cell 6.

4.1.3 Threatened and migratory fauna

The PMST identified 15 fauna species listed as threatened or migratory by the EPBC Act as known or likely to occur in the Project Area. Twelve of these are also listed as threatened by the NPW Act. A search of the BDBSA indicated that 6 species listed as threatened under the EPBC Act and/or the NPW Act have been recorded within 5 km of the Project Area since 1995 (Appendix 2.).

The field survey recorded one Rare and one Vulnerable species listed by the NPW Act:

- Rare – Sooty Oyster Catcher (*Haematopus fuliginosus*); and
- Vulnerable – Yellow-tailed Black Cockatoo (*Zanda funerea whiteae*).

Two Sooty Oystercatchers were observed foraging on a rock shelf at the base of cliff in Cell 5 (Figure 4), while a flock of Yellow-tailed Black Cockatoos was recorded in planted *Pinus halepensis* (Aleppo Pines) in Cell 10 (Figure 6).

Although searched for Hooded Plover, this species, listed as Vulnerable by both the EPBC Act and NPW Act, was not recorded in beach and dune habitat in Cell 10. However, as the area is a known breeding site last used in 2019, the species has been assessed as known to occur. An additional 11 species of threatened fauna have been assessed as likely or possible to occur, as shown in Table 7. The full likelihood of occurrence assessments for all species identified by database searches is provided in Appendix 2.

Most species listed in Table 7 are marine and wetland species. They possibly occur at times on beach and shore habitat in Cell 10, but would not occur in cliff top or gully habitat in Cells 5 and 6. Three species (listed below) may occur more widely throughout the Project Area, although all require mature trees to be present:

- Yellow-tailed Black Cockatoo;
- Grey-headed Flying Fox; and
- Black-chinned Honeyeater.

Table 7. Threatened and migratory fauna known or likely to occur in the Project Area.

Scientific Name	Common Name	Conservation Status		Likelihood of Occurrence	Location
		Aus	SA		
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi		Possible	Cell 10
<i>Calidris canutus</i>	Red Knot	EN	E	Possible	Cell 10
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	E	Possible	Cell 10
<i>Egretta sacra sacra</i>	Eastern Reef Heron		R	Highly likely	Cell 10
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R	Known	Cell 10
<i>Melithreptus gularis</i>	Black-chinned Honeyeater		V	Possible	Cell 10
<i>Numenius madagascariensis</i>	Eastern Curlew	CR	E	Possible	Cell 10
<i>Pandion haliaetus</i>	Eastern Osprey	Mi	E	Possible	Cell 5 Cell 6 Cell 10
<i>Thinornis cucullatus cucullatus</i>	Hooded Plover	VU	V	Known	Cell 10
<i>Tringa nubularia</i>	Common Greenshank	Mi		Possible	Cell 10
<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox	VU	R	Likely	Cell 10
<i>Zanda funerea whitea</i>	Yellow-tailed Black Cockatoo		V	Known	Cell 10

4.2 Vegetation associations

4.2.1 Cell 5 and Cell 6

Five native Vegetation Associations were mapped as a result of the field survey in Cells 5 and 6:

- *Acacia cupularis* and *Zygophyllum aurantiacum* Low Open Shrubland over *Austrostipa* spp. and exotic grasses and forbs (Table 8).
- *Lawrenia squamata* Sparse Low Shrubland over *Disphyma crassifolia* and *Austrostipa* spp. (Table 9).
- *Lomandra effusa* and *Chloris truncata* Sparse Grassland (Table 10).
- *Olearia axillaris* / *Atriplex cinerea* +/- *Acacia cupularis* Low Open Shrubland over *Austrostipa* spp. and exotic grasses and forbs (Table 11).
- *Olearia axillaris*, *Myoporum insulare* and *Leucophyta brownii* Low Open Shrubland over *Chloris truncata* and exotic grasses and forbs (Table 12).


Two non-native Vegetation Associations were also recognised and mapped:

- *Olea europaea* +/- *Pinus halepensis* Low Woodland over *Chrysanthemoides monilifera* and *Avena* sp (Table 13); and
- Revegetation areas and garden plantings (Table 14).

Vegetation associations for Cells 5 and 6 are mapped in Figure 4 and Figure 5.


Native vegetation ranged in condition from poor to fair, with high impact from weeds, particularly introduced species of grasses, such as *Avena* sp. (wild oats), and forbs such as *Oxalis pes-caprae* (Soursob). Along the length of the walkway, numerous informal trails and access points also cause impact to vegetation.

Table 8. Vegetation Association description, *Acacia cupularis* and *Zygophyllum aurantiacum* Low Open Shrubland over *Austrostipa* spp. and exotic grasses and forbs.

<i>Acacia cupularis</i> and <i>Zygophyllum aurantiacum</i> Low Open Shrubland over <i>Austrostipa</i> spp. and exotic grasses and forbs.			
Dominant Overstorey species		<i>Zygophyllum aurantiacum</i> <i>Acacia cupularis</i>	
Dominant mid and under storey species		<i>Threlkeldia diffusa</i> <i>Dissocarpus biflorus</i> <i>Austrostipa</i> sp. <i>Gazania linearis</i> * <i>Asphodelus fistulosus</i> * <i>Oxalis pes-caprae</i> *	
			
Description			
Survey Site	A7	Location	GDA 1994 -35.08399, 138.49405
Threatened Species observed	None		
Declared Weeds	<i>Lycium ferocissimum</i> * (African Boxthorn) <i>Gazania linearis</i> * (Gazania)		
Low open shrubland situated on shallow soils on upper slopes. Sparse low chenopod shrubs dominate the mid layer, while ground layer vegetation is dominated by introduced grass and forb species. Fair condition, although disturbed by weeds.			
Benchmark Community	Coastal Shrublands of Dunes and Cliff tops		
Unit Biodiversity Score	23.23		

*Denotes introduced species.

Table 9. Vegetation Association description, *Lawrencia squamata* Sparse Low Shrubland over *Disphyma crassifolia* and *Austrostipa* spp.

Lawrencia squamata Sparse Low Shrubland over Disphyma crassifolia and Austrostipa spp.			
Dominant Overstorey species	Lawrencia squamata Atriplex cinerea		
Dominant mid and under storey species	Disphyma crassifolium Austrostipa sp. Avena sp.* Gazania linearis* Moraea setifolia*		
Description			
Survey Site	A5	Location	GDA 1994 -35.0621, 138.5020

Lawrencina squamata Sparse Low Shrubland over Disphyma crassifolia and Austrostipa spp.

Threatened Species observed	None
Declared Weeds	<i>Pinus halepensis</i> * (Aleppo Pine) <i>Lycium ferocissimum</i> * (African Boxthorn)
Sparse low shrubland in poor condition situated on stony shallow soils of more exposed cliff tops. Ground layer vegetation is sparse, with large areas of bare ground, and dominated by <i>Disphyma crassifolium</i> and introduced grasses.	
Benchmark Community	Coastal Shrublands of Dunes and Cliff tops
Unit Biodiversity Score	15.54

*Denotes introduced species.

Table 10. Vegetation Association description, *Lomandra effusa* and *Chloris truncata* Sparse Grassland.***Lomandra effusa* and *Chloris truncata* Sparse Grassland**


Dominant Overstorey species	<i>Atriplex cinerea</i>	
Dominant mid and under storey species	<i>Lomandra effusa</i> <i>Chloris truncata</i> <i>Gazania linearis</i> * <i>Medicago sp.*</i> <i>Moraea setifolia</i> *	
Description		
Survey Site	A3, A6	Location
		GDA 1994 A3: -35.0574, 138.5040 A6: -35.0600, 138.5030
Threatened Species observed	None	
Declared Weeds	<i>Gazania linearis</i> *(Gazania) <i>Chrysanthemoides monilifera</i> *(Boneseed) <i>Lycium ferocissimum</i> * (African Boxthorn)	
Grassland in fair condition on exposed cliff tops with very sparse emergent chenopod shrubs. <i>Lomandra effusa</i> and <i>Chloris truncata</i> are codominant with introduced forb species.		
Benchmark Community	Coastal Tussock Grasslands of Dunes and Cliffs	
Unit Biodiversity Score	53.13	

*Denotes introduced species.

Table 11. Vegetation Association description, *Olearia axillaris* / *Atriplex cinerea* +/- *Acacia cupularis* Low Open Shrubland over *Austrostipa* spp. and exotic grasses and forbs.***Olearia axillaris* / *Atriplex cinerea* +/- *Acacia cupularis* Low Open Shrubland over *Austrostipa* spp. and exotic grasses and forbs**

Dominant Overstorey species	<i>Acacia cupularis</i>
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***Olearia axillaris* / *Atriplex cinerea* +/- *Acacia cupularis* Low Open Shrubland over *Austrostipa* spp. and exotic grasses and forbs**

Dominant mid and under storey species	<i>Olearia axillaris</i> <i>Atriplex cinerea</i> <i>Enchylaena tomentosa</i> <i>Oxalis pes-caprae</i> * <i>Vulpia</i> sp.* <i>Austrostipa</i> sp. <i>Asphodelus fistulosus</i> * <i>Medicago</i> sp.* <i>Lomandra effusa</i>		
Description			
Survey Site	A4	Location	GDA 1994 -35.
Threatened Species observed	None		
Declared Weeds	<i>Lycium ferocissimum</i> * (African Boxthorn) <i>Gazania linearis</i> * (Gazania)		
Low shrubland in more sheltered sites in poor condition. Heavily impacted by weeds, including <i>Asphodelus fistulosus</i> (Onion Weed) and <i>Oxalis pes-caprae</i> (Soursoy). Less disturbed on the seaward side of the walkway and mid slopes of the cliff.			
Benchmark Community	Coastal Shrublands of Dunes and Cliff tops		
Unit Biodiversity Score	32.21		

*Denotes introduced species.

Table 12. Vegetation Association description, *Olearia axillaris*, *Myoporum insulare* and *Leucophyta brownii* Low Open Shrubland over *Chloris truncata* and exotic grasses and forbs.


***Olearia axillaris*, *Myoporum insulare* and *Leucophyta brownii* Low Open Shrubland over *Chloris truncata* and exotic grasses and forbs**

Dominant Overstorey species	<i>Olearia axillaris</i> <i>Myoporum insulare</i>		
Dominant mid and under storey species	<i>Leucophyta brownii</i> <i>Threlkeldia diffusa</i> <i>Atriplex cinerea</i> <i>Chloris truncata</i> <i>Lomandra effusa</i> <i>Avena</i> sp.* <i>Arctotheca calendula</i> * <i>Asphodelus fistulosus</i> * <i>Oxalis pes-caprae</i> *		
Description			
Survey Site	A2	Location	
Threatened Species observed	<i>Ptilotus angustifolius</i> <i>Myoporum parvifolium</i>		
Declared Weeds	<i>Chrysanthemoides monilifera</i> * <i>Gazania linearis</i> *		
Open shrubland on the mid to upper slopes of coastal cliffs, becoming less open towards the upper slopes. Fair condition vegetation, with a diversity of native forb and grass species. However, the site is disturbed by introduced grasses and forbs, such as <i>Arctotheca calendula</i> (Cape Weed) and <i>Avena</i> sp. (wild oats).			
Benchmark Community	Coastal Shrublands of Dunes and Clifftops		

Unit Biodiversity Score	11.17
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*Denotes introduced species.

Table 13. Vegetation Association description, *Olea europaea* +/- *Pinus halepensis* Low Woodland over *Chrysanthemoides monilifera* and *Avena* sp.

<i>Olea europaea</i> +/- <i>Pinus halepensis</i> Low Woodland over <i>Chrysanthemoides monilifera</i> and <i>Avena</i> sp.			
Dominant Overstorey species	<i>Olea europaea</i> *		
Dominant mid and under storey species	<i>Chrysanthemoides monilifera</i> * <i>Avena</i> sp.* <i>Gazania linearis</i> * <i>Oxalis pes-caprae</i> *		
Description			
Survey Site	A1	Location	GDA 1994 -35.06155, 138.50244
Threatened Species observed	None		
Declared Weeds	<i>Gazania linearis</i> * (Gazania) <i>Pinus halepensis</i> * (Aleppo Pine) <i>Chrysanthemoides monilifera</i> * (Boneseed) <i>Olea europaea</i> * (European Olive)		
A non-native woodland situated on shallow rocky soils on the sides and base of a deep gully. Dominated by <i>Olea europaea</i> (European Olive) in the upper storey and <i>Chrysanthemoides monilifera</i> (Boneseed) in the mid storey. Isolated <i>Acacia cupularis</i> occur in the floor of the gully. Ground layer contains introduced grasses and forbs, including <i>Avena</i> sp. (wild oats), <i>Gazania linearis</i> (Gazania) and <i>Oxalis pes-caprae</i> (Sour sob).			
Benchmark Community	Non-native - Not assessed		
Unit Biodiversity Score	Non-native - Not assessed		

*Denotes introduced species.

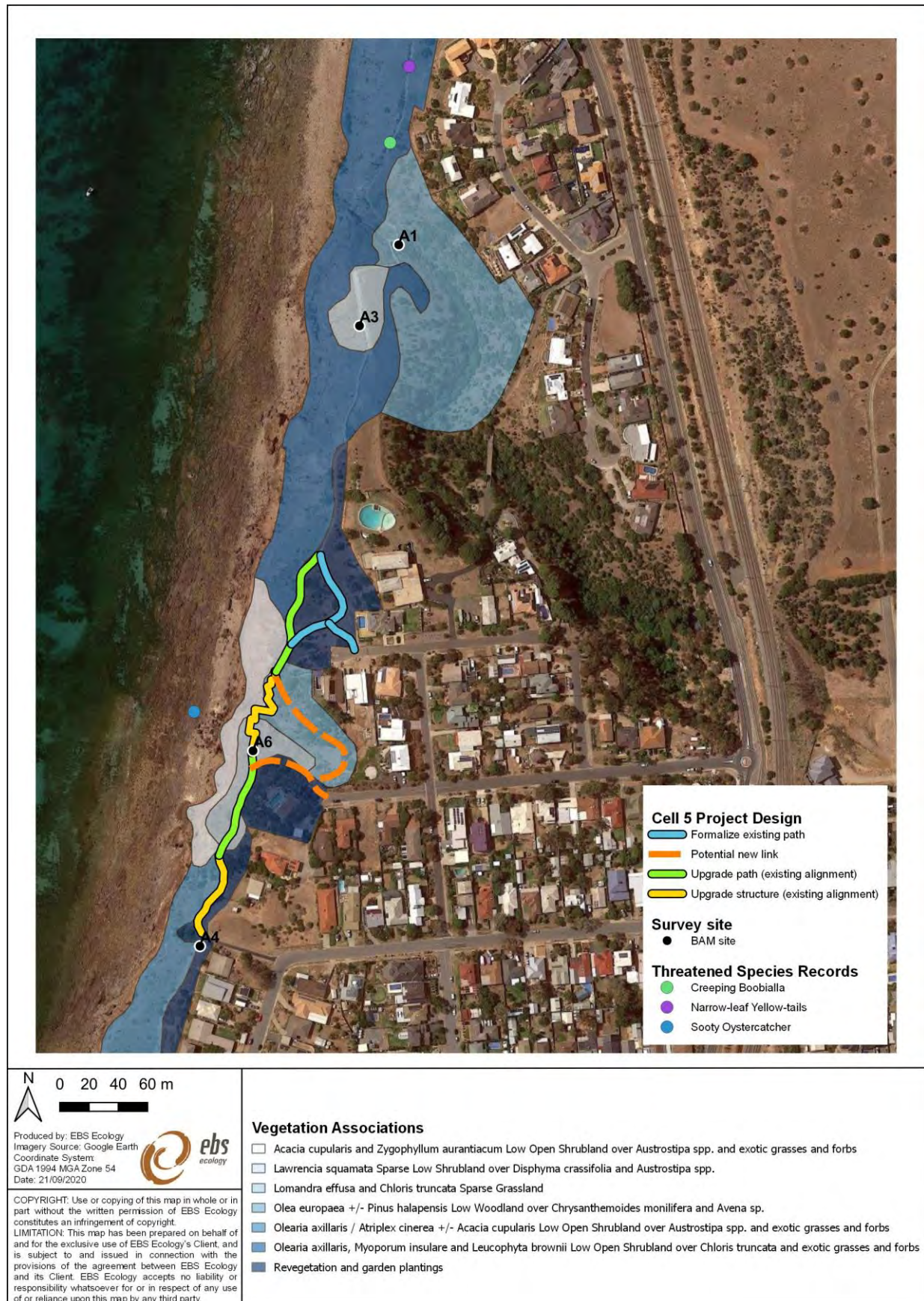
Table 14. Vegetation Association description, Revegetation and garden plantings.

Revegetation and garden plantings			
Dominant Overstorey species	<i>Eucalyptus</i> spp. <i>Acacia</i> spp. <i>Myoporum insulare</i> <i>Allocasuarina verticillata</i> <i>Scaevola crassifolia</i>		
	Dominant mid and under storey species	<i>Avena</i> sp.* <i>Oxalis pes-caprae</i> * <i>Lolium</i> sp.* <i>Medicago</i> sp.* <i>Austrostipa</i> sp. <i>Brassica tournefortii</i> *	
Description			
Survey Site	Not surveyed	Location	Cell 5, Cell6, Cell 10
Threatened Species	None recorded		
Declared Weeds	None recorded		

Revegetation and garden plantings	
Revegetation of mixed shrubs and garden plantings, including introduced and native species. This vegetation Association cannot be defined as native vegetation and was not formerly surveyed. However, species lists were collected and the distribution in Cell 5, Cell 6 and Cell 10 mapped.	
Benchmark Community	Non-native - Not assessed
Unit Biodiversity Score	Non-native - Not assessed

*Denotes introduced species.

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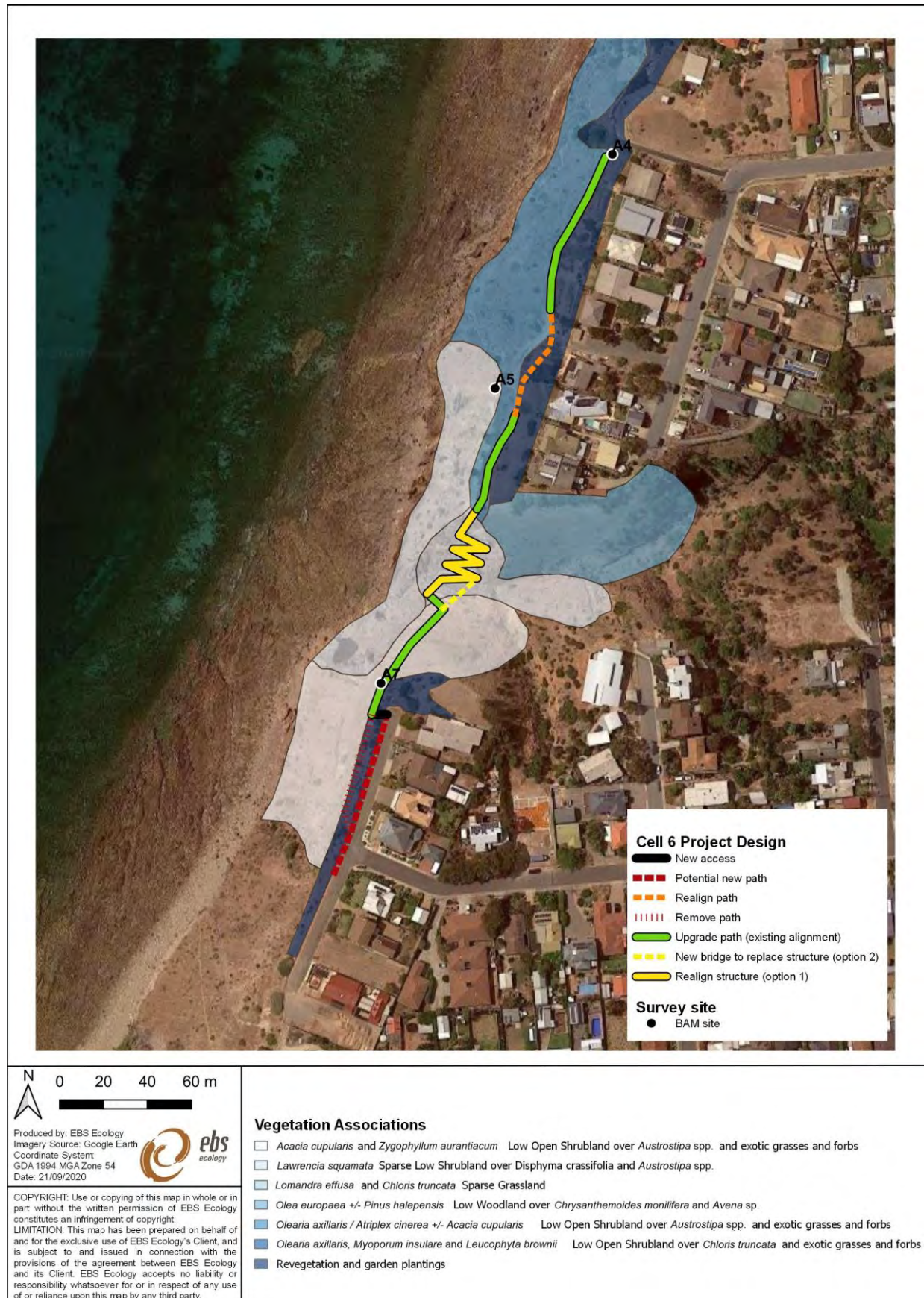


Figure 5. Vegetation Associations and Project design, Cell 6.

4.2.2 Cell 10

Seven native Vegetation Associations have been mapped previously in *Flora and fauna assessment Coast Park – Hallett Cove* (T&M Ecologists, 2019), with the remainder of the area composed of non-native grassland or woodland and revegetation areas. Mapped in Figure 6, these Vegetation Associations were ground truthed and photographed during the field survey. The mapping completed by T&M Ecologists was found to be accurate.

The seven native Vegetation Associations mapped for Cell 10 are listed below. Descriptions of each can be found in T&M Ecologists 2019.

- *Acacia longifolia* ssp. *sophorae* Shrubland (Figure 7).
- *Melaleuca halmaturorum* +/- *Leptospermum laevigatum* Very Low Open Forest (Figure 8).
- *Nitraria billardiarei* Shrubland (Figure 9).
- *Olearia axillaris* and *Myoporum insulare* Low Open Shrubland (Figure 10).
- *Olearia axillaris*, *Myoporum insulare* and *Leucophyta brownii* Low Open Shrubland (Figure 11).
- *Phragmites australis* Tall Grassland with emergent *Eucalyptus camaldulensis* (Figure 12).
- *Spinifex hirsutus* Tussock Grassland (Figure 13).

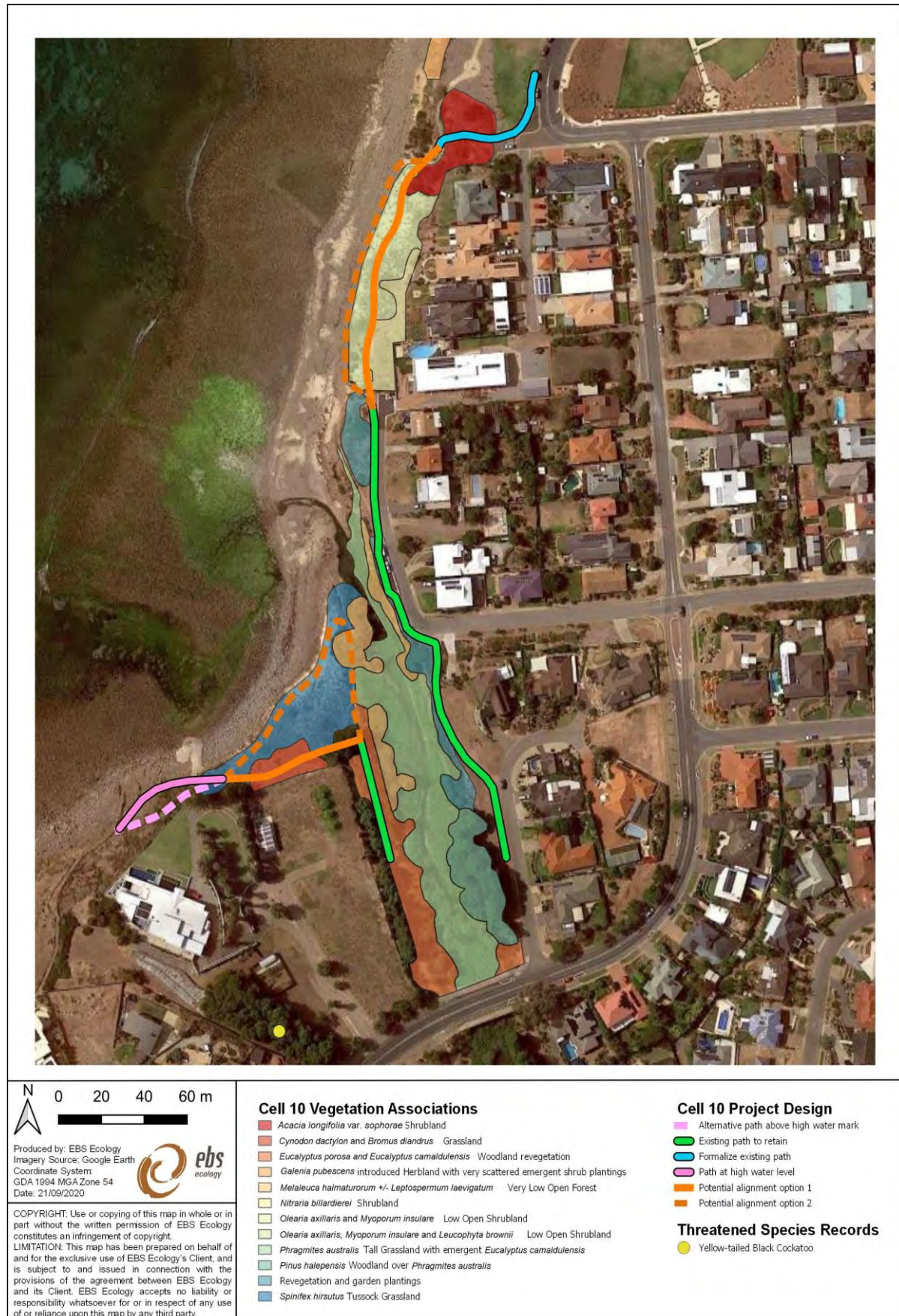


Figure 6. Vegetation Associations and Project Design, Cell 10. Vegetation Association mapping has been taken from *Flora and fauna assessment Coast Park – Hallet Cove* (T&M Ecologists, 2019).



Figure 7. *Acacia longifolia* ssp. *sophorae* Shrubland.



Figure 8. *Melaleuca halmaturorum* +/- *Leptospermum laevigatum* Very Low Open Forest



Figure 9. *Nitraria billardiarei* Shrubland.



Figure 10. *Olearia axillaris* and *Myoporum insulare* Low Open Shrubland.



Figure 11. *Olearia axillaris*, *Myoporum insulare* and *Leucophyta brownii* Low Open Shrubland.



Figure 12. *Phragmites australis* Tall Grassland with emergent *Eucalyptus camaldulensis*.



Figure 13. *Spinifex hirsutus* Tussock Grassland.



Figure 14. Revegetation of *Eucalyptus camaldulensis* and *Eucalyptus microcarpa*.

4.3 Flora and fauna species recorded during the survey

4.3.1 Flora and fauna

Sixty-six flora species were recorded during the survey (Appendix 3.). This included 27 introduced and 39 native species, two of which are threatened species listed under the NPW Act (see Section 4.1.2).

Fauna was not diverse, consisting mainly of species common to open space in urban areas, with one reptile, 20 bird and 2 mammal species recorded (Appendix 4). Five species recorded were introduced:

- *Vulpes vulpes* (Red Fox);
- *Passer domesticus* (House Sparrow);
- *Rock Dove* (*Columba livia*);
- *Sturnus vulgaris* (Common Starling); and
- *Turdus merula* (European Blackbird).

Two species listed as threatened under the NPW Act, both birds, were recorded, as discussed in Section 4.1.3.

4.3.2 Weeds

Seven plants declared as weeds under the Landscape SA Act 2019 were recorded. Two of these are also classed as Weeds of National Significance (WoNS). Weeds recorded during the survey are listed in Table 15.

Table 15. Declared weeds and WoNS recorded in the Project Area.

Scientific Name	Common Name	Growth Form	LSA Act Declared	WoNS
<i>Cenchrus setaceus</i>	Fountain Grass	Grass	Yes	No
<i>Chrysanthemoides monilifera</i>	Boneseed	Shrub	Yes	Yes
<i>Gazania linearis</i>	Gazania	Forb	Yes	No
<i>Lycium ferocissimum</i>	African Boxthorn	Shrub	Yes	Yes

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Scientific Name	Common Name	Growth Form	LSA Act Declared	WoNS
<i>Olea europaea</i>	European Olive	Tree	Yes	No
<i>Pinus halepensis</i>	Aleppo Pine	Tree	Yes	No
<i>Polygala myrtifolia</i>	Myrtle-leaf Milkwort	Shrub	Yes	No

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5 DISCUSSION AND RECOMMENDATIONS

Results of the desktop and field surveys indicate that native vegetation occurs in the Project Area and will potentially be impacted. This consists of shrubland and grassland Vegetation Associations in poor to fair condition. While the area is exempt from the NV Act, clearing of vegetation may be inconsistent with the *City of Marion Development Plan*, the *City of Marion Remnant Vegetation Plan 2018 – 2023* and the DV Act.

Four flora and 10 fauna species listed as threatened under the NPW Act possibly occur in the Project Area, four recorded during the field survey. Two of these species are also listed as threatened under the EPBC Act and three fauna species listed as Migratory under the EPBC Act are also likely to occur.

Of these fauna species, nine are wetland species that are only likely to occur on the beach and near the Field River outlet in Cell 10, while three species require mature trees for foraging resources, as summarised in Table 16. This list includes the Hooded Plover, listed as Vulnerable under the EPBC Act, that is known to nest on the beach in Cell 10.

No Threatened Ecological Communities occur in the Project Area.

Recommendations for addressing impact to the Hooded Plover are discussed in Section 5.1, while other constraints are addressed in Sections 5.2, 5.3 and 5.4.

Table 16. Threatened and migratory species occurrence in the Project Area.

Threatened species	Legislation	Habitat*	Occurrence
<i>Actitis hypoleucos</i> Common Sandpiper	EPBC Act	Wetlands, beaches	Cell 10
<i>Calidris canutus</i> Red Knot	EPBC Act NPW Act	Wetlands, beaches	Cell 10
<i>Calidris ferruginea</i> Curlew Sandpiper	EPBC Act NPW Act	Wetlands, beaches	Cell 10
<i>Egretta sacra sacra</i> Eastern Reef Heron	NPW Act	Wetlands, beaches	Cell 10
<i>Haematopus fuliginosus</i> Sooty Oystercatcher	NPW Act	Wetlands, beaches	Cell 10
<i>Melithreptus gularis</i> Black-chinned Honeyeater	NPW Act	Requires mature trees	Cell 10
<i>Numenius madagascariensis</i> Eastern Curlew	EPBC Act NPW Act	Wetlands, beaches	Cell 10
<i>Pandion haliaetus</i> Eastern Osprey	EPBC Act NPW Act	Wetlands, beaches	Cell 10
<i>Thinornis cucullatus</i> Hooded Plover	EPBC Act NPW Act	Wetlands, beaches	Cell 10
<i>Tringa nebularia</i> Common Greenshank	EPBC Act	Wetlands, beaches	Cell 10
<i>Pteropus poliocephalus</i> Grey-headed Flying Fox	EPBC Act NPW Act	Requires mature trees	Cell 10
<i>Zanda funerea whitea</i> Yellow-tailed Black Cockatoo	NPW Act	Requires mature trees	Cell 10

*Refer to Appendix 2

5.1 Hooded Plover

Two project design options have been proposed for walkway construction in Cell 10, close to Hooded Plover habitat. These are shown in Figure 15 as Option 1 and Option 2. Hooded Plovers are known to nest high up the beach. In addition to the potential of direct impacts, such as nest trampling and predation by domestic dogs, the species is known to be susceptible from indirect impacts associated with disturbance.

As discussed in Section 2.1, the City of Marion has previously been provided with recommendations by Birdlife Australia for avoiding and minimising impact to Hooded Plovers. The two Project design options proposed address these recommendations as described in Table 17.

As Option 1 addresses most of Birdlife Australia's recommendations, it reduces the impact on Hooded Plovers. It may also have a positive impact, by closing beach access near nesting habitat and reducing disturbance impacts.

It is recommended that Option 1 be developed over Option 2 and that Council or its contractors undertake an EPBC Self-assessment to test the significance of impact on Hooded Plovers. This should occur according to the *Matters of National Environmental Significance Significant impact guidelines 1.1 – Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, 2013).

Table 17. Project design and impact to Hooded Plovers.

Location	Previous Recommendations	Option 1*	Option 2*
East of Field River	<ol style="list-style-type: none"> 1. Situate the walkway as far east as possible on the dunes east of the Field River mouth. 2. Situate the walkway at the far eastern side of the dunes to allow for habitat retreat due to climate change. 3. Remove the two beach access points at either end of the dunes east of the Field River, channelling walkers onto the new formal walkway and away from nesting areas. 4. If revegetating dunes following construction, use local native species that provide habitat for nesting plovers (i.e. avoid dense plantings of shrubs). 	<ol style="list-style-type: none"> 1. Given the result of consultation with residents, the walkway is positioned as far as is possible to the east. 2. Option 1 does not allow for habitat retreat resulting climate change. 3. Beach access points are removed. 4. Not addressed in project design. 	<ol style="list-style-type: none"> 1. Option 2 would construct the walkway directly through the known nesting site of Hooded Plover. 2. Option 2 does not allow for habitat retreat resulting from climate change. 3. Beach access points would become part of the new walkway. 4. Not addressed in project design.
West of Field River	<ol style="list-style-type: none"> 1. Walkway should closely follow the boundary of Council/private land behind the dunes to connect with the base of the existing walkway at the base of the cliffs. 2. Terminate the current track behind the dunes to reduce the funnelling of people onto the beach just south of the Field River outlet. 	<ol style="list-style-type: none"> 1. Walkway follows the boundary of Council land closely. 2. Current track to south of the Field River outlet is terminated. 	<ol style="list-style-type: none"> 1. Walkway follows Field River and boundary between dune and beach. 2. Track accessing beach is not terminated.

*As mapped in Figure 15.



Figure 15. Project design options for walkway construction in Hooded Plover habitat, Cell 10.

5.2 Cell 5

Ecological constraints relevant to Cell 5 and recommendations are discussed in Table 18.

Table 18. Cell 5, constraints and recommendations.

Constraint	Comments	Recommendations
Native vegetation	Four native Vegetation Associations occur in Cell 5. All works are proposed to occur on current alignment, except potential new link with Pindee St.	Where possible, design walkway to follow existing alignment and place any laydown/construction sites outside areas mapped as native vegetation.
Threatened flora	Two threatened flor species occur at the northern end of Cell 5. No work is proposed for this location.	Vegetation Management Plan to be included in the Construction Environmental Management Plan. Weed Management Plan to be included in the Construction Environmental Management Plan.

5.3 Cell 6

Ecological constraints relevant to Cell 5 and recommendations are discussed in Table 19.

Table 19. Cell 6, constraints and recommendations.

Constraint	Comments	Recommendations
Native vegetation	Three native Vegetation Associations occur in Cell 6. Potential new path alignment on The Esplanade is in non-native vegetation (revegetation and garden plantings). Walkway realignment north of Kurnabinna Gully is in non-native vegetation (revegetation and garden plantings). Re-development of Kurnabinna Gully crossing will impact native vegetation.	Where possible, design walkway to follow existing alignment and place any laydown/construction sites outside areas mapped as native vegetation. Vegetation Management Plan to be included in the Construction Environmental Management Plan. Weed Management Plan to be included in the Construction Environmental Management Plan.
Threatened flora	No threatened flora were recorded in this Cell during the field survey. However, it is possible that four species may occur that were not detected due to survey limitations.	

5.4 Cell 10

Ecological constraints relevant to Cell 5 and recommendations are discussed in Table 20.

Table 20. Cell 10, constraints and recommendations.

Constraint	Comments	Recommendations
Native vegetation	<p>Seven native Vegetation Associations occur in Cell 10.</p> <p>All works are proposed to occur on current alignment, except potential new link with Pindee St.</p>	<p>Where possible, design walkway to follow existing alignment and place any laydown/construction sites outside areas mapped as native vegetation.</p> <p>Vegetation Management Plan to be included in the Construction Environmental Management Plan.</p> <p>Weed Management Plan to be included in the Construction Environmental Management Plan.</p>
Threatened and migratory fauna	<p>Nine species of threatened or migratory species are known to or possibly utilise the beach area.</p> <p>Three threatened species are known to or possibly utilise mature, flowering trees in Cell 10.</p>	<p>Close or formalise beach access points where feasible to do so.</p> <p>Avoid clearing mature trees, both introduced and native species.</p> <p>Avoid construction of walkway infrastructure on the beach/foredune where possible.</p> <p>Consider advice from Birdlife Australia as far as is practicable in Project Design.</p>

6 REFERENCES

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7 APPENDICES

Appendix 1. Assessment of likelihood for threatened flora.

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Marino Coastal Walk Flora and Fauna Assessment

Scientific name	Common name	Conservation status		Source of information	Last sighting (year)	Habitat constraints	Likelihood of occurrence within project area
		Aus	SA				
<i>Caladenia tensa</i>	Greencomb Spider-orchid	EN		1	No records	The Greencomb Spider-orchid grows on red-brown sandy loams on rises in open woodland dominated by <i>Eucalyptus leucoxylon</i> (Department of Agriculture, Water and the Environment, 2020b).	Unlikely. There are no records of the species within 5 km of the Project Area and the degraded coastal shrubland is not suitable habitat.
<i>Acacia dodonaeifolia</i>	Hop-bush Wattle		R	2	2014	Mainly in woodland open forest vegetation formation. Soils; hard acidic, yellow duplex, red shallow porous loamy, sandy alkaline yellow duplex (State Herbarium of South Australia, 2020a).	Unlikely. Although recorded within 5 km since 1995, the coastal cliff-top and dune habitats found in the Project Area are not suitable for this species.
<i>Acacia iteaphylla</i>	Flinders Ranges Wattle		R	2	2019	Found on northern Eyre Peninsula eastward to the Flinders Ranges and northern Mount Lofty Ranges growing on hillsides amongst rocky outcrops or in valleys along rocky creek banks. Widely planted & naturalised elsewhere and widespread in the Mt Lofty Ranges region (Botanic Gardens of South Australia, 2020a).	Unlikely. The Project Area is outside the natural distribution of the species. Recent records likely refer to planted specimens.
<i>Acacia whibleyana</i>	Whibley's Wattle	EN	E	2	2002	This species has a restricted distribution and has been collected in an area within 40 km of Tumby Bay on southern Eyre Peninsula. It has been collected from loamy soils over limestone, sometimes near salt swamps (State Herbarium of South Australia, 2020b).	Unlikely. The Project Area is outside the natural distribution of the species. Recent records likely refer to planted specimens.
<i>Austrostipa densiflora</i>	Fox-tail Spear-grass		R	2	2019	Occurs almost exclusively amongst rocks or on very shallow soil overlying rock and	Likely.

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Scientific name	Common name	Conservation status		Source of information	Last sighting (year)	Habitat constraints	Likelihood of occurrence within project area
		Aus	SA				
						most common in drier, elevated sites (Royal Botanic Gardens Victoria, 2020a).	Recent records occur in Hallett Cove Conservation Park in similar habitat. <i>Austrostipa</i> spp. grasses were recorded during the field survey but could not be identified as they weren't flowering.
<i>Austrostipa multispiculis</i>	Many-flowered Spear-grass		R	2	2000	Endemic to South Australia and found on the Yorke Peninsula, Kangaroo Island and the Mount Lofty Ranges growing on limestone loams and sandy loams in woodland and grassland (Botanic Gardens of South Australia, 2020b).	Unlikely. The Project Area has no limestone soils or woodland and/or grassland habitats.
<i>Austrostipa tenuifolia</i>			R	2	2000	Found on the Eyre Peninsula, Mount Lofty Ranges, the Murray and the upper South-east in South Australia, growing sandy soils in grassland or grassy woodland associated with <i>Callitris</i> or <i>Allocasuarina</i> . Also found in Western Australia and Victoria (Botanic Gardens of South Australia, 2020c).	Unlikely. The Project Area has no <i>Callitris</i> or <i>Allocasuarina</i> grassy woodlands.
<i>Caladenia pusilla</i>	Pigmy Caladenia		R	2	2003	Occurs in clumps or small groups in clay or gravel soils in exposed sites in open forest, often in soils which are boggy in winter but bake hard in summer (State Herbarium of South Australia, 2020c)	Unlikely. The only seasonally wet areas are at the bottom of gullies. These sites are heavily impacted by weeds and are not suitable habitat for terrestrial orchid species.
<i>Eucalyptus alatissima</i>	Kingsmill's Mallee		R	2	2012	Restricted to the central western of South Australia growing on gravelly red sands and loams between sand dunes, in open mallee (Botanic Gardens of South Australia, 2020d).	Unlikely. The Project Area is outside the natural distribution of the species. Recent records likely refer to planted specimens.

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Scientific name	Common name	Conservation status		Source of information	Last sighting (year)	Habitat constraints	Likelihood of occurrence within project area
		Aus	SA				
<i>Eucalyptus fasciculosa</i>	Pink Gum		R	2	2019	Grows on soils of poor fertility, such as sandy or rocky areas, and if often associated with <i>Eucalyptus leucoxylon</i> in the Mount Lofty Ranges (Nicolle, 1997).	Unlikely. No <i>Eucalyptus fasciculosa</i> individuals were recorded during the field survey, despite searching the entire Project Area.
<i>Euphrasia collina ssp. osbornii</i>	Osborne's Eyebright	EN	E	1, 2	2008	Generally occurs in mallee scrubland but has also been found growing in sclerophyll forest and sometimes in sclerophyll woodland, heathy openings in wet sclerophyll forest and a swamp at Mount Compass (Department for Environment and Heritage, 2008a).	Unlikely. There is no Mallee habitat in the Project Area.
<i>Leptorhynchus elongatus</i>	Lanky Buttons		E	2	2006	Occurs in woodland and grassland on sandy to sandy loam soils (Botanic Gardens of South Australia, 2020e).	Unlikely. Soils in the Project Area, excepting sand dunes in Cell 10, are skeletal soils over shallow rock and no woodland habitat occurs.
<i>Maireana decalvans</i>	Black Cotton-bush		E	2	1996	Found on heavy seasonally waterlogged soils (Department for Environment and Heritage, 2008b).	Unlikely. No seasonally waterlogged habitats occur in the Project Area except near the mouth of the Field River. This site has no <i>Maireana</i> sp. present.
<i>Maireana rohrlachii</i>	Rohrlach's Bluebush		R	2	2006	Grows on slightly saline and/or gypseous, sandy loam soils, often fringing lakes or in seasonally wet areas (Royal Botanic Gardens of Victoria, 2020b).	Unlikely. The limited areas of suitable habitat for the species (areas near the lower slopes and base of gullies) were searched for the

Marino Coastal Walk Flora and Fauna Assessment

Scientific name	Common name	Conservation status		Source of information	Last sighting (year)	Habitat constraints	Likelihood of occurrence within project area
		Aus	SA				
							species. It was not recorded during the survey.
<i>Myoporum parvifolium</i>	Creeping Boobialla		R	2, 3	2019	Coastal cliffs, sand, and brackish mud flats (Prescott, 1991).	Known. Recorded during the field survey.
<i>Olearia pannosa ssp. pannosa</i>	Silver Daisy-bush	VU	V	1	No records	Found in mallee and woodland habitats, with an undergrowth typically dominated by Acacia spp., Melaleuca spp., chenopod shrubs and grasses and sedges. (Department for Environment and Heritage, 2008c).	Unlikely. There is no suitable woodland or mallee habitat in the Project Area.
<i>Podolepis decipiens</i>			R	2	2020	More arid woodland, mallee and heath (Botanic Gardens of South Australia, 2020f).	Unlikely. There is no suitable woodland, mallee or heath habitat in the Project Area.
<i>Podolepis jaceoides</i>	Showy Copper-wire Daisy		R	2	2006	Occurs in grassland, woodland and mallee, typically on soils of higher nutrient status (State Herbarium of South Australia, 2020e).	
<i>Podolepis muelleri</i>	Button Podolepis		V	2	2020	Found mainly in the Flinders Ranges and the Mount Lofty Ranges, growing on coastal cliffs and on stony sites in woodland and grassland further inland (Botanic Gardens of South Australia, 2020g).	Likely. Habitat is suitable. The field survey occurred outside of the species flowering season, meaning any plants present may not have been detected.
<i>Prasophyllum pallidum</i>	Pale Leek-orchid	VU	R	1	No records	Grows singly or in small groups on the more fertile soils of woodland and well-grassed open forests. (Department for	Unlikely. Coastal shrublands and cliff tops are not suitable habitat for this species.

Marino Coastal Walk Flora and Fauna Assessment

Scientific name	Common name	Conservation status		Source of information	Last sighting (year)	Habitat constraints	Likelihood of occurrence within project area
		Aus	SA				
						Environment and Heritage, 2008c).	
<i>Prasophyllum pruinosum</i>	Plum Leek-orchid	EN	E	1	No records	Open woodland and grassy forest with <i>Callitris gracilis</i> , <i>Eucalyptus leucoxylon</i> and <i>E. fasciculosa</i> . Occurs in the open or in the shelter of broom-like shrubs in well drained, fertile loams and sandy soils (Department for Environment and Heritage, 2008d).	Unlikely. Coastal shrublands and cliff tops are not suitable habitat for this species.
<i>Ptilotus angustifolius</i>	Narrow-leaf Yellow-tails		E	2, 3	2019	Endemic to South Australia and from near Quorn, north-east of Port Augusta, south to Victor Harbor, growing on rocky slopes or hills (Botanic Gardens of South Australia, 2020h).	Known. Recorded during the field survey.
<i>Swainsona behriana</i>	Behr's Swainson-pea		V	2	2006	Once found in the Mount Lofty Ranges and the lower South-east, growing on light or occasionally heavy soils in moist grassland and woodland. Now only found in the northern and eastern side of the Mount Lofty Ranges (Botanic Gardens of South Australia, 2020i).	Unlikely. The Project Area is outside the known current distribution of the species and no moist grassland or woodland habitats occur.

Conservation status

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level. An asterisk denotes ratings that need to be qualified for a variety of reasons, such as changes to taxonomy or nomenclature since listing or because a species assessed as 'presumed extinct' had to be listed under the Endangered category. Further details are available from the Vascular Plant Metadata document on the [DEW website](#).

Source of Information

1. EPBC Act Protected Matters Report (Department of Agriculture, Water and the Environment, 2020a) – 5 km buffer applied to project area.
2. Biological Database of South Australia data extract (Government of South Australia, 2020a) - 5 km buffer applied to project area.
3. Recorded during the field survey.

Appendix 2. Assessment of likelihood for threatened fauna.

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Marino Coastal Walk Flora and Fauna Assessment

Scientific name	Common name	Conservation status		Source of information	Last sighting (year)	Habitat constraints	Likelihood of occurrence
		Aus	SA				
<i>Apus pacificus</i>	Fork-tailed Swift	Mi		1	No records	<p>The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher.</p> <p>In Australia, they mostly occur 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. They also occur over settled areas, including towns, urban areas and cities (Department of Agriculture, Water and the Environment, 2020c).</p>	<p>Unlikely.</p> <p>Possible as a fly-over record only. The species is unlikely to utilise any terrestrial habitat in the Project Area.</p>
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi		1	No records	<p>The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats (Department of Agriculture, Water and the Environment, 2020d).</p>	<p>Possible.</p> <p>Although not recorded since 1995, limited suitable habitat for the species exists at the mouth of the Field River and adjacent shoreline habitat.</p>
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	E	1	No records	<p>Favours permanent freshwater wetlands with tall, dense vegetation, particularly bulrushes (Office of Environment and Heritage, 2020).</p>	<p>Unlikely.</p> <p>There is no suitable habitat in the Project Area, nor any recent records.</p>
<i>Calidris canutus</i>	Red Knot	EN	E	1	No records	<p>Mainly inhabit 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.</p>	<p>Possible.</p> <p>Although not recorded since 1995, limited suitable habitat for the species exists at the mouth of the Field River and adjacent shoreline habitat.</p>

Marino Coastal Walk Flora and Fauna Assessment

Scientific name	Common name	Conservation status		Source of information	Last sighting (year)	Habitat constraints	Likelihood of occurrence
		Aus	SA				
						(Department of Agriculture, Water and the Environment, 2020e).	
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	E	1	No records	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 (Department of Agriculture, Water and the Environment, 2020f).	Possible. Although not recorded since 1995, limited suitable habitat for the species exists at the mouth of the Field River and adjacent shoreline habitat.
<i>Egretta sacra sacra</i>	Pacific Reef Heron		R	2	2011	Rocky shores, exposed reefs, beaches, tidal rivers and mangroves (Pizzey & Knight, 2007).	Highly likely. The species has been recorded within the last 10 years. Shoreline habitat at the Field River mouth and at the base of cliffs is suitable for the species.
<i>Falco hypoleucos</i>	Grey Falcon	VU	R	1	No records	Lightly treed inland plains; gibber deserts, sandridges, pastoral lands and timbered watercourses (Pizzey & Knight, 2007).	Unlikely. There is no suitable habitat for the species in the Project Area.
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		R	3		Intertidal rocky reefs, mostly on ocean shores (Pizzey & Knight, 2007).	Known. Recorded during the field survey.
<i>Melithreptus gularis</i>	Black-chinned Honeyeater		V	2	2010	Eucalypt woodland with an annual rainfall range of 400-700 mm, particularly associations containing ironbark and box. Favoured habitats incorporate a mixture of mature and regenerating woodland Eucalypts (Department for	Possible. Suitable woodland habitat is very limited in the Project Area and restricted to revegetated areas at the Field River.

Marino Coastal Walk Flora and Fauna Assessment

Scientific name	Common name	Conservation status		Source of information	Last sighting (year)	Habitat constraints	Likelihood of occurrence
		Aus	SA				
						Environment and Heritage, 2008e)	
<i>Myiagra cyanolueca</i>	Satin Flycatcher	Mi	E	1	No records	Heavily vegetated gullies in forests and taller woodlands. Coastal forests and woodlands during migration (Pizzey & Knight, 2007).	Unlikely. Suitable habitat does not exist in the Project Area.
<i>Numenius madagascariensis</i>	Eastern Curlew	CE	E	1	No records	Estuaries and tidal mudflats (Pizzey & Knight, 2007).	Possible. Although not recorded since 1995, limited suitable habitat for the species exists at the mouth of the Field River and adjacent shoreline habitat.
<i>Pandion haliaetus</i>		Mi	E	1, 2	1998	Littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers (Department of Agriculture, Water and the Environment, 2020f).	Possible. Limited suitable habitat occurs and there are recent records within 5 km of the Project Area.
<i>Rostratula australis</i>	Australian Painted Snipe	EN	E	1	No records	Generally, inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire (Department of Agriculture, Water and the Environment, 2020g).	Unlikely. There are no suitably vegetated wetlands in the Project Area and no recent records of the species.
<i>Sternula nereis nereis</i>	Australian Fairy Tern	VU	E	1	No records	Nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. Roosting habitat	Possible. Although not recorded since 1995, limited suitable habitat for

Marino Coastal Walk Flora and Fauna Assessment

Scientific name	Common name	Conservation status		Source of information	Last sighting (year)	Habitat constraints	Likelihood of occurrence
		Aus	SA				
						includes rocky or sandy beaches (Department of Agriculture, Water and the Environment, 2020h).	the species exists at the mouth of the Field River and adjacent shoreline habitat.
<i>Thinornis cucullatus cucullatus</i>	Hooded Plover	VU	V	1, 2	1997	Weedy rock shelves and reefs, broad ocean beaches and adjacent sand dunes (Pizzey & Knight, 2007).	Known. Recorded during the field survey.
<i>Tringa nubilaria</i>	Common Greenshank	Mi		1	No records	Mudflats, estuaries, saltmarshes and fresh and saline wetlands (Pizzey & Knight, 2007).	Possible. Although not recorded since 1995, limited suitable habitat for the species exists at the mouth of the Field River and adjacent shoreline habitat.
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot	EN	V	1	No records	Inhabit a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland and are usually associated with infertile, sandy and well drained soils. Within these vegetation communities they typically inhabit areas of dense ground cover (Department of Agriculture, Water and the Environment, 2020i).	Unlikely. Habitats in the Project Area do not provide the density of cover in the understorey that the species requires, being composed of low open shrubland and grassland.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	R	1, 2	2020	The Grey-headed Flying-fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, <i>Melaleuca</i> swamps and <i>Banksia</i> woodlands. It also feeds on commercial fruit crops and on introduced tree species	Likely. The species is likely to utilise planted and remnant flowering trees in Cell 10 for foraging.

Scientific name	Common name	Conservation status		Source of information	Last sighting (year)	Habitat constraints	Likelihood of occurrence
		Aus	SA				
						in urban areas. (Department of Agriculture, Water and the Environment, 2020j)	
<i>Zanda funerea whiteae</i>	Yellow-tailed Black Cockatoo		V	2, 3	2018	Forests, woodlands and plantations of <i>Eucalyptus</i> and exotic conifers (e.g. <i>Pinus halepensis</i> and <i>Pinus radiata</i>) (Pizzey & Knight, 2007).	Known. Recorded during the field survey.

Conservation status

Aus: Australia (Environment Protection and Biodiversity Conservation Act 1999). SA: South Australia (National Parks and Wildlife Act 1972). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level. Mi: listed as migratory under the EPBC Act. Ma: listed as marine under the EPBC Act.

Source of Information

1. EPBC Act Protected Matters Report (Department of Agriculture, Water and the Environment, 2020a) – 5 km buffer applied to project area.
2. Biological Database of South Australia data extract (Government of South Australia, 2020a) - 5 km buffer applied to project area.
3. Recorded during the field survey.

Appendix 3. Flora species recorded during the survey.

Scientific Name	Common Name	NPW Act	EPBC Act	WoNS	LSA Act Declared
<i>Acacia cupularis</i>	Cup Wattle				
<i>Acacia paradoxa</i>	Kangaroo Thorn				
<i>Acacia victoriae</i> ssp.	Elegant Wattle				
<i>Agave</i> sp.*					
<i>Allocasuarina verticillata</i>	Drooping Sheoak				
<i>Arctotheca calendula</i> *	Cape Weed				
<i>Asphodelus fistulosus</i> *	Onion Weed				
<i>Atriplex cinerea</i>	Coast Saltbush				
<i>Austrostipa</i> sp.	Spear-grass				
<i>Avena</i> sp.*	Oat				
<i>Brassica tournefortii</i> *	Wild Turnip				
<i>Calostemma purpureum</i>	Pink Garland-lily				
<i>Carrichtera annua</i> *	Ward's Weed				
<i>Cenchrus setaceus</i> *	Fountain Grass				Y
<i>Chloris truncata</i>	Windmill Grass				
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i> *	Boneseed			Y	Y
<i>Convolvulus erubescens</i> complex					
<i>Dianella brevicaulis</i>	Short-stem Flax-lily				
<i>Disphyma crassifolium</i> ssp. <i>clavellatum</i>	Round-leaf Pigface				
<i>Dissocarpus biflorus</i> var.	Two-horn Saltbush				
<i>Dodonaea viscosa</i> ssp.	Sticky Hop-bush				
<i>Enchylaena tomentosa</i> var.	Ruby Saltbush				
<i>Euphorbia peplus</i> *	Petty Spurge				
<i>Foeniculum vulgare</i> *	Fennel				
<i>Frankenia pauciflora</i> var.	Southern Sea-heath				
<i>Freesia laxa</i> *					
<i>Fumaria</i> sp.*	Fumitory				
<i>Gazania linearis</i> *	Gazania				Y
<i>Gomphocarpus cancellatus</i> *	Broad-leaf Cotton-bush				
<i>Lawrencia squamata</i>	Thorny Lawrencia				
<i>Lepidosperma</i> sp.	Sword-sedge				
<i>Leucophyta brownii</i>	Coast Cushion Bush				
<i>Leucopogon rufus</i>	Ruddy Beard-heath				
<i>Lomandra effusa</i>	Scented Mat-rush				
<i>Lomandra</i> sp.	Mat-rush				
<i>Lycium ferocissimum</i> *	African Boxthorn			Y	Y
<i>Maireana enchylaenoides</i>	Wingless Fissure-plant				
<i>Medicago minima</i> var. <i>minima</i> *	Little Medic				
<i>Medicago</i> sp.*	Medic				
<i>Melaleuca lanceolata</i>	Dryland Tea-tree				
<i>Moraea setifolia</i> *	Thread Iris				
<i>Myoporum insulare</i>	Common Boobialla				

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Scientific Name	Common Name	NPW Act	EPBC Act	WoNS	LSA Act Declared
<i>Myoporum parvifolium</i>	Creeping Boobialla	R			
<i>Nitraria billardierei</i>	Nitre-bush				
<i>Olea europaea ssp.*</i>	Olive			Y	
<i>Olearia axillaris</i>	Coast Daisy-bush				
<i>Osteospermum sp.*</i>					
<i>Oxalis pes-caprae*</i>	Soursob				
<i>Pimelea micrantha</i>	Silky Riceflower				
<i>Pimelea serpyllifolia ssp. serpyllifolia</i>	Thyme Riceflower				
<i>Pinus halepensis*</i>	Aleppo Pine				Y
<i>Polygala myrtifolia*</i>	Myrtle-leaf Milkwort				Y
<i>Ptilotus angustifolius</i>	Narrow-leaved Yellow-tails	R			
<i>Reichardia tingitana*</i>	False Sowthistle				
<i>Rhagodia parabolica</i>	Mealy Saltbush				
<i>Rosmarinus officinalis*</i>	Rosemary				
<i>Rytidosperma sp.</i>	Wallaby-grass				
<i>Salsola australis</i>	Buckbush				
<i>Scabiosa atropurpurea*</i>	Pincushion				
<i>Scaevola crassifolia</i>	Cushion Fanflower				
<i>Sida intricata</i>	Twiggy Sida				
<i>Sonchus oleraceus*</i>	Common Sow-thistle				
<i>Threlkeldia diffusa</i>	Coast Bonefruit				
<i>Vittadinia cuneata var.</i>	Fuzzy New Holland Daisy				
<i>Vulpia sp.</i>	Fescue				
<i>Zygophyllum aurantiacum/eremaeum</i>	Shrubby Twinleaf				

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Appendix 4. Fauna species recorded during the survey.

Scientific Name	Common Name	NPW Act	EPBC Act
REPTILES			
<i>Tiliqua rugosa</i>	Sleepy Lizard		
BIRDS			
<i>Gavicalis virescens</i>	Singing Honeyeater		
<i>Anthochaera carunculata</i>	Red Wattlebird		
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		
<i>Columba livia</i> *	Rock Dove		
<i>Corvus mellori</i>	Little Raven		
<i>Egretta novaehollandiae</i>	White-faced Heron		
<i>Falco cenchroides</i>	Nankeen Kestrel		
<i>Gymnorhina tibicen</i>	Australian Magpie		
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	R	
<i>Larus pacificus</i>	Pacific Gull		
<i>Microcarbo melanoleucos melanoleucos</i>	Little Pied Cormorant		
<i>Ocyphaps lophotes</i>	Crested Pigeon		
<i>Passer domesticus</i> *	House Sparrow		
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		
<i>Phalacrocorax varius</i>	Pied Cormorant		
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater		
<i>Sturnus vulgaris</i> *	Common Starling		
<i>Thalasseus bergii</i>	Crested Tern		
<i>Turdus merula</i> *	Common Blackbird		
<i>Zanda funerea whiteae</i>	Yellow-tailed Black Cockatoo		V
MAMMALS			
<i>Tursiops truncatus</i>	Common Bottlenose Dolphin		
<i>Vulpes vulpes</i> *	Red Fox		

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