

BATEMANS BAY BRIDGE PROJECT

BRIDGE OVER CLYDE RIVER

Urban Design and Landscape Plan



Cover image:

Artist impression – view of new Batemans Bay Bridge from Holmes Lookout, Clyde River National Park

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Glossary

AHD Australian Height Datum	Roads and Maritime Road and Maritime Services
AHIMS Aboriginal Heritage Information Management System	RW Retaining wall
AS Australian Standards	SB Southbound
BCA Building Code of Australia	SS Stainless steel
CBD Central Business District	SUP Shared User Path
CFC Compressed Fibre Cement	SWTC Scope of Works and Technical Criteria
CM ⁺ Conybeare Morrison	UDLP Urban Design and Landscape Plan
CPTED Crime Prevention Through Environmental Design	WQB Water Quality Basin
DDA Disabilities and Discrimination Act	WSUD Water Sensitive Urban Design
EEC Endangered Ecological Community	Gateway There are entrance points which have a high degree of visibility and a distinct sense of transition. Gateways may include landscaping, public art, gateway structures, special lighting and signs.
EIS Environmental Impact Statement	Shared Path These are priority routes for pedestrians and cyclists. A pathway adjacent to the road.
ESD Environmentally Sustainable Development	
Highway HW1 Princes Highway	
LGA Local Government Area	
LS Landscape	
NB Northbound	
NSW New South Wales	
Project Batemans Bay Bridge Project	
RL Reduced Level	

NOTE

This report illustrates drawings and images to demonstrate urban design intent only. Structural and other engineering information shown is indicative only, please refer to engineering drawings for details.

Design development is underway and this report includes the current status of design, which will be subject to confirmation following stakeholder and community consultation.

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1.0 General

1.1 Purpose of this report

This report illustrates the project's urban and landscape design plan. Specifically, how the New Batemans Bay Bridge relate to its context, how the proposed design solutions respond to the specific requirements determined as part of the approval documents and community consultation. It is also worth noting, that the Project falls under the compliancy of the Safety Mitigation Measures (SMM).

Project components are developed through an integrated urban design approach. This approach encourages a continuous component evolution and refinement throughout the Project period.

The components have receive further development as part of the detailed design stage, arising from engineering requirements, construction constraints and Authority approvals, as well as design modifications as an outcome of the community and stakeholder consultation process.

1.2 Design methodology

The integrated urban and landscape design for the project are prepared in collaboration with a multi-disciplinary team of engineers, contractors, artist, community and stakeholder consultant, landscape designers, 3D visualisers and urban designers. We have worked very closely with other members of the team including Context Landscape Design (in association with CM⁺), John Holland, VSL, Tony Gee, Jacobs, and our community and stakeholder consultant Mirella Di Genua.

Key steps included:

- Attended site visit
- Reviewed background documents
- Identified opportunities
- Developed urban and landscape design objectives and principles based on overall project objectives
- Developed design strategies based on driver experience and legacy projects
- Prepared concept sketches and alternate options for northern and southern foreshores
- Developed design of bridge piers based on the key strategies
- Developed urban design features in consultation with artist
- Developed the process of preparing detailed design and documentation
- Check SWTC Compliance.

Softwares:

- Main Report: InDesign
- Drawings: Civil/Map 3D, AutoCad 2018
- 3D images: 3D Max, Rhino, Sketchup, Lumion, hand sketches
- General graphics: Photoshop, Illustrator, PowerPoint.

1.3 Document structure

This report has been structured to identify design responses and strategies, as well as demonstrating compliance as outlined in the Technical Criteria Scope of Works (SWTC) and SMM.

Chapter 1.0 – General

Introduces the project, design methodologies employed and guideline documents used to inform the design.

Chapter 2.0 – Compliance with environmental approval documents

Demonstrates compliance with SMM.

Chapter 3.0 – Consultation

Provides a summary of consultation strategy and process undertaken to date.

Chapter 4.0 – Contextual Analysis

Provides a brief contextual analysis of the project context, with particular focus on urban design and landscape related issues.

Chapter 5.0 – New Batemans Bay Bridge

Chapter 6.0 – Retaining walls

Chapter 7.0 – Landscape design

Chapter 8.0 – Foreshore works

Chapter 9.0 – Artwork strategy

Chapter 10.0 – Conclusion

1.4 Guideline documents

Key guideline documents include:

- *Beyond the Pavement - urban design policy procedures and design principles*, Roads and Maritime Services, January 2014
- *Bridge Aesthetics - design guidelines to improve the appearance of bridges in NSW*, Roads and Maritime Services, July 2012
- *Batemans Bay Bridge Replacement Environmental Impact Statement*, Roads and Maritime Services, November 2017
- *Batemans Bay Bridge Replacement Review of Environmental Factors*, Roads and Maritime Services, November 2017
- *Infrastructure Design Standard*, Eurobodalla Shire Council
- *Batemans Bay Bridge Replacement Urban Design Report and Landscape Character Visual Impact Assessment*, Ki Studio, October 2017
- *Batemans Bay Bridge Replacement Aboriginal Cultural Heritage Assessment*, Aurecon on behalf of Roads and Maritime Services, October 2017
- *Batemans Bay Town Centre Structure Plan*, Eurobodalla Shire Council, 2008
- *Landscape Guideline*, Roads and Maritime Services, April 2008
- *Guideline for Landscape Character and Visual Impact Assessment EIA-N04*, Roads and Maritime Services, March 2013
- *Guideline for Batter Surface Stabilisation Using Vegetation*, Roads and Maritime Services, April 2015
- *Biodiversity Guidelines - protecting and managing biodiversity on RTA projects*, September 2011
- *Water Sensitive Urban Design Guideline*, Roads and Maritime Services, May 2017

- *Shotcrete Design Guidelines - design guideline to improve the appearance of shotcrete in NSW*, Roads and Maritime Services, 2016
- *Designing to Minimise Vandalism - an investigation into planning and design measures to avoid or mitigate vandalism (final draft)*, RTA, November 2008
- *Soil Landscapes of Sydney*, Soil Conservation Service of NSW, 1999
- *Environmental Friendly Seawalls*, Office of Environment and Heritage, 2009

We have also collaborated with artist Chris Fox to explore potential urban public art opportunities, which can be used as potential urban design features, providing an integrated artwork, urban design and engineering approach to the project. This process are subject to consultation with stakeholders and community. Refer to Section 9.0.



Figure 1-1: Guideline documents

2.0 Compliance with environmental approval documents

2.1 Compliance with environmental approval documents - Summary of Safeguards and Management Measures (SMM)

Impact	ID	Environmental safeguards	Document reference
General	LC1	An Urban Design and Landscape Plan (UDLP) are prepared to support the final detailed project design and implemented as part of the CEMP. The UDLP presents an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment. The UDLP will include: <ul style="list-style-type: none">proposed revegetation plan that includes:<ul style="list-style-type: none">species to be usedscreening of infrastructure where required and practicalminimising the impacts of headlight glare on surrounding residentsplanting of foreshore areas to be to be determined in consultation with Council.procedures for monitoring and maintaining landscaped or rehabilitated areas.design treatments for:<ul style="list-style-type: none">built elements including retaining walls and the bridge and consider application of crime prevention through environmental design strategies.pedestrian and cyclist elements including shared use path locations, paving types and pedestrian crossingsfixtures such as seating, lighting, fencing and signsdetails of the staging of landscape works taking account of related environmental controls such as erosion and sedimentation controls and drainage.	This document
			Chapters 7.11, 7.12 and 7.17
			Chapter 7.0
			Chapter 7.0
			Ongoing - subject to discussions with Council and other stakeholders, including FAC in Oct/Nov 2018
			Chapter 7.7
			Chapters 5.0, 6.0 and 8.0
			Chapters 5.0, 6.0 and 8.0
			Chapter 8.3
			Chapter 7.3
		The UDLP are prepared in accordance with relevant guidelines, including: <ul style="list-style-type: none">Beyond the Pavement urban design policy, process and principles (Roads and Maritime 2014c)Landscape Guideline (RTA 2008)Bridge Aesthetics (Roads and Maritime 2012c)Shotcrete Design Guideline (RTA 2005c).	Chapter 1.3

Impact	ID	Environmental safeguards	Document reference
Integration of earthworks design with existing landform	LC2	The potential visual impact of the earthworks are minimised by careful design that integrates with adjoining landforms. This is achieved through rounding of the top of cut batters, tailing off of cut batters and a gradual flattening of grades at ends of fill embankments in order to avoid sharp transitions at ends.	Chapter 7.6
Integration of earthworks design with existing landform	LC3	Retaining walls will be constructed to minimise the construction footprint and removal of existing vegetation, where possible. Consideration are given to screen planting below walls and the use of visually recessive materials in order to minimise the visual dominance of retaining walls.	Chapters 6.0 and 7.0
Retention of existing vegetation	LC4	The proposal are designed to avoid impact to prominent trees and vegetation communities where possible. Water quality structures and drainage lines are designed to avoid existing vegetation where possible.	Chapter 7.0

3.0 Consultation

3.1 Community consultation strategy

A robust and sustainable consultation strategy is established as part of the project, and is documented in the Community Involvement Plan. This plan ensures appropriate levels of consultation with key stakeholders and the community to manage expectations and minimise risk as the project is carried forward.

Key stakeholders include:

- Foreshore Advisory Committee (FAC)
- Department of Fisheries

The consultation process is divided into two components:

- Consultation with key stakeholders
- Consultation with the community

The FAC is a major advisory committee, and is established to provide recommendations to Roads and Maritime, and the project team, as part of the detailed design process. It includes expert members from various communities from the local area, including the Council, local businesses, art/ historical society members, river user groups, aboriginal representatives and Crown Land representatives.

The key objective of the FAC is to establish community values and create a common vision for the Batemans Bay foreshore that considers the differing needs of the various stakeholders. The current urban design for the project will be presented to the FAC and any feedback received will be addressed to ensure the common vision is achieved for the project.

The FAC consultation process also includes the potential development of an urban design artwork strategy, which will allow for local artists to be engaged during the detailed design process, along with preliminary artwork explorations developed by artist Chris Fox, as part of developing an integrated urban design approach for the project.

Consultation with fisheries will be undertaken by submitting the UDLP and any feedback from them will be addressed appropriately.

Consultation with the community will be undertaken through community display sessions. Any feedback received from the community display sessions will be included in a submissions responses schedule, which will address the community comments.

The following program are prepared at the time of writing this report:

- Phase 1 – FAC meetings between October to December 2018
- Community update/Media release – December 2018
- Phase 2 – FAC meetings between February to March 2019
- Public display of foreshore design – March to April 2019

Summary of Community and stakeholder responses will be included as appendices in the UDLP, when they become available.

The project is in its final phase of consultation and feedback from the FAC and finalisation of the design.



4.0 Contextual analysis

4.1 Project overview

Roads and Maritime propose to replace the existing bridge over the Clyde River (referred to as Batemans Bay Bridge in this report) by constructing a new, dual carriageway bridge, to the west of the existing (referred to as the new Batemans Bay Bridge in this report).

Main elements of the project include:

- Construction of a new bridge to the west of the existing Batemans Bay Bridge
- New parking and community facilities along the northern and southern foreshores
- Public domain improvements on the northern and southern foreshores, including providing reinstatement of the existing T-wharf at the southern foreshore
- Site rehabilitation and landscaping improvements
- Decommission and removal of the existing bridge.

Potential benefits include:

- Improving freight access by allowing larger vehicles of up to 26 metres to cross the Clyde River
- Improving traffic movement at Kings and Princes Highway intersection
- Avoiding the ongoing maintenance costs of the existing bridge
- Provisions for public domain improvements on the northern and southern foreshore
- Opening up recreational and commercial opportunities.

4.2 Contextual analysis

4.2.1 Regional context

Batemans Bay lies within Eurobodalla Shire and it is the largest township on the coast south of Nowra. It is defined by the beautiful, expansive waterways of the Clyde River as it meets the South Pacific Ocean, forming a gateway to the Eurobodalla region beyond.

The township is located along the Princes Highway about 280 kilometres from Sydney, 760 kilometres from Melbourne and about 151 kilometres from Canberra. Other townships in the region include Moruya, Bodalla, Tuross Head, Mogo and Nelligen.

While tourism is Batemans Bay's main industry, many other industries, such as fishing, forestry, and oyster farming are also well established in the area.

Regional river crossings

The user experience of crossing the river on the bridge is widely recognised as a memorable aspect of the journey along the Princes Highway whilst travelling along the south coast between Sydney and the New South Wales (NSW) border.

There are a number of river crossings along the South Coast of NSW from Sydney to Moruya identified as follows:

- Captain Cook Bridge, Georges River
- Nowra Bridge, Shoalhaven River
- Burrill Lake Bridge, Burrill Lake
- Princes Highway Bridge over Tabourie Creek, Tabourie Creek
- Batemans Bay Bridge, Clyde River
- Princes Highway Bridge over Moruya River, Moruya River.



Figure 1-2: Canberra region tablelands map









Figure 1-3: Looking north over the Clyde River towards Pigeon House Mountain.

Source: <http://www.southcoast.com.au/batemansbay/bridge/history.htm>



Figure 1-4: Regional river crossings

	<p>Captain Cook Bridge Precast, prestressed concrete girder bridge</p> <p>Length: 506 metres Width: 27.5 metres Spans: 7 Piers: 6 Shared path: Yes</p> <p>Reinforced concrete piers on prestressed concrete piles with a precast pre-tensioned superstructure</p>		
	<p>Nowra Bridge</p> <p>Length: 342 metres Width: 15 metres Spans: 8 Piers: Tapered 'V' piers Shared path: Yes</p> <p>Box girder</p>		
	<p>Burrill Lake Bridge Precast super T girder bridge</p> <p>Length: 290 metres Width: 12-15 metres Spans: 16 Shared path: Yes</p>		<p>Princes Highway Bridge over Tabourie Creek Precast girder bridge</p> <p>Length: 288 metres Width: 8-10 metres Spans: 16 Shared path: Yes</p>
	<p>Batemans Bay Bridge Steel truss bridge</p> <p>Length: 287 metres Width: 8.2 metres Spans: 10 Piers: 9 Shared path: Yes</p> <p>Concrete piers on concrete piles with a steel truss superstructure</p>		<p>Princes Highway Bridge over Moruya River Steel bridge</p> <p>Length: 350 metres Width: 8-10 metres Spans: 7 Piers: Blade piers</p>

4.2.2 Local context

The township of Batemans Bay is strongly defined by its riverside setting and undulating hills. The area is known for its coastal beauty and is a major tourist destination, particularly for tourists travelling from Canberra and Sydney, with a spectacular combination of a picturesque coastline, pristine waterways and lush forest mountains.

Batemans Bay has a population of over 11,000 and is the main commercial and regional centre of the Eurobodalla Local Government Area (LGA). Significant planning for current and future development is underway, which is likely to lead to growth in population and traffic. This will have a significant impact on the current roads and other infrastructure at Batemans Bay, such as the bridge.

Batemans Bay Bridge

The Batemans Bay Bridge lies just to the north of the town over the Clyde River on the HW1 Princess Highway. It is located within the urban area of Batemans Bay Township, the Clyde River estuary and its surrounding unspoilt natural environment.

It is the primary north-south coastal transport corridor for vehicles, pedestrians and cyclists and, as the central element of the area, connects the commercial/industrial areas south of the river to the more dispersed residential areas of the north.

A variety of land forms and uses surround the bridge. Areas to the north are characterised by residential and holiday developments, while those to the south and coastal southeast comprise commercial, industrial and residential developments. The southwest is characterised by tidal wetlands and mangroves.

Both northern and southern foreshores serve as public recreational areas. Korner's Park and the beach on the northern foreshore offers picnic and contemplation areas. The high cutting on the northern approach frames the entry onto the bridge and the bay below. The 'On the Pier' restaurant with its outdoor deck offers the opportunity for people to enjoy panoramic views of the river.

The southern foreshore provides a promenade that extends for almost its full length, offering generous recreational areas and uninterrupted views towards the north. The promenade has been upgraded recently with shelters, providing community art which references World War I and II, local heritage, and amenities such as car parking facilities toilets and improved landscaping.

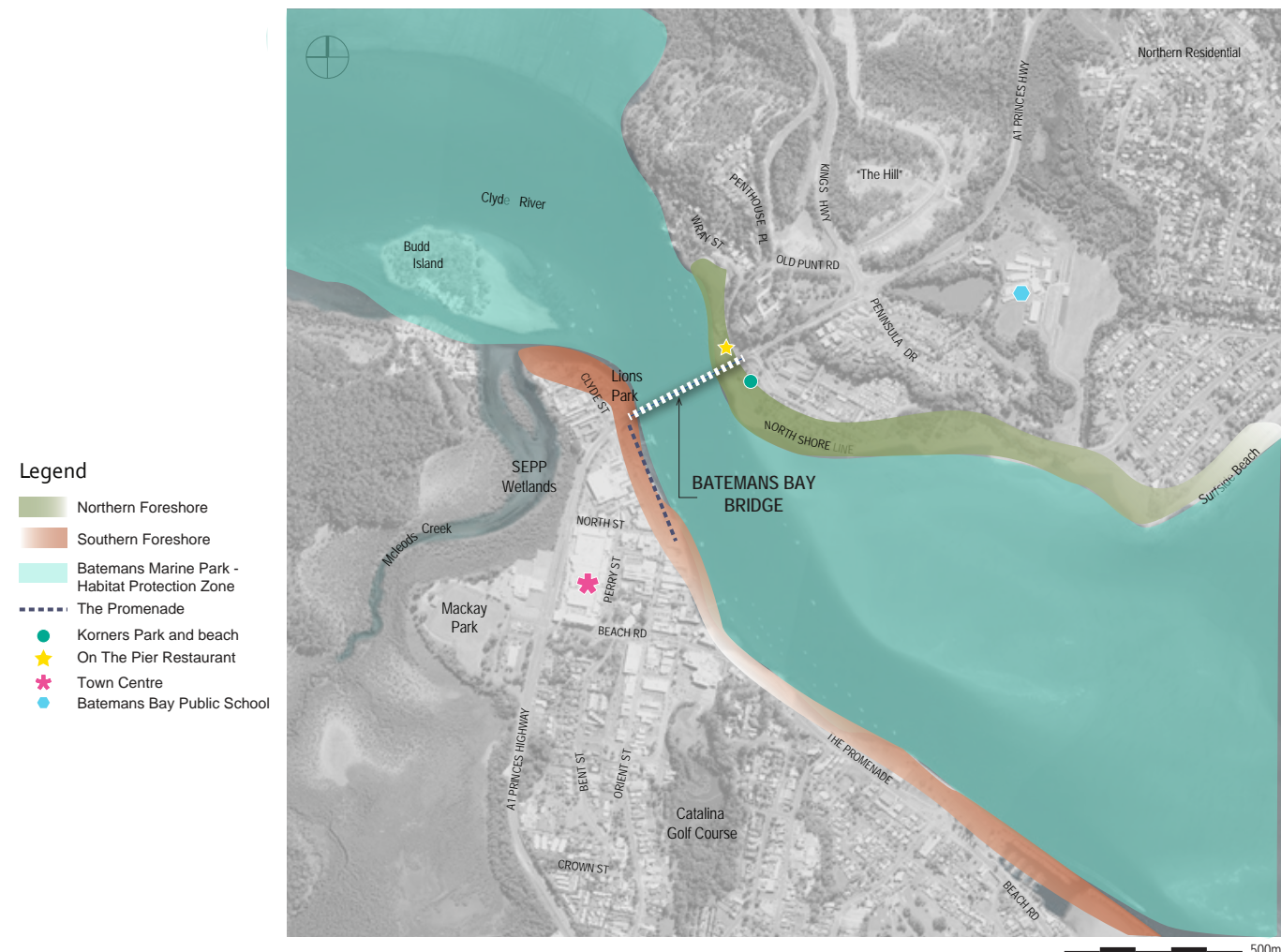


Figure 1-5: Local context map



Figure 1-6: Batemans Bay Masterplan Source: Workshop Architecture

Along with Batemans Bay's picturesque coastline and pristine waterways, the Batemans Bay Bridge is a well known and loved local icon.

The existing bridge has a strong visual character and heritage significance derived from its distinct trusses and central lift span towers. It is 287 metres in length and comprised of 10 spans and carries two lanes of traffic for a width of 8.5 metres. It was constructed in 1956 to replace the ferry punt, and has a lift span which is used to accommodate larger commercial water traffic. It is listed on the *Eurobodalla Local Environmental Plan 2012* and the *Roads and Maritime Section 170 Heritage and Conservation Register* as a locally significant item and also features on many 'post card' views of the area as it has come to symbolise the region.

The existing bridge serves as the main northern gateway to the township of Batemans Bay, marking the entry and providing an identity to the town and its coastal communities. However, many issues are associated with its use, including:

- No access for larger, heavy vehicles due to weight and height limitations
- Up to \$1 million in annual maintenance costs
- Technical failures in operating the lift span, causing traffic delays
- Restricted access for large marine traffic due to the bridge's clearance height when the lift span is down.

The project will provide an opportunity for the new Batemans Bay Bridge to create a new iconic landmark that also references the heritage significance of the existing bridge. It will also enhance the natural setting and re-establish the gateway identity to Batemans Bay. The new bridge will become a distinct marker along the coastal journey creating a new legacy and postcard image for Batemans Bay.



Figure 1-7: View looking north from Korners Park



Figure 1-8: View looking south from northern approach



Figure 1-9: View looking south from existing park on southern foreshore



Figure 1-10: View of Batemans Bay Bridge from existing wharf



Figure 1-11: View of On The Pier Restaurant on northern foreshore



Figure 1-12: View along the promenade looking north



Figure 1-13: View of Batemans Bay town centre along Clyde Street



Figure 1-14: View of Batemans Bay Bridge from northern foreshore

Land use

Batemans Bay is characterised by a combination of urban and natural environments. The analysis identifies major land uses along the corridor.

The southern foreshore is characterised by the town centre, and is predominantly mixed use with low density residential areas. The northern foreshore is predominantly low to medium density accommodation, with recreational areas along the shoreline.

Design implications:

- Capitalise on areas on the southern foreshore zoned for environmental conservation to introduce placemaking opportunities for the community
- Maximise the northern foreshore recreation areas by introducing activity generators, such as BBQ areas, contemplation areas, and improved boat ramp access
- Minimise impact to residential areas on the north

Heritage

The Batemans Bay Bridge Replacement – Aboriginal Cultural Heritage Assessment, October 2017 identified the Batemans Bay area as a region rich in natural resources that was once intensively used by the Aboriginal people. Though several archaeological sites are identified by the study, they are not impacted by the proposed works.

The *Eurobodalla Local Environmental Plan*, 2012 lists several heritage items that will be impacted by the proposed works.

These are:

- I294 – Existing Batemans Bay Bridge
- I167 – Former car ferry ramps.

Though none of these are of state heritage significance, careful consideration needs to be taken to minimise impacts or provide for preserving memory.

Design implications:

- Opportunity to reinstate the existing bridge's heritage significance through artwork and placemaking opportunities
- Retain heritage ramps on the northern and southern foreshores.

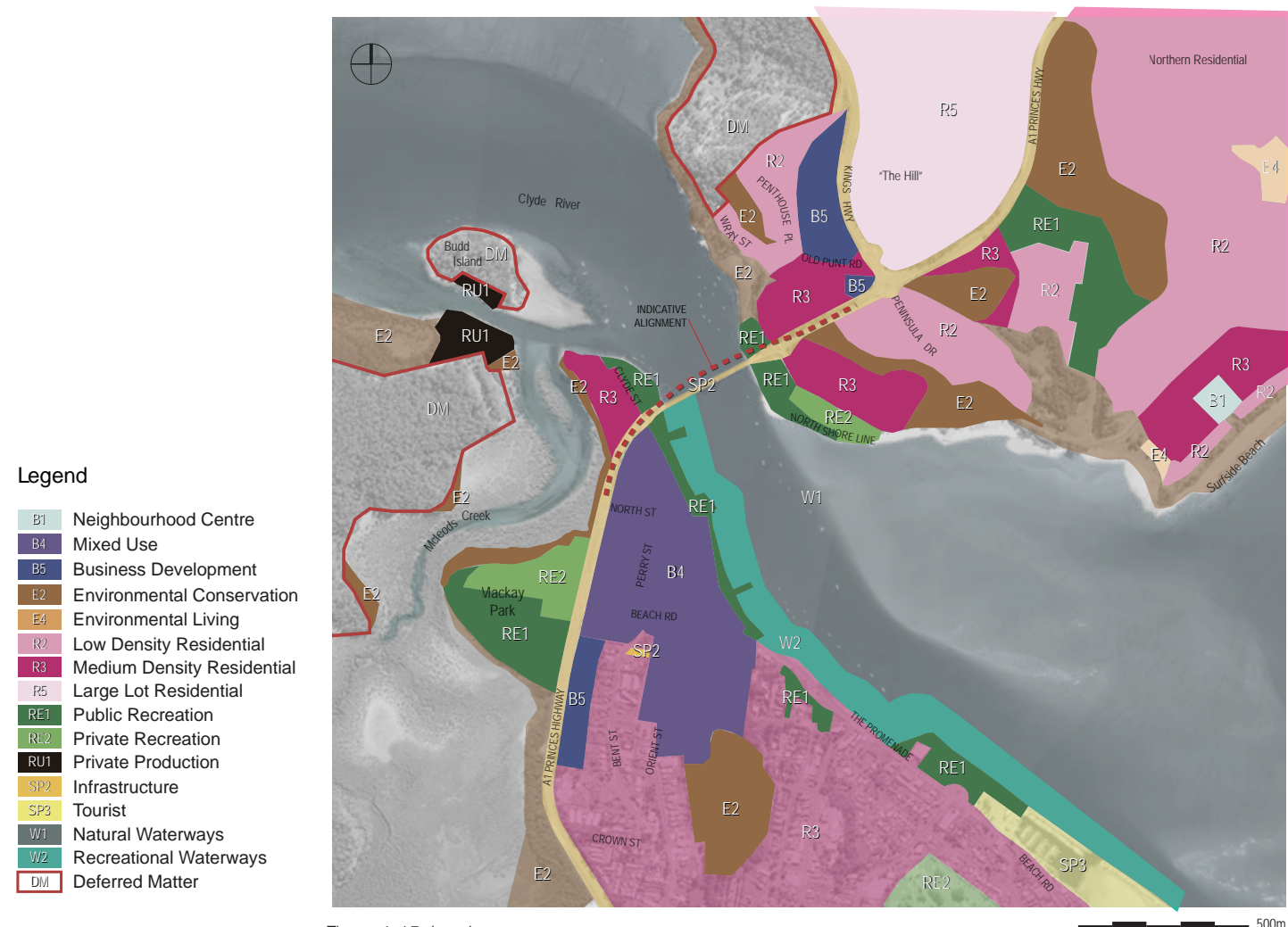


Figure 1-15: Land use
Source: Batemans Bay Bridge Replacement – Urban Design Report and Landscape Character and Visual Assessment

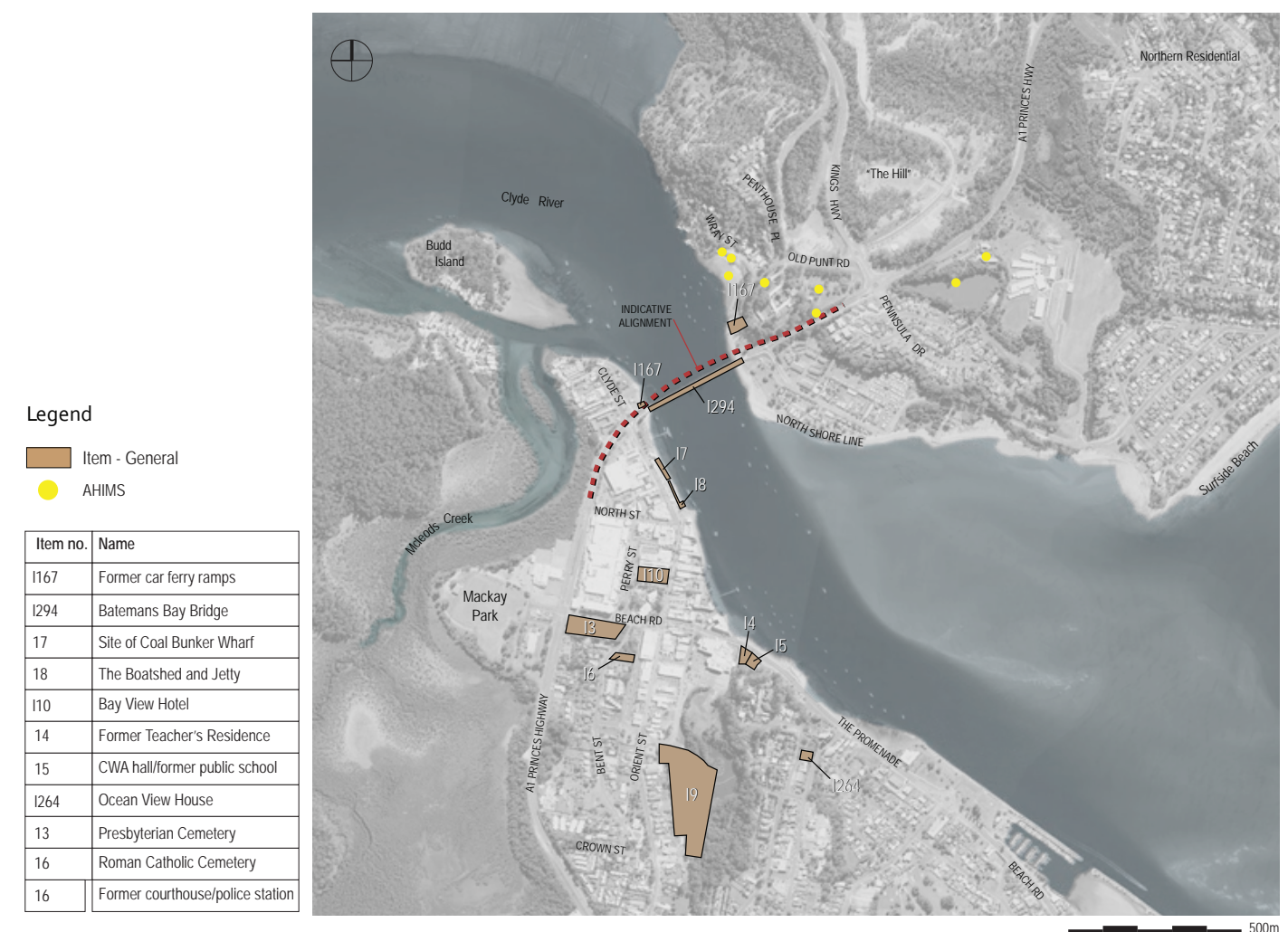


Figure 1-16: Heritage
Source: Batemans Bay Bridge Replacement – Urban Design Report and Landscape Character and Visual Assessment

Topography and views

The north is characterised by several high points and rugged topography, the high ground is separated from the foreshore by a steep escarpment.

In contrast, the south is relatively low in elevation with little variations in height and undulations.

Design implications:

- Opportunity to utilise the ridge on the norther foreshore as a visual catchment
- Maintain open views on the southern foreshore.



Existing view of Batemans Bay Bridge from Holmes Lookout, Clyde River National Park

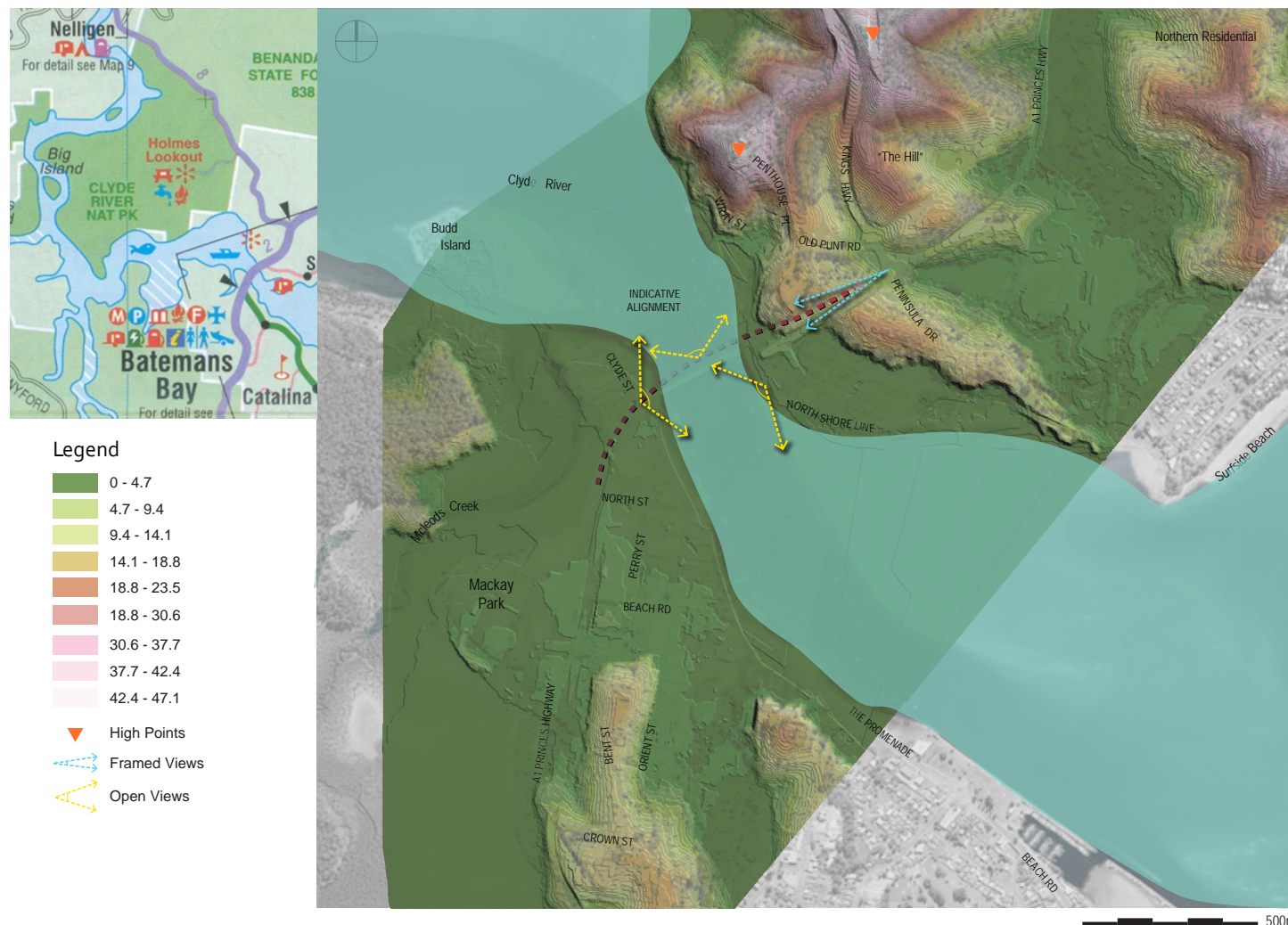


Figure 1-17: Topography and views

Source: Batemans Bay Bridge Replacement – Urban Design Report and Landscape Character and Visual Assessment

Connectivity

The Princes Highway is the main arterial road connecting the north and south sides of the town. Clyde Street and Beach Road are the two main local roads on the southern foreshore leading into the town centre, while on the northern foreshore Wharf Road provides the main access to the foreshore edge.

The township is generally served by three bus routes:

- 757 Batemans Bay to Maloneys
- 760 Batemans Bay to Moruya
- 761 Batemans Bay to Sunshine Bay.

There are also interstate and intrastate buses.

Design implications:

- Minimise impact on existing bus routes
- Maintain links to activity generators on the northern and southern foreshores.



Figure 1-18: Connectivity

Source: Batemans Bay Bridge Replacement – Urban Design Report and Landscape Character and Visual Assessment

Vegetation and open space

The north is predominantly characterised as bushland setting located on high ground. It is comprised of *wet sclerophyll forest (grassy)* with dense tress and areas of open grassland. It has limited framed views to the bay and river below.

The defining character of the south is the wetland, which forms part of the Clyde River estuary. It is an environmentally sensitive area, which include mangroves and salt marshes and Mcleods Creek.

Major open spaces include:

- Korner's Park
- Mackay Park.

Design implications:

- Limit impact on environmentally sensitive vegetation types
- Minimise impact on existing vegetation
- Recognise the importance of the visual prominence of the bridge with the view shed of the river
- Minimise light spill into the waterway and vegetated areas.

Landscape character zones

The corridor is characterised by a series of distinct landscape character types, which contribute to the overall urban experience of the area.

The north is characterised by dense bushland setting with stands of mature trees and has limited or closed views towards the water. It is also developed with one to two storey family residences and commercial properties close to the foreshore.

The south is characterised by open vistas and panoramic views to both the foreshore and landscape beyond. It has been developed as the town centre with a retail strip along the southern foreshore.

Design implications:

- Retain open views from the bridge
- Strengthen the promenade connection on the southern foreshore
- Enhance existing landscape character.



Figure 1-19: Vegetation and views
Source: Batemans Bay Bridge Replacement – Urban Design Report and Landscape Character and Visual Assessment

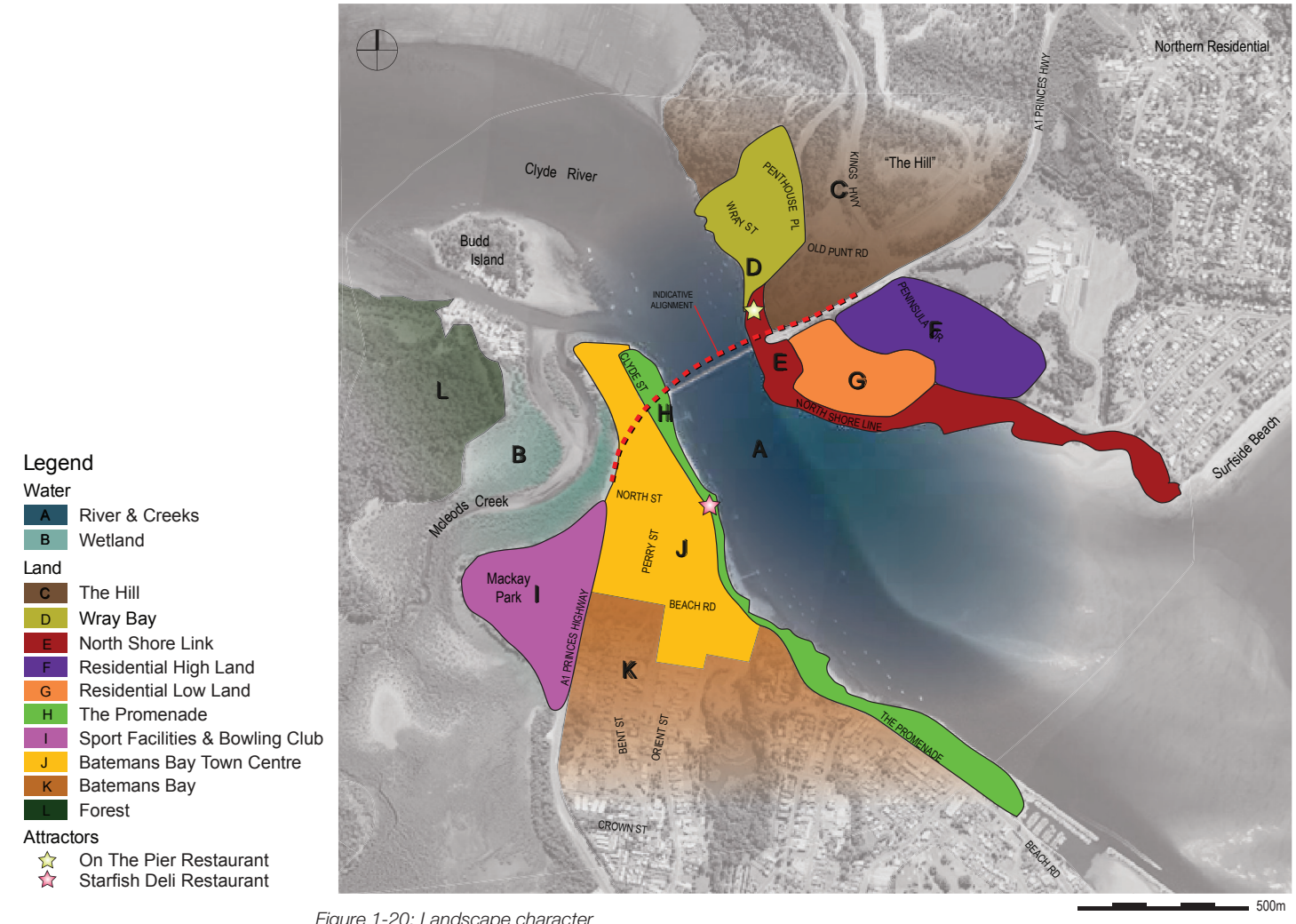














Figure 1-20: Landscape character
Source: Batemans Bay Bridge Replacement – Urban Design Report and Landscape Character and Visual Assessment

<p>Zone A – River and Creeks</p>  <p>Figure 1-21: View looking towards the southern foreshore from existing bridge over Clyde River</p>	<p>Zone B – Wetland</p>  <p>Figure 1-22: SEPP14 wetlands</p>	<p>Zone C – The Hill</p>  <p>Figure 1-23: View towards existing bridge over Clyde River from Princes Highway</p>	<p>Zone D – Wray Bay</p>  <p>Figure 1-24: Wray Street</p>
<p>Zone E – North Shore Link</p>  <p>Figure 1-25: View of existing crossing over Clyde River from northern foreshore looking north</p>	<p>Zone F – Residential High Land</p>  <p>Figure 1-26: View from Peninsular Drive looking northeast</p>	<p>Zone G – Residential Low Land</p>  <p>Figure 1-27: View from Wharf Road looking southeast</p>	<p>Zone H – The Promenade</p>  <p>Figure 1-28: View looking towards existing bridge over Clyde River from southern promenade</p>
<p>Zone I – Sports Facilities & Bowling Club</p>  <p>Figure 1-29: View of former Batemans Bay Bowling Club from Vesper Street</p>	<p>Zone J – Batemans Bay Town Centre</p>  <p>Figure 1-30: Batemans Bay Town Centre</p>	<p>Zone K – Batemans Bay</p>  <p>Figure 1-31: View from Orient Street looking northeast</p>	<p>Zone L – Forest</p>  <p>Figure 1-32: View of Batemans Bay from Holmes Lookout, Clyde River National Park</p>

4.3 Clyde River crossing – journey through time

The first provision made for the crossing of the Clyde River was the establishment of a ferry-punt in 1871. This punt was later replaced by a steam ferry.

With the increase in traffic in the early forties and the reconstruction of Princes Highway between Ulladulla and Batemans Bay, there became a need to replace the ferry connection with a bridge along Princes Highway. This led to the construction of a 10 span lift span truss bridge in 1956, which allowed ferries and boats to pass under the bridge, and replaced the only remaining vehicular ferry on the Princes Highway between Sydney and the Victorian border.

The proposal to replace the lift span bridge with a new bridge provides an opportunity to create a new identity and legacy for Batemans Bay.

The new bridge, with its foreshore improvements, can be understood as a part of a larger narrative of crossing the Clyde River and is seen as a suitable replacement for the existing bridge, which is held in high esteem by locals who appreciate its importance to the town and coastal communities beyond.

The new bridge will provide improved connectivity between the foreshores, open up views through the estuary from the town to the ocean, and provide an opportunity to reference the past as it provides for the future.

The urban and landscape design concept illustrates the initiatives provided to experience this journey through time.



Figure 1-33: Batemans Bay 1950s



Figure 1-34: Batemans Bay 1981



Figure 1-35: Batemans Bay 2017

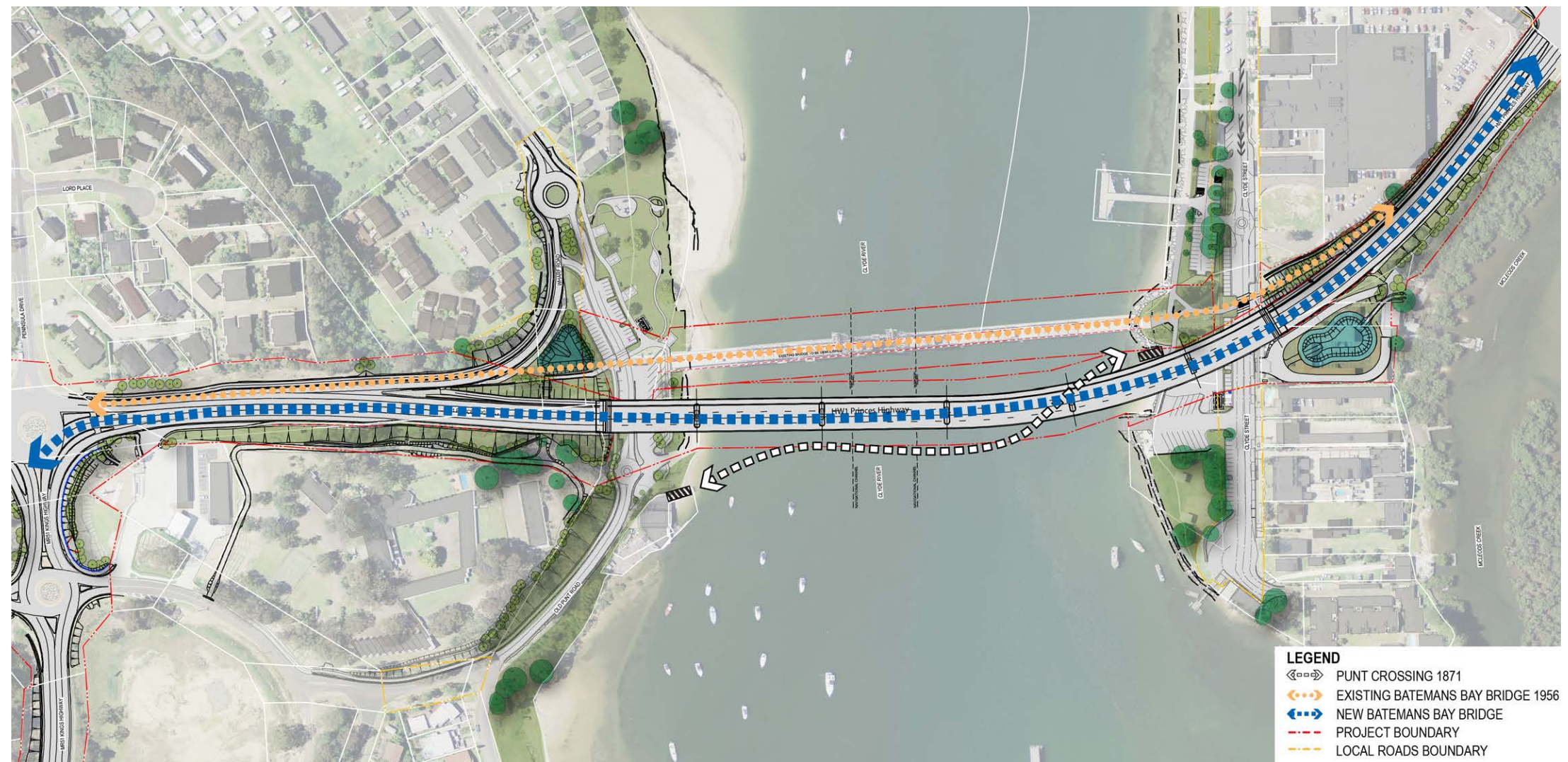


Figure 1-36: Clyde River crossings – journey through time

Landscape shown is indicative

The punt



Figure 1-37: The vehicular ferry before construction of the Clyde River bridge



Figure 1-38: The punt



Figure 1-39: Batemans Bay punt



Figure 1-40: View from the north bank of the new bridge over the Clyde River with the vehicular ferry still in operation. (Nov 1956)

Construction of Batemans Bay Bridge



Figure 1-41: Clyde River from northern side looking south toward Batemans Bay. Showing falsework and piers in early stages of construction of new bridge. (26/5/1949)



Figure 1-42: Progress of construction of the bridge over the Clyde River at Batemans Bay looking south. (Feb 1953)



Figure 1-43: First span erected on the bridge over the Clyde River at Batemans Bay (18/8/1955)



Figure 1-44: Showing the bridge nearing completion. It is constructed with light steel trusses on concrete piers and with a concrete deck. (Nov) 1956

The township



Figure 1-45: The main street in 1921



Figure 1-46: The bowling club in 1954



Figure 1-47: The punt next to the new bridge which opened in November 1956



Figure 1-48: The newly opened Soldiers Club

4.4 Urban design objectives and principles

Vision

To create a bridge that complements Batemans Bay, with its picturesque coastline and pristine waterways, and reinforces the identity of the town in the creation of a legacy for the community.

The elegant sculptural form of the bridge will provide a positive experience for drivers as well as the community by opening up new vistas from both the bridge and foreshores while respecting the heritage values and the character of the surrounding landscape.

Design approach

The team adopted the following design values, to achieve the objectives:

- Commitment to aesthetics
- Context sensitive design
- Contribution of sustainability to the aesthetic outcome
- Complementarity of cost and aesthetics
- Comprehensive design process
- Collaboration in the design team
- Consultation with community.

The design values include the recognition of:

- The need to balance urban outcomes with sound business case principles
- The importance of looking at the communities' perspective in this important piece of connectivity between both sides of the Clyde River
- The importance of defining a bridge that sits well in the landscape and provides for intuitive wayfinding
- The importance of recognising community sensitivity, marine ecosystem sensitivity as well as the surrounding biota to lighting and light spill
- The importance of demonstrating the Eurobodalla LGA's commitment to a sustainable future
- The importance of the heritage significance of the existing bridge
- The importance of working with Council's and other stakeholders' vision of the new bridge as a new gateway to Batemans Bay.

As part of the design process, the team has:

- Defined the issues and established good urban design principles and strategies, based on the guideline documents to present an integrated engineering and urban design outcome for the project
- Ensured that new infrastructure is seamlessly integrated into the existing environment and that impacts to the visual environment are mitigated, by providing a design solution that is sympathetic to the region's built, natural and community values.
- Ensured that a simple, robust, elegant, and subtle, but iconic design is provided for the new bridge, which contributes positively to the riverscape and the user experience
- Ensured that existing water views from numerous vantage points are maintained and enhanced
- Ensured that a strong and sustainable consultation strategy has been established
- Developed a holistic urban and landscape design strategy which provide future opportunities for the community, including implementation of an artwork strategy and placemaking beyond the scope of this project.

Key urban design issues

- Character of the built, natural and social community of the immediate area and visual catchment of the proposed bridge
- Significant visual impact to and from the proposed works
- Impact on heritage significance of Aboriginal and non-Aboriginal heritage and cultural values of the surrounding area
- Impact on existing native and cultural vegetation, and habitat
- Clear pedestrian and roadway connections and integration with existing elements in the public domain, and crime prevention through environmental design (CPTED) issues
- Public consultation of informing proposed works
- Identification of types of existing and proposed landscapes, including signature landscape, screening landscape and integration landscape
- Impacts of overshadowing from various urban design elements on the surroundings
- Provisions for navigation
- Potential light spills on neighbouring communities
- Impact of levee works, if required, on the waterfront edge
- Maintaining the integrity and relationship of the river estuarial environment not only to the study area, but extended to reflect the relationship with the surrounding river estuarial character
- Impact on the recreational values of Clyde River
- Impact on properties as part of the upgrade works
- Sustainability and innovation in design.

The following is a list of key project specific urban design objectives as outlined in the *Batemans Bay Bridge Replacement Review of Environmental Factors*, Roads and Maritime Services, November 2017 (REF). These are applied during the design development process and will also guide further design refinement.

Based on the above objectives, principles and strategies, an urban and landscape coloured strategy plan is developed, which informs the detailed design concept for the project.

Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Relate to the greater landscape context	Create an arched form that relates to the topography and the bay	Maximise the forested character to the north	Capitalise on viewing opportunities	Explore opportunities to express the geology of the cutting
Design principles: <ul style="list-style-type: none"> • Adopt best practice engineering, urban and landscape design solutions • Minimise the visual impact of the new Batemans Bay Bridge on the environment • Take a holistic approach to the urban and landscape design, considering all visual aspects of the project to ensure a completely integrated design solution. 	Design principles: <ul style="list-style-type: none"> • Provide a design solution that is consistent and integrated longitudinally with the overall context, while also incorporating elements of interest inspired by the unique qualities of the locality • Create an interesting and enjoyable journey with a strong identity through visual diversity. 	Design principles: <ul style="list-style-type: none"> • Retain existing vegetation, where possible • Identification of types of existing and proposed landscapes, including signature landscape, screening landscape and integration landscape • Reinforce the existing indigenous vegetation with re-vegetation of suitable species • Consider the driver's experience of the landscape along the length of the corridor • Reuse of site topsoil and allow natural regeneration, where possible • Reinstate riparian buffer zone along the foreshore. 	Design principles: <ul style="list-style-type: none"> • Create an interesting and enjoyable journey with a design that allows for views of the bridge from both the bridge and surroundings • Limit the number of piers to allow for greater visual permeability • Minimise bulk and proportion of design elements • Employ urban design strategies to create a public domain that enhances and frames views. 	Design principles: <ul style="list-style-type: none"> • Retain natural cutting on the northern foreshore, where possible.
Objective 6	Objective 7	Objective 8	Objective 9	Objective 10
Be an elegant bridge, with clean lines	Be consistent with Bateman Bay Structure Plans	Enhance Batemans Bay amenity	Enhance Batemans Bay accessibility	Integrate the new earth forms and improve foreshore visibility
Design principles: <ul style="list-style-type: none"> • Maintain continuity and flowing lines in the development of bridge elements • Minimise abrupt changes in material or surfaces in the resolution of design details. 	Design principles: <ul style="list-style-type: none"> • Recognise the symbolic importance of the bridge to the community and its physical implications on the town • Align to the objectives outlined in Batemans Bay Town Centre Structure Plan and Greater Batemans Bay Structure Plan • Contribute positively to the implementation of the Structure Plan. 	Design principles: <ul style="list-style-type: none"> • Retain, where possible, existing public amenities • Reinstate amenities that are impacted by proposed works • Improve amenity in the vicinity of the bridge, its approaches and adjacent areas. 	Design principles: <ul style="list-style-type: none"> • Enhance opportunities of proposed works to improve pedestrian and cyclist links • Improve connectivity between the northern and southern foreshore • Ensure crime prevention through CPTED principles are incorporated into the design to provide for safety • Improve accessibility for maritime traffic. 	Design principles: <ul style="list-style-type: none"> • Provide appropriate pier spacing to allow bridge to float above the foreshore • Taper new earth forms into existing landforms, where possible • Undulate new earth forms into the redesign of foreshore elements.



1 STRATEGY PLAN

SCALE 1:4000

LEGEND

- | | | | |
|-----------------------------|-----------------------|------------------|----------------------|
| Project boundary | Shared path | Proposed basins | Hotels/accommodation |
| Local road project boundary | Potential shared path | Proposed carpark | Retail |
| Foreshore marker | Arrival points | Views | |



BATEMANS BAY BRIDGE PROJECT- BRIDGE OVER CLYDE RIVER

KEY URBAN DESIGN STRATEGIES

- Strengthen connectivity
- Celebrate views
- Maintain clear thoroughfare on Clyde Street
- Maintain clear thoroughfare from Wharf Rd to Old Punt Rd
- Maximise waterfront edge for the community
- Reinstate heritage abutments as an interpretation opportunity
- Reinstate foreshore activation areas for lookouts, contemplation and recreation
- Create opportunities for placemaking

Landscape shown is indicative

Figure 1-49: Urban design strategies

4.5 CPTED principles

CPTED is a crime prevention strategy that focuses on the planning, design and structure of places. This strategy is based on the principle of reducing opportunities for crime by using appropriate design and place management principles that make it easier for the public and law enforcement entities to navigate and understand the spaces they occupy and discourage offenders from seeing these same places as opportunities for crime and anti-social behaviour.

CPTED seeks to influence the design of buildings and places by:

- Increasing the perception of risk to criminals by increasing the possibility of detection, challenge and capture
- Increasing the effort required to commit crime by increasing the time, energy or resources which need to be expended
- Reducing the potential rewards of crime by minimising, removing or concealing ‘crime benefits’
- Removing conditions that create confusion about required norms of behaviour.

There are four principles that need to be used in the assessment of development applications to minimise the opportunity for crime:

- Surveillance
- Access control
- Territorial reinforcement
- Space management.

These principles are identified in the *Crime Prevention and the Assessment of Development Applications Guidelines under Section 79C of the Environmental Planning and Assessment Act 1979* issued by the (former) Department of Urban Affairs and Planning.

Application

Specific areas of the project where CPTED is most relevant are the areas where pedestrians and cyclists have access to the project corridor. The main focus for the CPTED review of the project is to ensure all proposed pedestrian and cyclist connections tie into the existing network along the corridor and have clear sightlines.

Key strategies employed in the design and their application include:

Key strategies	Application
<ul style="list-style-type: none">• Align new elements, where possible, with existing elements to reduce potential for hidden pockets of space to be created	The alignment of the new shared paths and footpaths on the bridge and foreshore are designed to be simple, elegant and legible and align seamlessly with the existing elements. Kinks, corner pockets or any abrupt starts or terminations are avoided.
<ul style="list-style-type: none">• Maintain continuity of all pedestrian, cyclist and shared paths to avoid ‘dead ends’	The proposed pedestrian, cyclist and shared paths are designed to provide a continuous connection between bridge, the southern and northern foreshores and integrate with existing local pedestrian and cycleway network.
<ul style="list-style-type: none">• Provide sufficient visual distance at changes in directions of pedestrian, cyclist and shared paths to avoid accidental contact with other users	The proposed pedestrian, cyclist and shared paths are designed to provide sufficient visual distances at changes in directions. The changes in directions are designed to have smooth transitions and adequate sightline distances to avoid accidental contact with other users.
<ul style="list-style-type: none">• Maintain lighting levels	The bridge and the foreshore design allow for adequate lighting in areas that will be accessed by people. Additional lighting are allowed in high activity areas which are used for recreational purposes, such as the BBQ areas, shelters, playgrounds etc, to allow for their use at night time.
<ul style="list-style-type: none">• Maintain clear sight lines when vegetation is planted along pedestrian, cyclist and shared paths	Clear sight lines are considered when planting vegetation along pedestrian, cyclist and shared paths, particularly in areas where there is a change or direction, at approaches to special areas, change in differing spatial conditions, such as foreshores and bridge approaches, etc.
<ul style="list-style-type: none">• Ensure safety of the pedestrian, cyclist and shared path users is maintained through active and passive measures in design	The proposed pedestrian, cyclist and shared paths are designed to creating placemaking opportunities. Active measures in design, include the provision for recreational activities (playground, BBQ, etc). Passive measure in design include the provision for adequate lighting in the public domain, provision for bollards for safety against potential clash of vehicles with pedestrians, provision of other public domain furniture, such as seats, potential public art elements, opportunities for interpretation of history of the place, viewing platforms, variation in material changes to demarcate between directional and other areas, integration of pathways with basins, etc.
<ul style="list-style-type: none">• Maintain, where possible, sightlines that connect streets across the corridor.	The proposed pedestrian, cyclist and shared paths are designed to maintain sightlines where streets connect across the corridor, by providing for a continuous and seamless connection through pedestrian crossings, traffic lights and other measures. These are at Clyde Street in the southern foreshore and Wharf Road and Old Punt Road in the northern foreshore.



Figure 1-50: Key principles

4.6 Urban design concept plan

The urban design for the project is developed through an iterative process, working closely with engineers, community, consultants, artist representatives and other government agencies through a series of design workshops to develop a common vision for the project.

The urban design for the project is built upon the user experience through movement and time by individuals using the space, which is perceived in four ways:

- Driver experience – along the roadway, one that is of a fast and direct movement at regional scale
- Pedestrian/cyclist experience – meandering through the residential, commercial and industrial precincts along the corridor, at local scale, perceived as individual elements in varied landscape
- River experience – at local scale but experienced from marine traffic
- Riverbank experience – at local scale experienced from the river banks

The urban design provides opportunities to enhance the above user experiences. They comprise of two main components:

- The bridge design
- The foreshore works design (north and south).

Based on the objectives, principles and strategies developed for the project, the urban and landscape design has endeavoured to achieve the following main initiatives:

- Provide an elegant design for the bridge that enhances the user experience and is integrated with other project elements to fit sensitively in the natural setting, and by respecting the identity of the existing bridge becomes the new icon and legacy for Batemans Bay
- Provide opportunities to reflect the heritage values of the project including the evolving narrative of the river crossing from a punt crossing, to the lift span crossing, to the new raised crossing
- Provide opportunities for the development of the foreshores, including the provision of additional parking, increased amenity and recreational zones,
- Enhance connectivity between communities on either side of the bridge
- Highlight opportunities that can be undertaken as part of future projects, in close consultation with key stakeholders and the community.

Key design outcomes include:

- Improved vehicular, cyclist and accessible pedestrian connectivity across the Clyde River, the foreshores and the surrounding townships and communities
- Reinforcement of the landscape setting to ensure that the proposed bridge is fully integrated into the local environment
- An integrated outcome for all urban design elements including water quality basins, stairs and decks that provide opportunities for placemaking and recreational functions
- Provision of increased amenities, such as picnic shelters, BBQ areas, toilet blocks, and contemplation areas
- Optimisation of open space to provide additional buffer landscape
- Provision of potential parkland space to offset the exiting parkland space impacted as part of the upgraded works
- Enhancement of the Mcleods Creek's riparian corridor where it is within project boundaries
- Landscape treatments and batter rounding in large cuts to integrate seamlessly with the surrounding environment
- Minimise the removal of existing vegetation
- Provision of feature urban design elements, with the potential use of public art as a medium for generating references points and identity markers in the public domain, to strengthen the user experience.

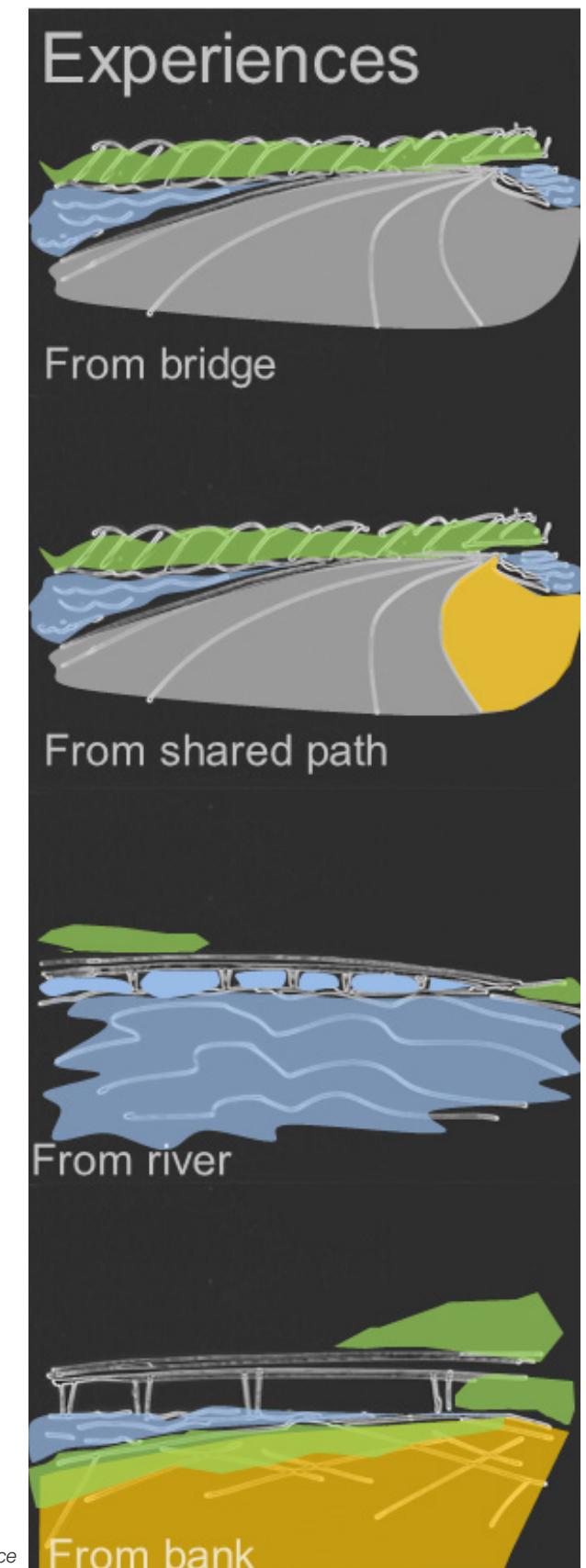
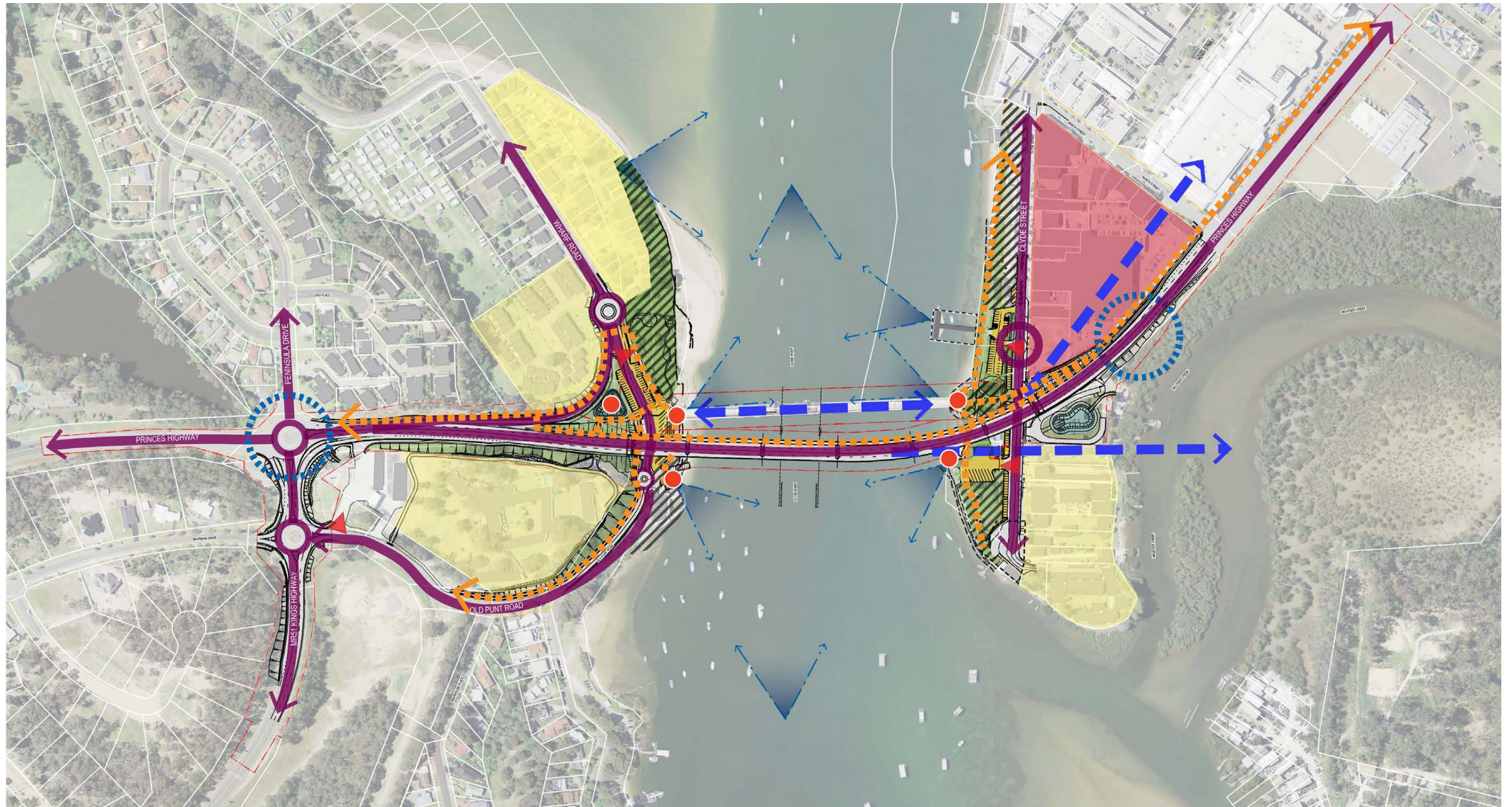


Figure 1-51: Bridge experience



1 | URBAN DESIGN STRUCTURE PLAN

SCALE 1:4000

LEGEND

- | | | | | | | |
|-----------------------------|------------------------------------|-------------------------------|-------------|----------------|-------------------|---------------|
| Project boundary | Vehicular circulation | Amenities/high activity areas | Views | Access points | Green/Blue system | Town centre |
| Local road project boundary | Pedestrian/Shared path circulation | View point/Interpretive areas | Axis spines | Arrival points | Proposed carpark | Accommodation |



Figure 1-52: Desire lines



1 PLAN - URBAN DESIGN CONCEPT PLAN
SCALE 1:4000

Landscape shown is indicative only

LEGEND

- PROJECT BOUNDARY
- LOCAL ROADS PROJECT BOUNDARY
- PROPOSED RETAINING WALL
- PROPOSED VEGETATION
- RETAINED VEGETATION
- HERITAGE VIEW AXIS
- VIEWS

- ① ELEGANT, NEW BATEMANS BAY BRIDGE WITH LARGE SPANS, MAXIMISING VIEWS OF THE RIVER AND OCEAN
- ② FEATURE LANDSCAPE TREATMENTS AT ABUTMENTS
- ③ REINSTATE HERITAGE ABUTMENTS WITH FISHING/VIEWING PLATFORMS AT EXISTING ABUTMENTS

- ④ FEATURE URBAN DESIGN ELEMENT WITH INTEGRATED BASIN TO PROVIDE A PLACEMAKING OPPORTUNITY
- ⑤ IMPROVED PARKING FACILITIES AND AMENITIES
- ⑥ CONTEMPLATION AREA REINSTATED WITH IMPROVED AMENITIES

- ⑦ FEATURE CENTRAL OPEN SPACE AS A PLACEMAKING OPPORTUNITY WITH INTEGRATION OF AMENITIES AND ARTWORK

Figure 1-53: Urban design concept plan

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5.0 New Batemans Bay Bridge

Vision

To create a bridge that complements Batemans Bay, with its picturesque coastline and pristine waterways, and reinforces the identity of the town in the creation of a legacy for the community. The elegant sculptural form of the bridge will provide a positive experience for drivers as well as the community by opening up new vistas from both the bridge and foreshore while respecting the heritage values and the character of the landscape.

5.1 Bridge design principles and strategies

The bridge design is based on the objectives and principles outlined in urban design guideline documents. The design is developed by working closely with the bridge and civil engineers as well as project managers to achieve a holistic urban design and engineering outcome.

Principles

The guiding principles in the development of bridge designs are:

- Provide seamless transitions for different bridge elements and materials
- Develop a modular appearance for balustrades, handrails and parapets
- Integrate support posts for bridge elements with the parapet profile
- Integrate lighting with the bridge structure.

Strategies

- Ensure that integration of proposed works with the existing is as seamless as possible
- Provide suitable sight lines, generous height and width
- Provide safe and vandal-resistant lighting
- Provide vandal-resistant/durable materials
- Maintain and enhance views.

5.2 Bridge alignment

As part of the design process, the reference design, along with a number of other alignment options, are investigated.

The horizontal alignment proposed by the team for the new Batemans Bay Bridge are carefully developed to ensure that it provides the best outcome for a positive user experience whilst minimising the impact and disturbance to the existing environment caused by construction works. This is achieved by using a combination of a straight and a curved configurations between abutments allowing for varied views and vistas to be experienced with the changing direction as one traverses in the southbound or northbound direction.

The straight alignment at the northern abutment is governed by space constraints; proximity to the On The Pier Restaurant and potential loss of sensitive vegetation. The curved alignment at the southern abutment is governed by the curved alignment of the existing bridge, which forms an entry gateway to the township.

The combination of the straight and curved alignment is aesthetically suited to its setting, which complements the natural geometries of the river and landforms. It is a distinct experience compared to other river crossings while travelling from Sydney down the south coast and will therefore, become an iconic element, providing a new identity to the bridge and the township of Batemans Bay.

5.3 Deck geometry and soffit

The deck geometry includes the provision for two carriageways in each direction, and a 3 metre wide accessible shared path along the eastern side of the southbound carriageway. This geometry is configured to minimise its width, whilst accommodating save clearance vehicular envelopes.

The superstructure is arranged symmetrically with the substructure, which will reduce constructability issues. The deck has a consistent width of about 20.3 metres with a superelevation, which allows for a smooth transition with the road works beyond the bridge. The deck soffit is formed by the shapes of the segmental girder, which are deeper in the middle and thinner at the ends, and follow the superelevation at each segment. The elevated and curved geometry in the vertical alignment of the bridge provides a dramatic effect and contributes towards the positive user experience of the bridge.

5.4 Superstructure

The bridge superstructure comprises a balanced cantilevered segmental precast concrete box girder. It is constructed by adopting a match cast method and is supported by piers with six spans across the Clyde River. The spans are equally spaced at about 78 metres wide in the mid spans and about 56 metres at the end spans. The profile of the box girder is a combination of a tapered and a rectangular section.

The tapered section is about 5.7 metres deep, the rectangular section is about 4 metres deep to accommodate for the arched profile at the piers. This combination of the tapered and the rectangular profiles arranged in a parabolic arch, when seen in elevation creates a clean, elegant, interesting, subtle but iconic aesthetic to the bridge.

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 5-1: Aerial view of the new Batemans Bay Bridge

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 5-2: View of new Batemans Bay Bridge from Holmes Lookout, Clyde River National Park

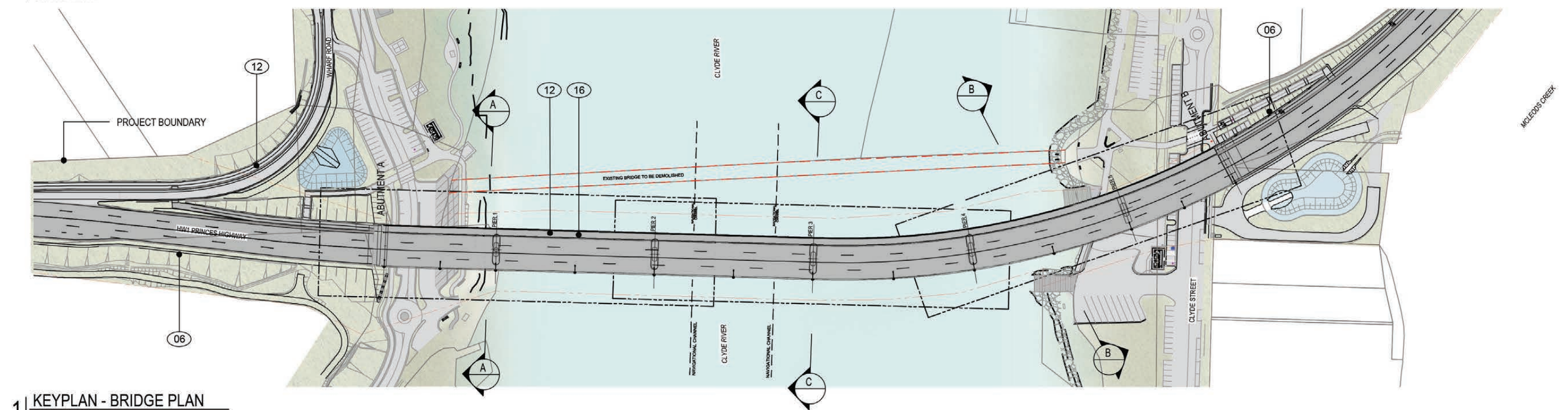
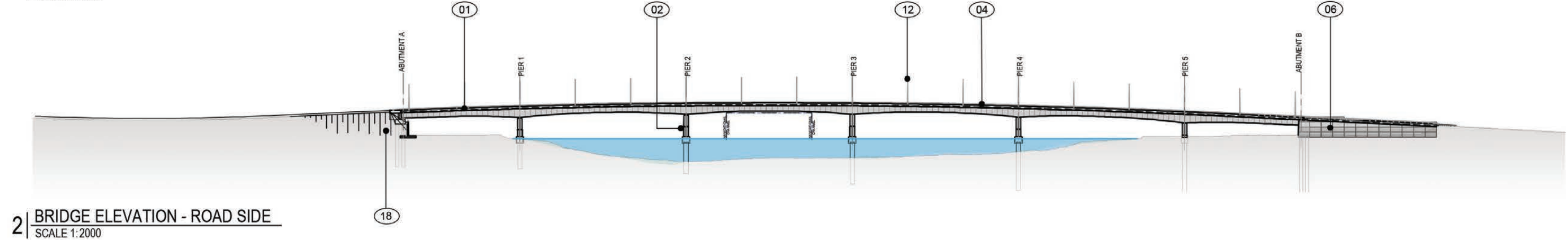
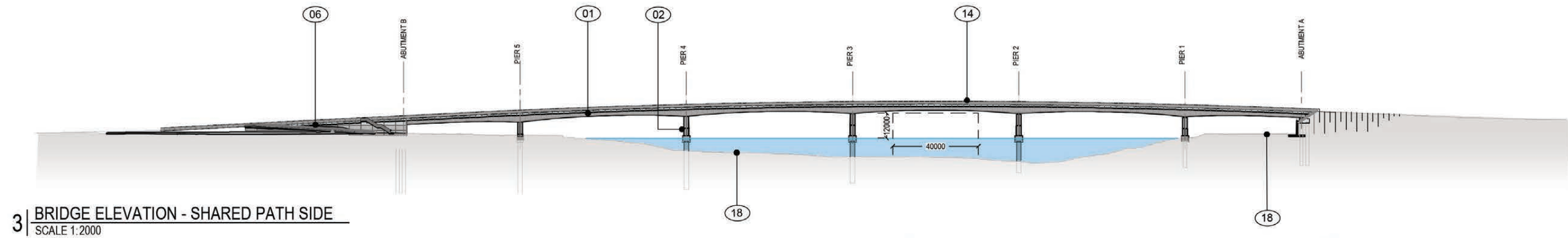
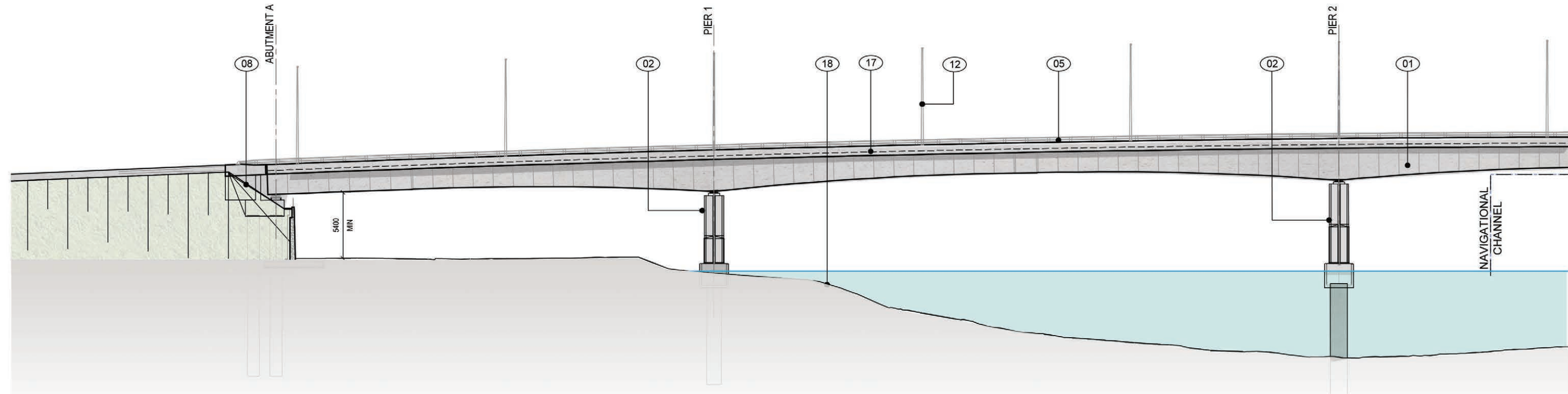
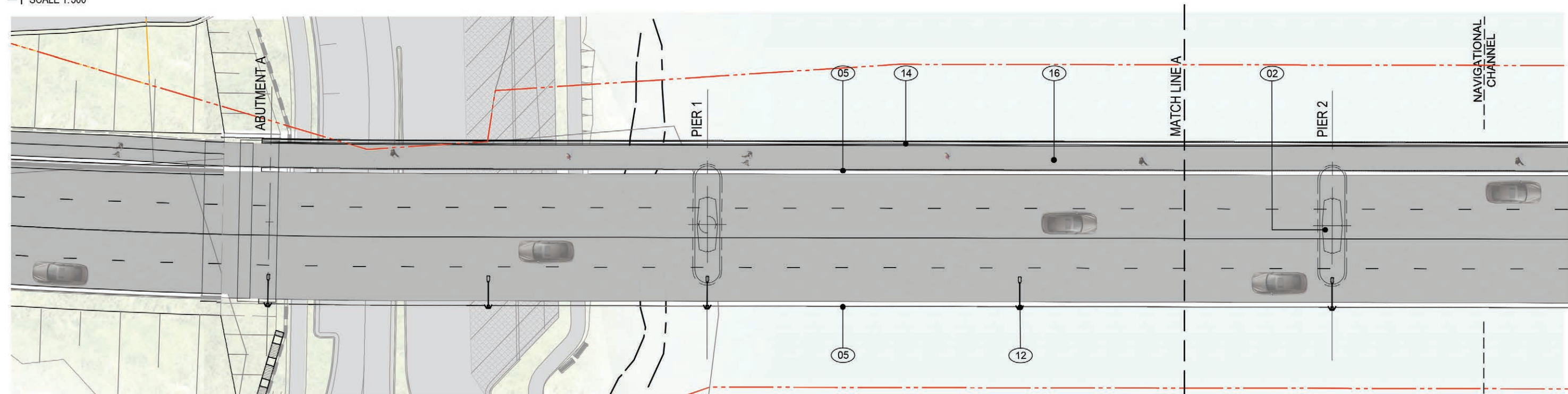


Figure 5-3: Bridge key plan



2 | ELEVATION - URBAN DESIGN CONCEPT PLAN
SCALE 1:500



1 | PLAN - URBAN DESIGN CONCEPT PLAN
SCALE 1:500

- LEGEND**
- | | | | | |
|-----------------------------------|------------------------------|-------------------------------|--------------------------|--|
| 01 SEGMENTAL CONCRETE BOX GIRDER | 05 PERFORMANCE BARRIER | 09 CYCLIST RAIL | 13 DRAINAGE | 17 FINISHED SURFACE LEVEL (INDICATIVE) |
| 02 CONCRETE PIER | 06 RETAINING WALL (PROPOSED) | 10 HANDRAIL | 14 BALUSTRADE | 18 EXISTING SURFACE LEVEL (INDICATIVE) |
| 03 CONCRETE PILE CAP (INDICATIVE) | 07 CONCRETE TEXTURE PANELS | 11 NOT USED | 15 ARCHITECTURAL GROOVES | 19 STEEL POST |
| 04 PARAPET | 08 ROCK PITCHING | 12 ROAD LIGHTING (INDICATIVE) | 16 SHARED PATH | |

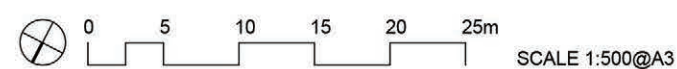
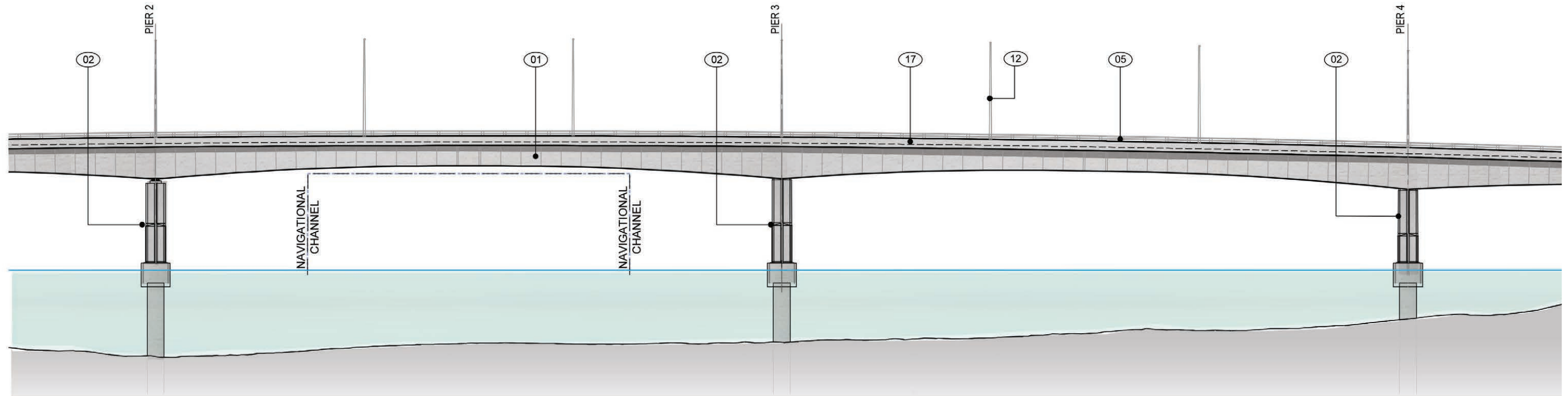
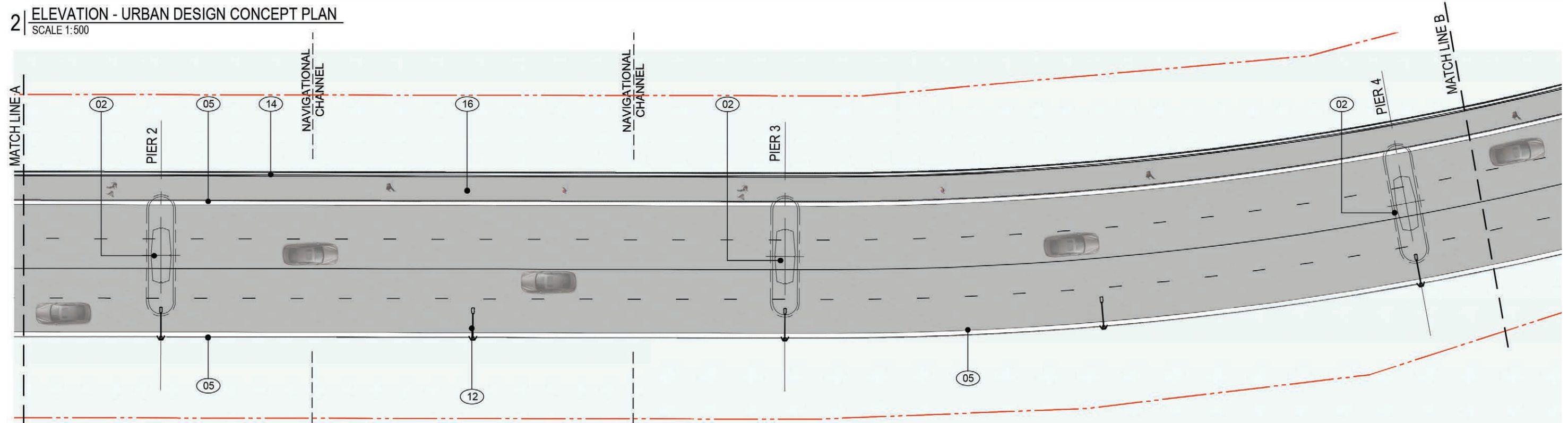


Figure 5-4: Bridge elevation sheet 1 of 3



2 ELEVATION - URBAN DESIGN CONCEPT PLAN
SCALE 1:500



1 PLAN - URBAN DESIGN CONCEPT PLAN
SCALE 1:500

LEGEND

- | | | | | |
|-------------------------------------|--------------------------------|---------------------------------|----------------------------|--|
| (01) SEGMENTAL CONCRETE BOX GIRDER | (05) PERFORMANCE BARRIER | (09) CYCLIST RAIL | (13) DRAINAGE | (17) FINISHED SURFACE LEVEL (INDICATIVE) |
| (02) CONCRETE PIER | (06) RETAINING WALL (PROPOSED) | (10) HANDRAIL | (14) BALUSTRADE | (18) EXISTING SURFACE LEVEL (INDICATIVE) |
| (03) CONCRETE PILE CAP (INDICATIVE) | (07) CONCRETE TEXTURE PANELS | (11) NOT USED | (15) ARCHITECTURAL GROOVES | (19) STEEL POST |
| (04) PARAPET | (08) ROCK PITCHING | (12) ROAD LIGHTING (INDICATIVE) | (16) SHARED PATH | |

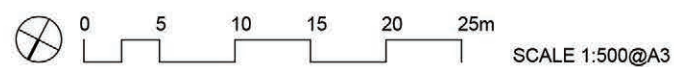
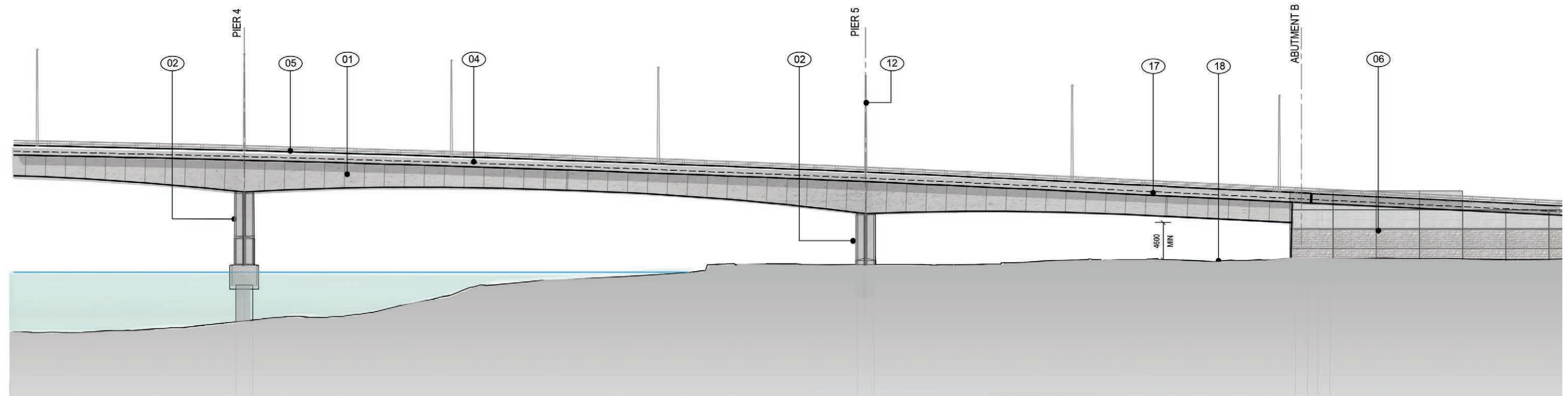
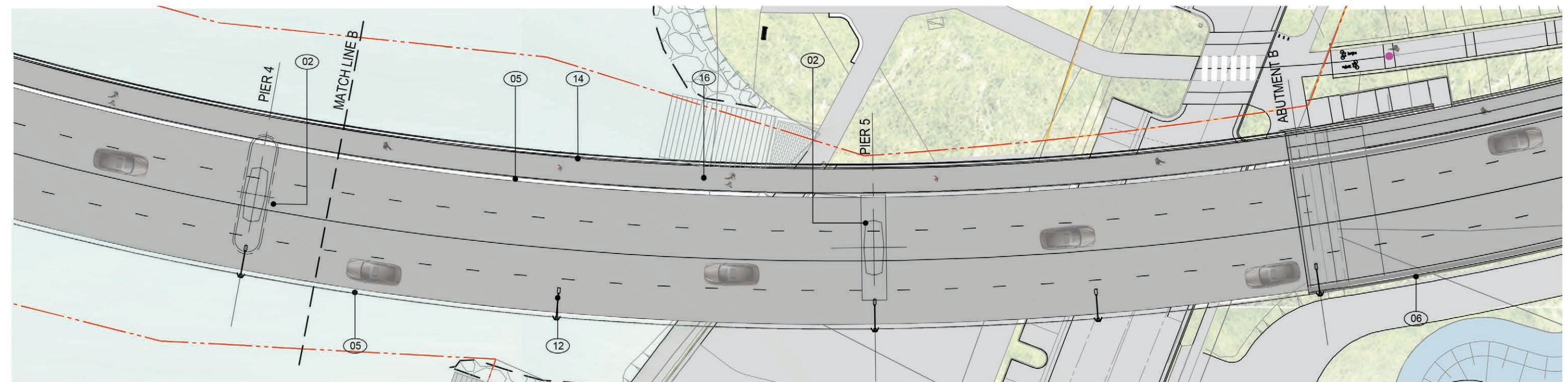


Figure 5-5: Bridge elevation sheet 2 of 3



2 | ELEVATION - URBAN DESIGN CONCEPT PLAN
SCALE 1:500



1 | PLAN - URBAN DESIGN CONCEPT PLAN
SCALE 1:500

LEGEND

- | | | | | |
|-----------------------------------|------------------------------|-------------------------------|--------------------------|--|
| 01 SEGMENTAL CONCRETE BOX GIRDER | 05 PERFORMANCE BARRIER | 09 CYCLIST RAIL | 13 DRAINAGE | 17 FINISHED SURFACE LEVEL (INDICATIVE) |
| 02 CONCRETE PIER | 06 RETAINING WALL (PROPOSED) | 10 HANDRAIL | 14 BALUSTRADE | 18 EXISTING SURFACE LEVEL (INDICATIVE) |
| 03 CONCRETE PILE CAP (INDICATIVE) | 07 CONCRETE TEXTURE PANELS | 11 NOT USED | 15 ARCHITECTURAL GROOVES | 19 STEEL POST |
| 04 PARAPET | 08 ROCK PITCHING | 12 ROAD LIGHTING (INDICATIVE) | 16 SHARED PATH | |

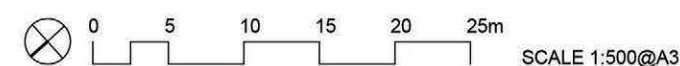
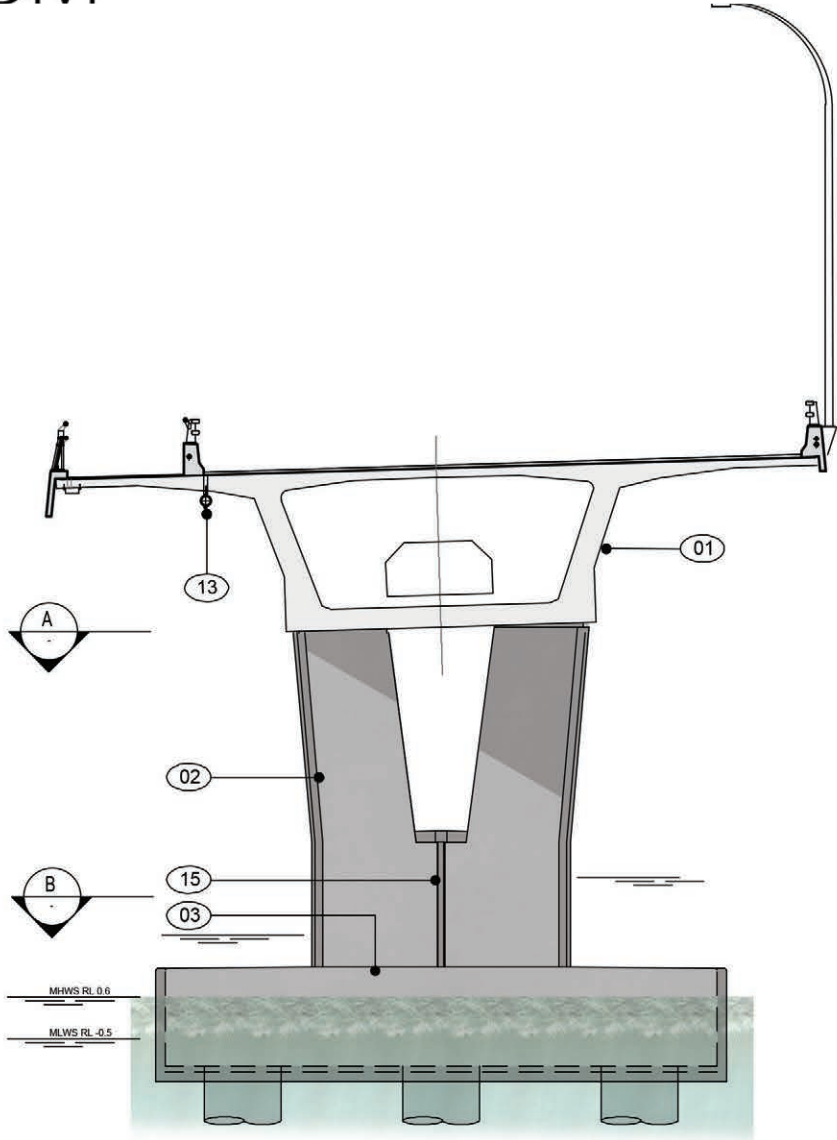
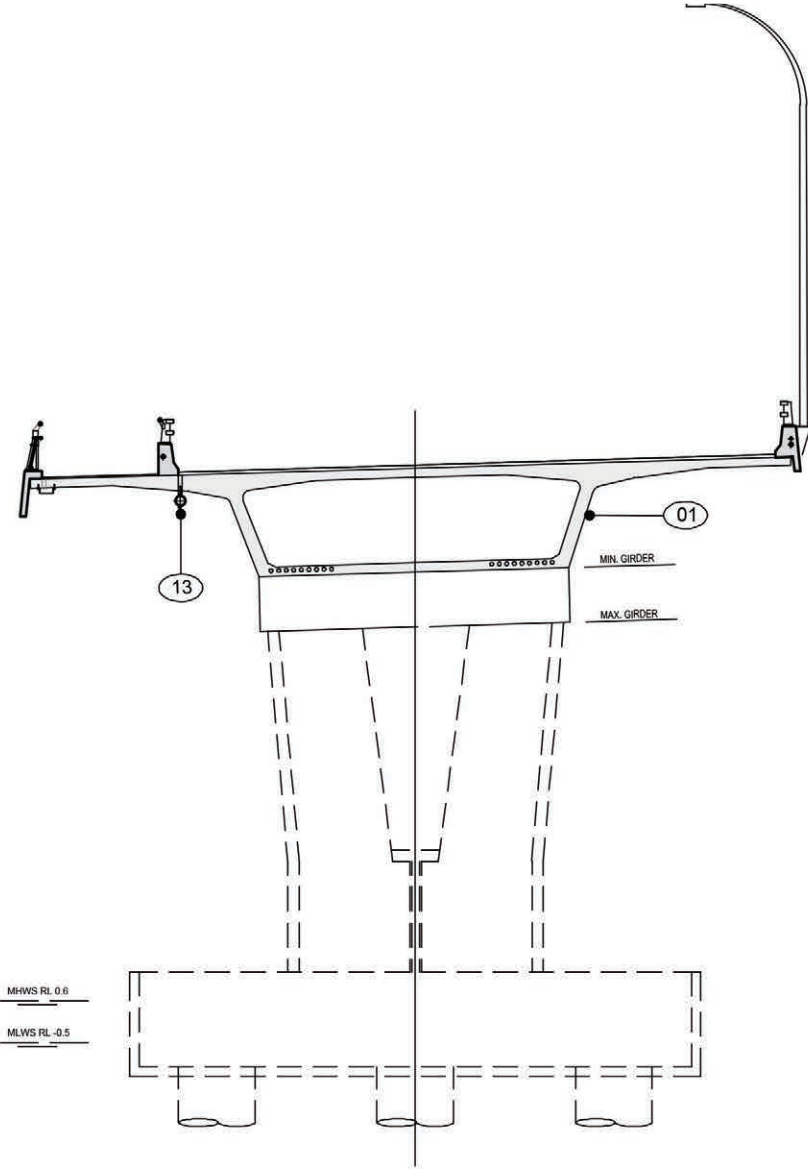


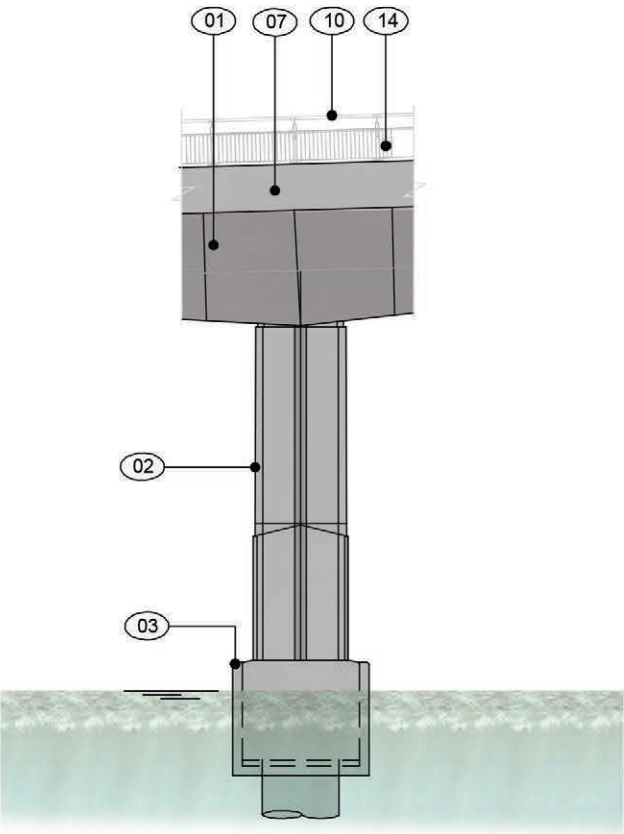
Figure 5-6: Bridge elevation sheet 3 of 3



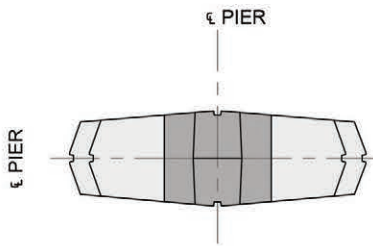
1 | PIER SEGMENT SECTION
SCALE 1:200



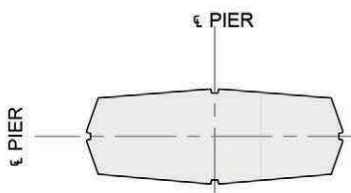
2 | MIDPAN SEGMENT SECTION
SCALE 1:200



3 | PIER - SIDE ELEVATION
SCALE 1:200



4 | PIER SECTION A-A
SCALE 1:200



5 | PIER SECTION B-B
SCALE 1:200

LEGEND

- | | | | | |
|-----------------------------------|------------------------------|--------------------------------------|--------------------------|--|
| 01 SEGMENTAL CONCRETE BOX GIRDER | 05 PERFORMANCE BARRIER | 09 CYCLIST RAIL | 13 DRAINAGE | 17 FINISHED SURFACE LEVEL (INDICATIVE) |
| 02 CONCRETE PIER | 06 RETAINING WALL (PROPOSED) | 10 HANDRAIL | 14 BALUSTRADE | 18 EXISTING SURFACE LEVEL (INDICATIVE) |
| 03 CONCRETE PILE CAP (INDICATIVE) | 07 CONCRETE TEXTURE PANELS | 11 SHARED PATH LIGHTING (INDICATIVE) | 15 ARCHITECTURAL GROOVES | 19 STEEL POST |
| 04 PARAPET | 08 ROCK PITCHING | 12 ROAD LIGHTING (INDICATIVE) | 16 SHARED PATH | |

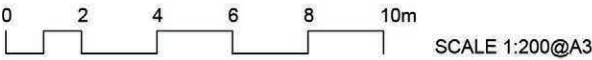


Figure 5-7: Bridge pier detail

5.5 Substructure

The substructure comprises of the piers, piles and pile caps. The piers are the most visible component of the bridge. Although configured as individual elements, it is important that the piers are seen as a group to achieve a well-proportioned structure that is integrated with the overall composition of the bridge.

Bridge pier

The pier shapes adopt a hollow tapered 'Y' shape profile, with a flat ridge at the bottom to maximise the pier opening and allow for easy draining.

This shape is considered best suited for the balanced cantilever method of construction and meets the program. The piers also have a tapered profile in plan, widest in the middle, with chamfered edges. Architectural grooves are provided in both directions, with potential to accommodate feature lighting in the grooves. These architectural treatments provide a lighter aesthetic to the piers and help to reduce their visual bulk and mass.

Based on further design studies and coordination with the team, the hollow tapered 'Y' shape profile is further refined, by using the shortest pier (Pier 5) as a guide, the 'Y' shape remains uniform throughout each pier to provide visual consistency and enhance the overall aesthetic of the bridge. Pier 5 is also further refined by elevating the top of the apex and introducing an extra in-situ piece to reduce the visual stubbiness of the pier.

Pile caps

The pile caps are intended to complement the shape of the piers, they are reduced in size, slender and have rounded edges to reduce their bulk while maintaining their structural integrity.

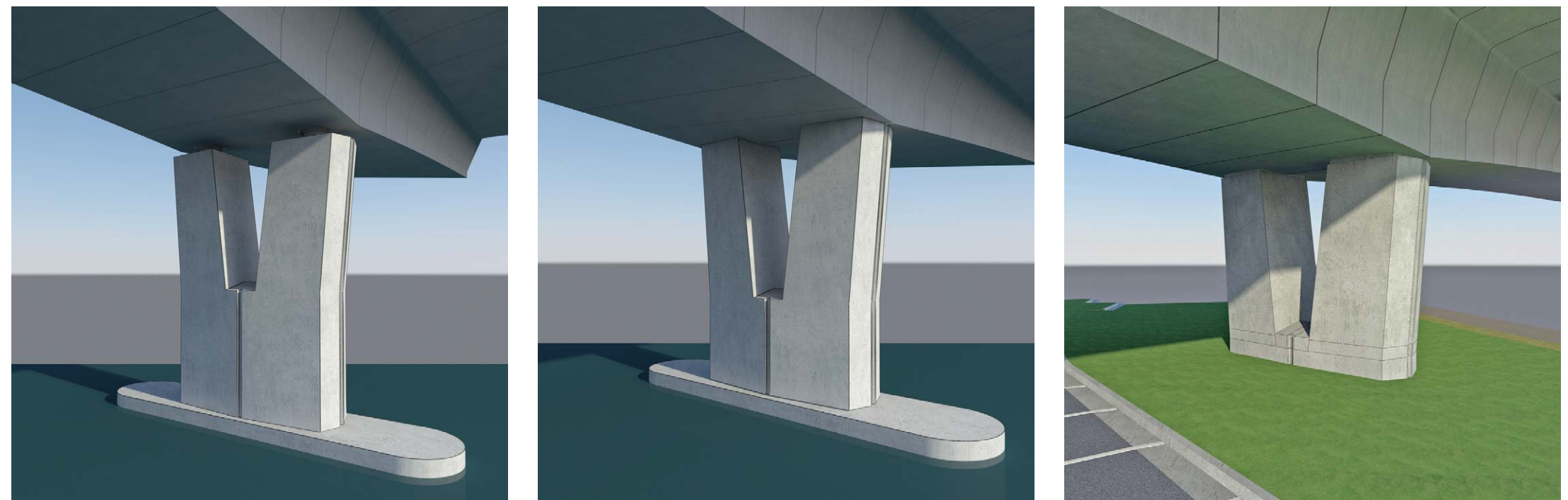
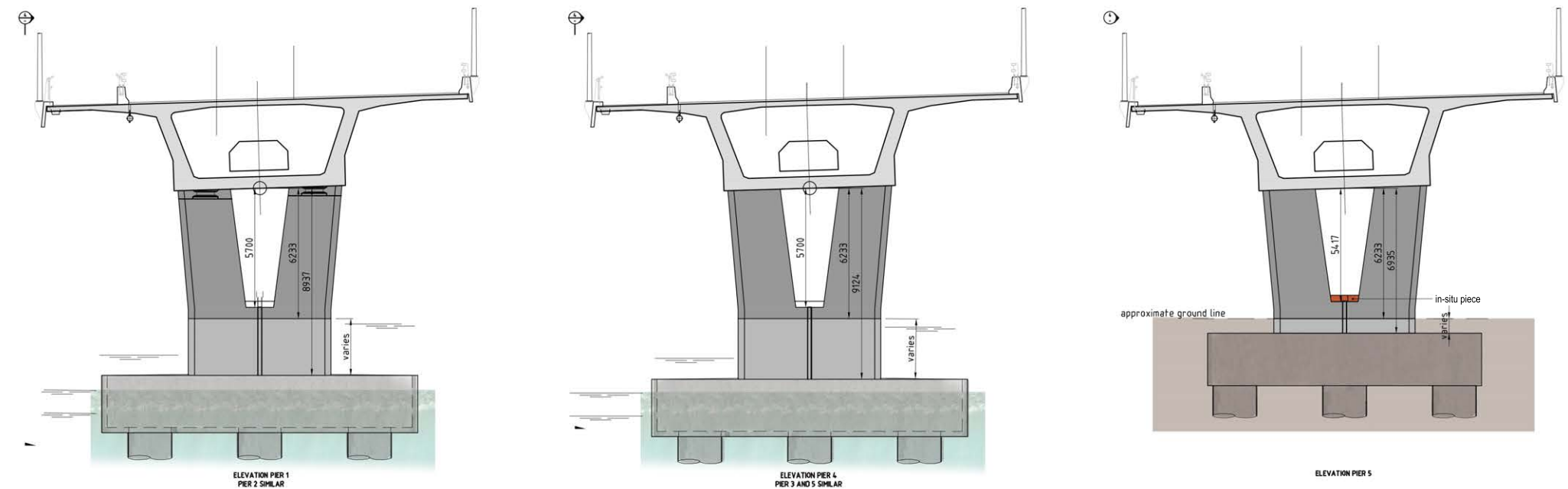


Figure 5-8: Pier optimisation studies



Figure 5-9: Existing view from southern foreshore looking north

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 5-10: View from southern foreshore

5.6 Bridge abutments

The bridge abutments, located at the northern and southern foreshores are major visual elements experienced mostly by the users of the public domain at the foreshores. The bridge abutments have varied profiles due to the heights of the bridge at the different locations. The northern abutment are lower than the southern abutment, as the bridge is higher at the southern abutment.

The abutment at the northern end (Abutment A) is a cast in-situ retaining wall located in front, which retains the fill at the abutment and returns at each end. The abutment at the southern end wrap around the abutment and extend on both sides of the abutment (Abutment B). They are highly visible from the neighbourhood and the southern foreshore. The abutment face is vertical to ground along the eastern and western sides and leans back at 1:40 long in section through the bridge to minimise visual impact to Clyde Street. They are constructed using a cast in-situ system.

Maintenance access

The rear of the northern abutment include maintenance steps to provide access to the maintenance bench in front of the abutment. The southern abutment has a maintenance path in front of the abutment with tubular handrail for fall prevention. A heavy duty, secured access doorway is provided at each abutment, to allow access into the structure to carry out inspections and maintenance works.

Abutment finishes

Abutment finishes differ between the north and south. The southern abutment structure will be finished with cast in-situ textured concrete panels to reduce their bulk and scale, the same texture is also extended to retaining walls on both sides. The overall effect is to create a consistent visual appearance and to reduce the overall visual mass.

The northern abutment, being a cast in-situ retaining wall will have a natural concrete finish, the selection of a more simple treatment is to create a blank canvas for the potential integration of artwork, which will be further developed with local artist(s) and the community.

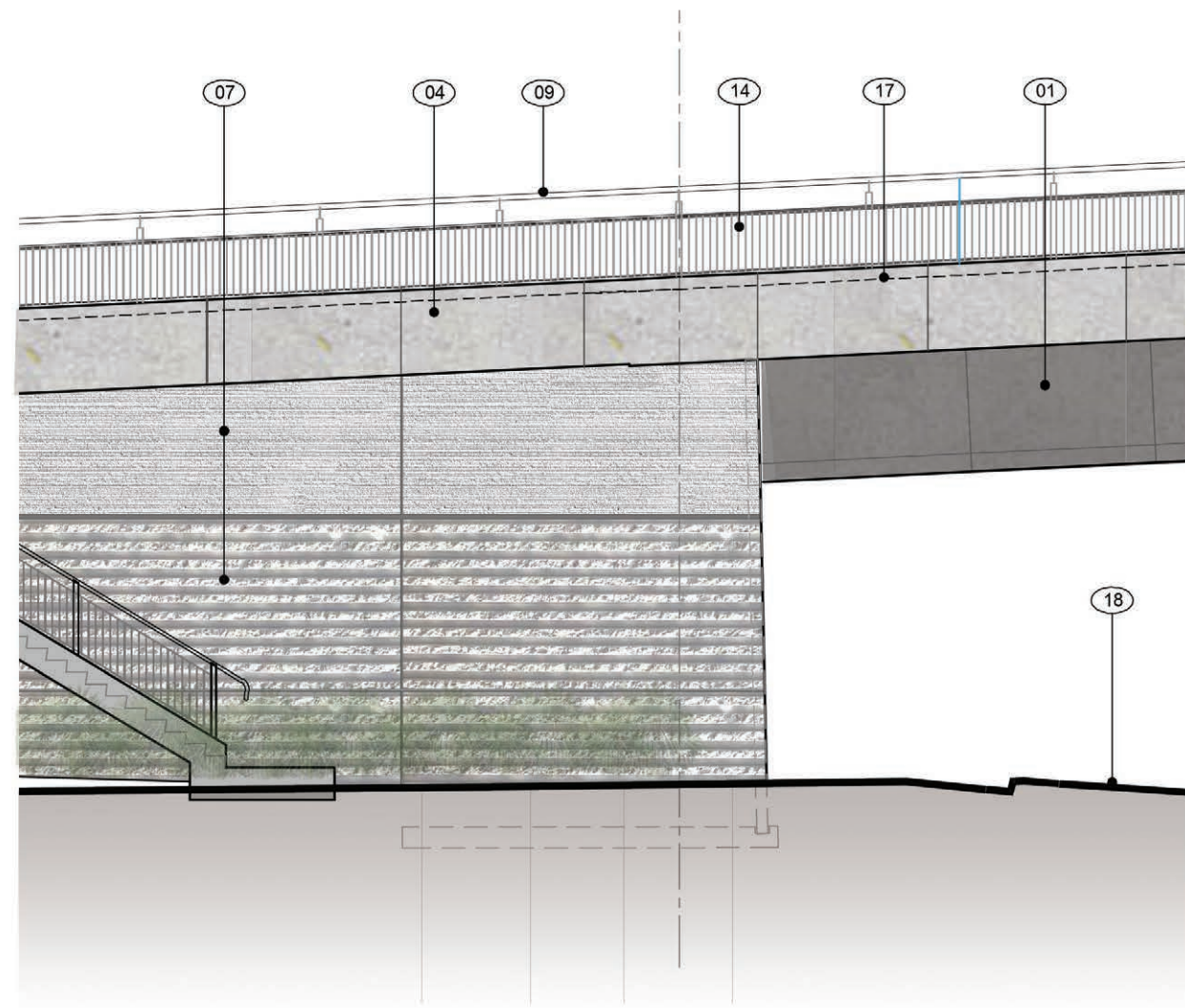
Please refer to Chapter 6.0 for details.

Artist impression

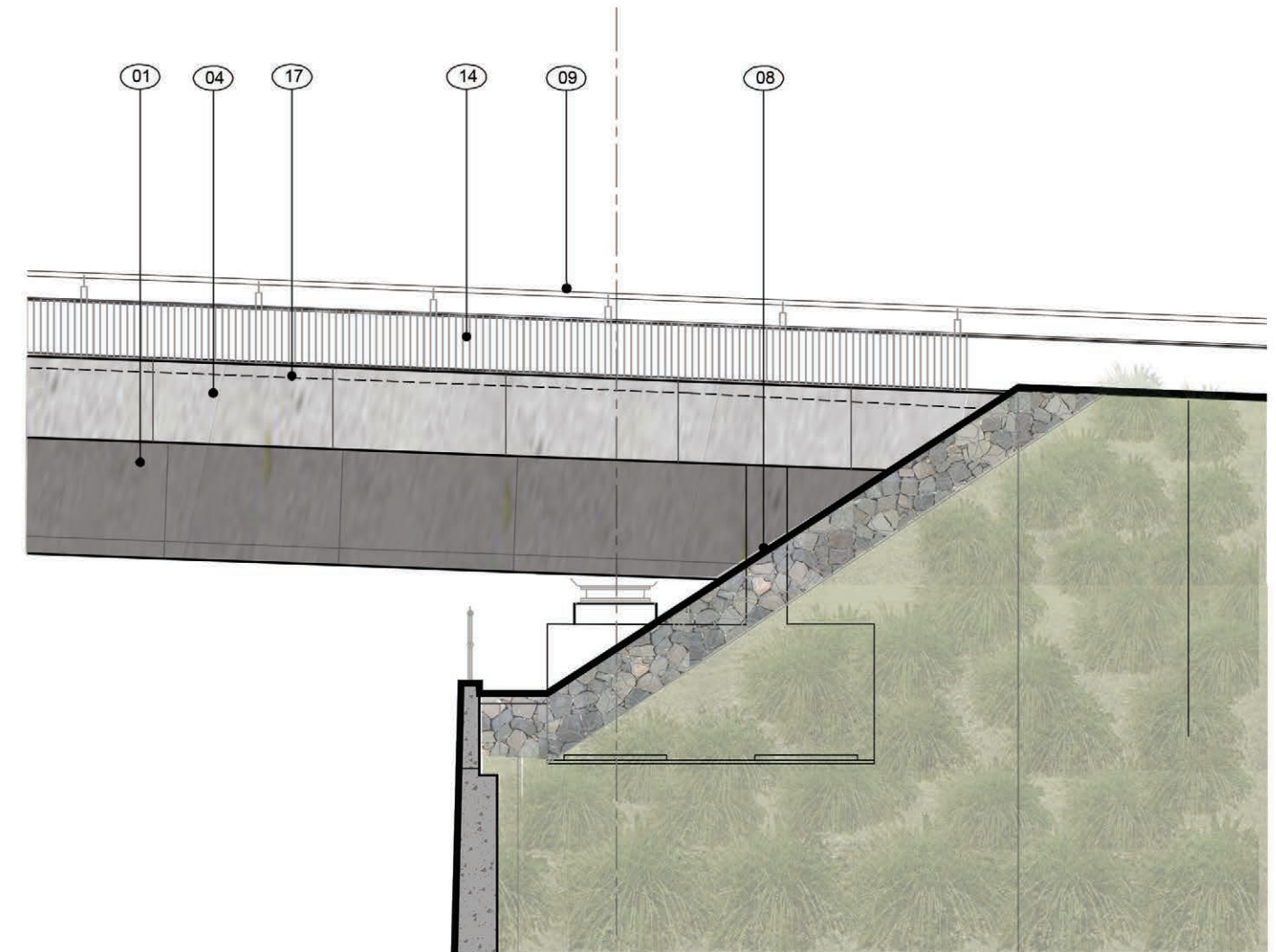
Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 5-11: Northern foreshore abutment



1 | ELEVATION ABUTMENT B - SHARED PATH SIDE
SCALE 1:100



1 | ELEVATION ABUTMENT A - SHARED PATH SIDE
SCALE 1:100

LEGEND

- | | | | | |
|-------------------------------------|--------------------------------|--|----------------------------|--|
| (01) SEGMENTAL CONCRETE BOX GIRDER | (05) PERFORMANCE BARRIER | (09) CYCLIST RAIL | (13) DRAINAGE | (17) FINISHED SURFACE LEVEL (INDICATIVE) |
| (02) CONCRETE PIER | (06) RETAINING WALL (PROPOSED) | (10) HANDRAIL | (14) BALUSTRADE | (18) EXISTING SURFACE LEVEL (INDICATIVE) |
| (03) CONCRETE PILE CAP (INDICATIVE) | (07) CONCRETE TEXTURE PANELS | (11) SHARED PATH LIGHTING (INDICATIVE) | (15) ARCHITECTURAL GROOVES | (19) STEEL POST |
| (04) PARAPET | (08) ROCK PITCHING | (12) ROAD LIGHTING (INDICATIVE) | (16) SHARED PATH | |

Figure 5-12: Abutment details



1 | ELEVATION ABUTMENT A
SCALE 1:100

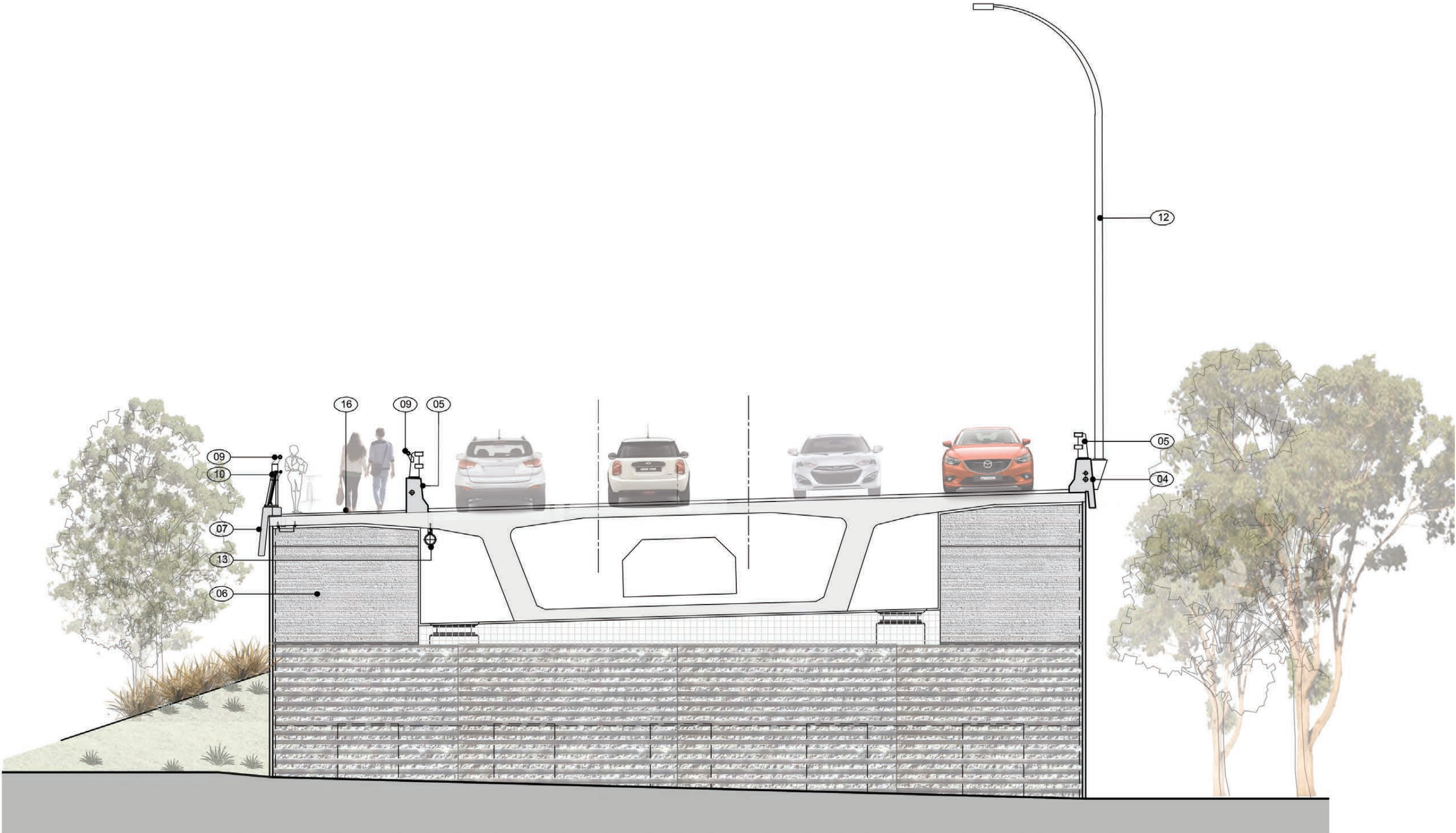
LEGEND

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|-------------------------------------|--------------------------------|---------------------------------|----------------------------|--|
| (01) SEGMENTAL CONCRETE BOX GIRDER | (05) PERFORMANCE BARRIER | (09) CYCLIST RAIL | (13) DRAINAGE | (17) FINISHED SURFACE LEVEL (INDICATIVE) |
| (02) CONCRETE PIER | (06) RETAINING WALL (PROPOSED) | (10) HANDRAIL | (14) BALUSTRADE | (18) EXISTING SURFACE LEVEL (INDICATIVE) |
| (03) CONCRETE PILE CAP (INDICATIVE) | (07) CONCRETE TEXTURE PANELS | (11) SIDEWALK | (15) ARCHITECTURAL GROOVES | (19) STEEL POST |
| (04) PARAPET | (08) ROCK PITCHING | (12) ROAD LIGHTING (INDICATIVE) | (16) SHARED PATH | |



SCALE 1:100@A3

Figure 5-13: Abutment A detail



1 | ELEVATION ABUTMENT B
SCALE 1:100

- LEGEND
- 01 SEGMENTAL CONCRETE BOX GIRDER

02 CONCRETE PIER

03 CONCRETE PILE CAP (INDICATIVE)

04 PARAPET

05 PERFORMANCE BARRIER

06 RETAINING WALL (PROPOSED)

07 CONCRETE TEXTURE PANELS

08 ROCK PITCHING

09 CYCLIST RAIL

10 HANDRAIL

11 SHARED PATH LIGHTING (INDICATIVE)

12 ROAD LIGHTING (INDICATIVE)

13 DRAINAGE

14 BALUSTRADE

15 ARCHITECTURAL GROOVES

16 SHARED PATH

17 FINISHED SURFACE LEVEL (INDICATIVE)

18 EXISTING SURFACE LEVEL (INDICATIVE)

19 STEEL POST

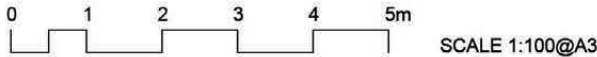


Figure 5-14: Abutment B detail

5.7 Bridge parapet

The bridge parapets consist of concrete segments connected to the bridge deck and extend along the full length of the bridge. Due to different end conditions at each side, their depths vary, but are consistent in depth along the full length of one side.

The parapets on the road side are integrated with the performance barrier, which have the twin rails above them. The parapets on the shared path side are integrated with the handrail and balustrade located above them. The handrail features a signature tapered post, which is formed in the shape of the old bridge's steel pylons, to provide a historical reference.

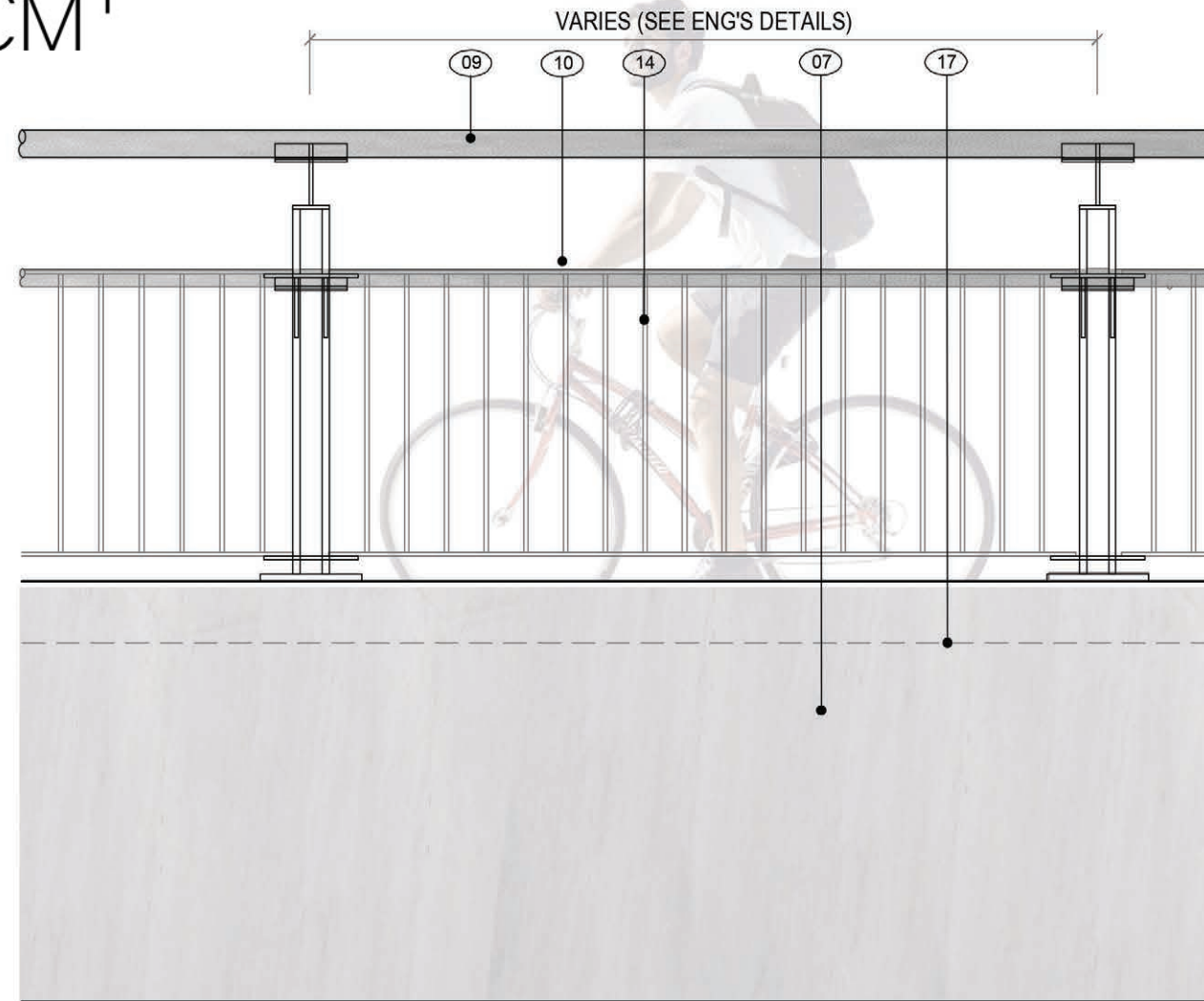
They consist of two steel hollow flats which encompass the supports for the handrail and the cyclist rails above. The balustrades also follow the tapered angle of the post and are arranged in a staggered configuration in plan, to maximise views in the direction of travel. The cyclist rail is proposed to be in marine grade stainless steel. The drainage pipes are located away from the parapets on the inward side under the southbound carriageways. The shared path zone is drained by using scuppers at the end of the deck in cross section. The bridge parapets extend beyond the drainage elements and will therefore conceal them.

5.8 Bridge shared path handrail

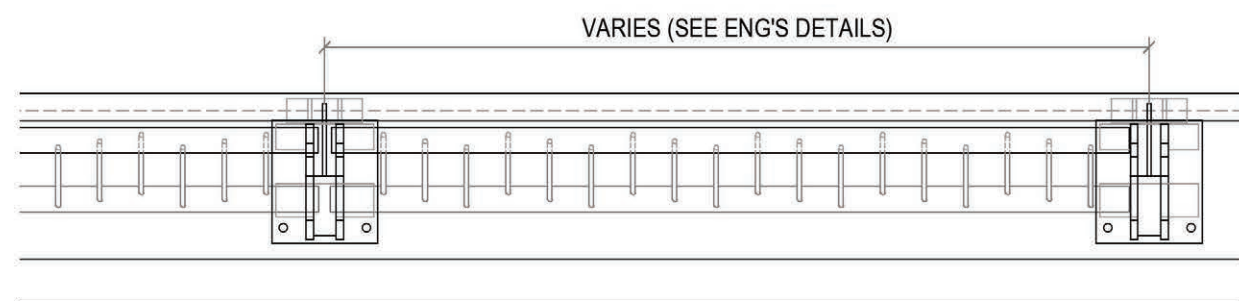
The bridge shared path handrail is an important visual element and an opportunity to incorporate elements of the existing Batemans Bay Bridge into the new design.

The guiding principles in the design of the handrails is as follows:

- Reference aspects of the existing bridge through the design of the posts
- Integrated with other bridge elements
- Contribute to the overall bridge aesthetic
- Meets both urban design, engineering and safety requirements
- The arrangement of the balustrade responds to the curve of the bridge.



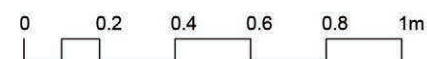
2 | DETAIL 02 - ELEVATION
SCALE 1:20



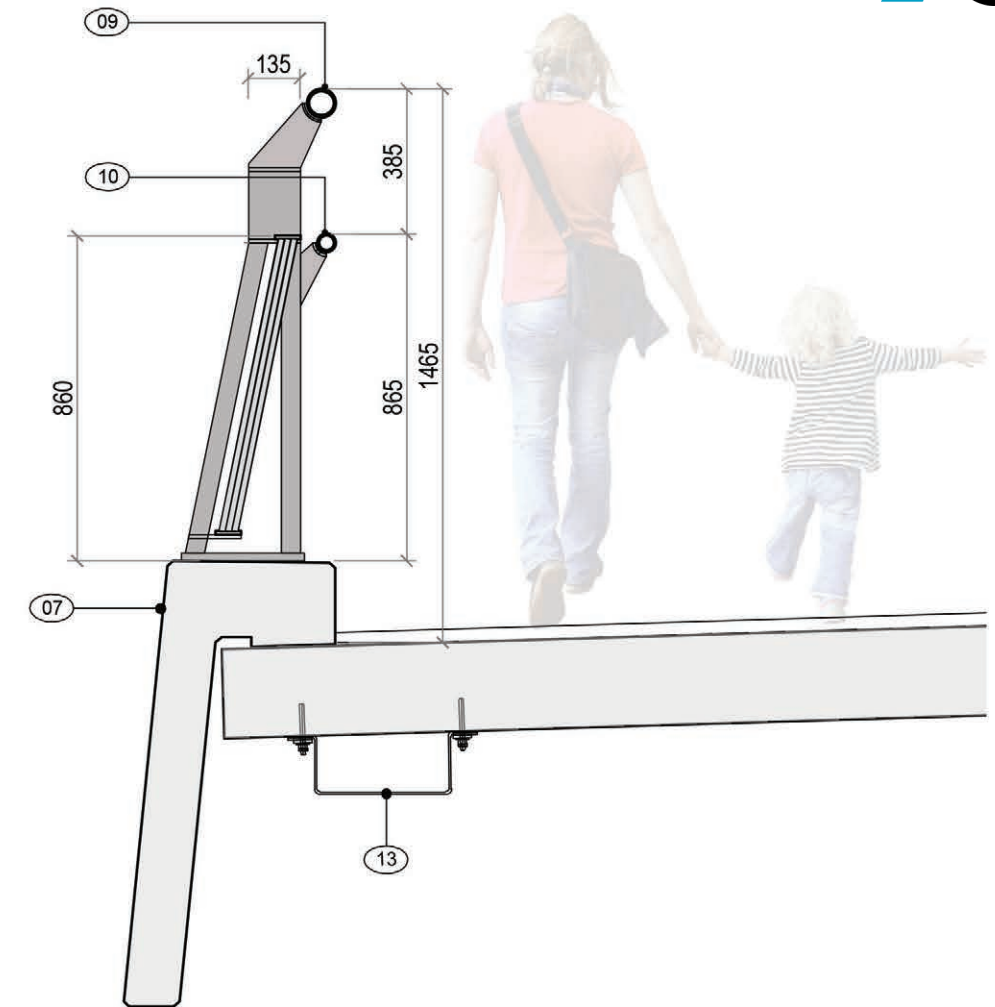
1 | DETAIL 01 - PLAN
SCALE 1:20

LEGEND

- | | | | | |
|-------------------------------------|--------------------------------|--|----------------------------|--|
| (01) SEGMENTAL CONCRETE BOX GIRDER | (05) PERFORMANCE BARRIER | (09) CYCLIST RAIL | (13) DRAINAGE | (17) FINISHED SURFACE LEVEL (INDICATIVE) |
| (02) CONCRETE PIER | (06) RETAINING WALL (PROPOSED) | (10) HANDRAIL | (14) BALUSTRADE | (18) EXISTING SURFACE LEVEL (INDICATIVE) |
| (03) CONCRETE PILE CAP (INDICATIVE) | (07) CONCRETE TEXTURE PANELS | (11) SHARED PATH LIGHTING (INDICATIVE) | (15) ARCHITECTURAL GROOVES | (19) STEEL POST |
| (04) PARAPET | (08) ROCK PITCHING | (12) ROAD LIGHTING (INDICATIVE) | (16) SHARED PATH | |



SCALE 1:20@A3



3 | DETAIL 03 - SECTION
SCALE 1:20

Figure 5-15: Handrail and parapet detail

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5.9 Bridge user experience

The bridge is designed to provide an interesting and enriching experience from various vantage points and scales of movement. Users of the bridge will experience panoramic, uninterrupted and elevated views over the Clyde River, creating a memorable journey.

The experience from the river – from the river one approaches the bridge at a slow speed and takes in the view of the expanse of the crossing. The subtle curve and wide arched spans open up views that were previously closed allowing a stronger connection between Batemans Bay and the ocean. The pier design, with its tapered elements and ‘V’ shaped opening provides a lightness to the structure and gives the feeling that the bridge deck is floating above water.

The experience from the Road – from the road the bridge reinforces the gateway to Batemans Bay as it sweeps across the estuary and enters the town. The slight superelevation and subtle curve of the bridge provides views of the bridge beyond to drivers making the crossing. As the bridge reveals itself, it reveals new views on the landscape and estuary and the journey across the bridge, framed by the views of this open area becomes a new part of the iconic narrative of Batemans Bay.

The experience from the shared path – from the shared path the bridge is experienced at a slower pace and both its large scale and attention to detail can be appreciated. Moving along the railing one can experience the scale of the sweep of the bridge, take in new elevated views of the estuary and observe the subtle detailing of the railing and appreciate its references to the design of the existing bridge and the memory of that iconic part of the history of Batemans Bay.

The new Batemans Bay Bridge will provide a new layer to the narrative of crossing the Clyde, makes reference to the old and allow drivers, pedestrians and the public to participate in the creation of new set memories at the centre of their community.

Key bridge design features include:

- A clean, elegant, subtle but iconic bridge design
- A balanced cantilever arched structure, with maximised spans to maintain and enhance views to the water
- Navigation clearance located appropriately in the centre of the alignment with the highest clearance
- Superstructure comprising a segmental box girder constructed with the match casting method
- A structural section featuring a consistent module to upper box and arched sections proportionately varied as required
- A well-proportioned ‘Y’ shaped pier with ‘V’ shaped openings with a consistent profile from the shortest to the longest pier
- Articulation of piers with grooves and chamfers to reduce its bulk
- Provision for feature lighting
- Maintaining a slender proportion that ties in with the overall components of the bridge
- A minimum number of piers with maximum spans
- A handrail design to reference the old pylon shape
- Provision for road lighting on the western side of the bridge and conduits provided for feature lighting to be accommodated.



Figure 5-16: Existing – view from the end of Old Punt Road, from the carpark near the heritage ramp

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 5-17: Proposed – view from the end of Old Punt Road, from the carpark near the heritage ramp



Figure 5-18: Existing – Clyde Street (south of the Princes Highway) looking north towards the existing carpark

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 5-19: Proposed – Clyde Street (south of the Princes Highway) looking north towards the existing carpark displaying the southern abutment of the new Batemans Bay Bridge



Figure 5-20: Existing – the beach in front of the park on the north-east foreshore looking north

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 5-21: Proposed – the beach in front of the park on the north-east foreshore looking north displaying the northern abutment of the new Batemans Bay Bridge



Figure 5-22: Existing – the Batemans Bay promenade looking north



Figure 5-23: Proposed – the Batemans Bay promenade looking north towards the new Batemans Bay Bridge

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6.0 Retaining wall structures

6.1 Retaining wall design principles and strategies

Guiding principles in the development of designs for retaining walls are to:

- Minimise the physical and visual intrusion of retaining structures on the surrounding context
- Minimise the disturbance of existing flora, particularly significant tree stands
- Create a family of similar textures that can be applied to various materials to maintain consistency across the project
- Provide measures to break the bulk and scale of the retaining structures, particularly when facing the neighbourhood side
- Use retaining wall types to respond to local conditions
- Provide a continuous smooth profile for the walls
- Coordinate joints with patterning dimensions.

Location of retaining walls and their visual prominence within the urban context plays an important factor on the retaining wall design. The design strategy for retaining wall structures is based on the following strategies:

- Ensure applied finishes to retaining structures are appropriate to their context
- Ensure design detailing of applied finishes to retaining walls is a refined enhancement
- Integrate landscape design to provide some softness and reduce visual impact
- Provide textures and patterns to reduce the bulk, scale and visual impact of the large retaining structures
- Ensure detailing is of the highest standard.



Figure 6-1: Retaining wall finish at southern abutment



1 | RETAINING WALL - KEY PLAN
SCALE 1:2500

- LEGEND
- PROJECT BOUNDARY
 - LOCAL ROADS BOUNDARY
 - PROPOSED RETAINING WALL

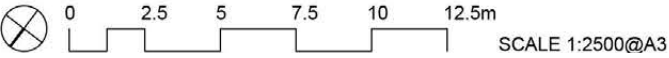


Figure 6-2: Retaining wall key plan

6.2 Southern retaining wall design concept

The southern retaining wall (RW5) is located along the eastern side of southern abutment of the New Bridge over Clyde River. It is about 60 metres in length and reaches a maximum height of about 7.5 metres. RW6 is located along the western side of southern abutment, it is about 78 metres in length and reaches a maximum height of about 8 metres.

Design of RW5 and RW6 takes into consideration their visual and proximity to surroundings such as the existing Batemans Bay Bridge, row of motels on upper Clyde Street and its visual impact on Clyde Street. The design introduces a decorative treatment to the wall with texture to provide visual relief, is domestic in scale and breaks down the bulk and size of the wall.

Key design features include:

- A design that is developed as a simple, robust and integrated series of elements
- Articulation of the wall through patterns, creating an interesting façade
- Use of neutral colours with non-reflective finishes, making the wall recessive in the environment
- An incline to the vertical surface away from the footpath (as seen in long section through bridge) to minimise visual impact on Clyde Street and desire lines
- A horizontal emphasis to the appearance of the retaining wall, with the incorporation of a linear pattern finish at two varying scales to provide visual interest.
- The treatment wraps around the southern abutment face to provide a continuous finish
- Landscape is integrated with the wall by maximising the landscape buffer between the wall and the accessible ramp
- Pattern and textures articulated in scale and proportion to deter graffiti.

A shorter retaining wall (RW8) is also located on the south, in front of RW5. It is required to provide safe batter slope and forms part of the concrete channel. Due to its relatively small scale it will have a natural concrete finish.

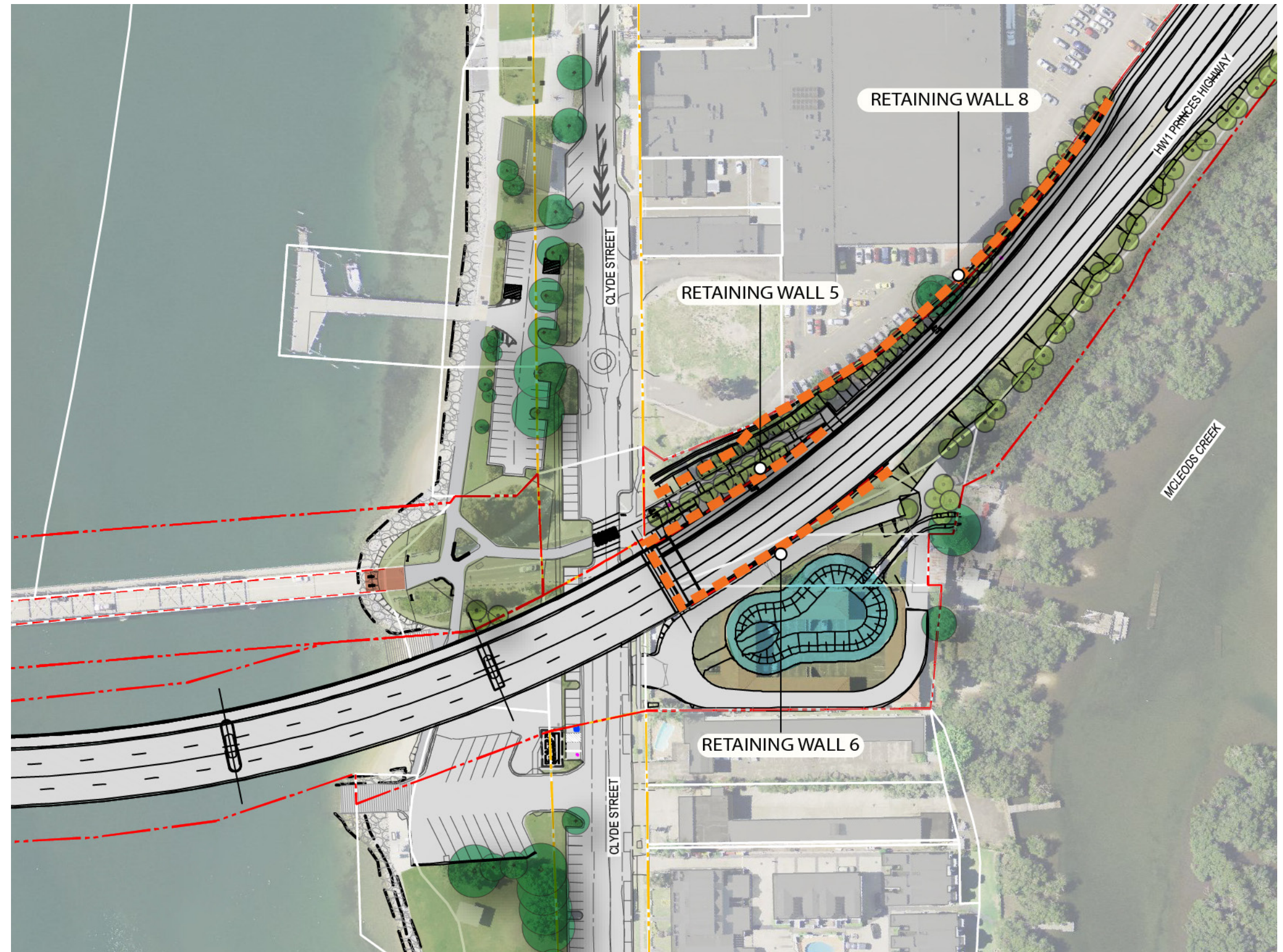


Figure 6-3: Southern retaining wall key plan

Accessible ramp and stairs

An accessible ramp and stairs are also located at the southern abutment. The ramp and stairs connects users from Clyde Street to the shared user path (SUP) on the bridge. The stairs is a cantilevered structure attached to RW5, while the accessible ramp is supported on ground.

RW8 is located on the eastern side of the southern foreshore. The wall is approximately 1.5 metres high.

Key design features include:

- The ramp and stairs complies with AS 1428.1
- Satisfies desire lines and is integrated with new and existing shared paths and footpaths
- Articulation of RW8 is similar to RW5, with textured concrete panels to tie the two elements together
- Planting on the batters in term of accent planting to provide visual relief and CPTED measures.

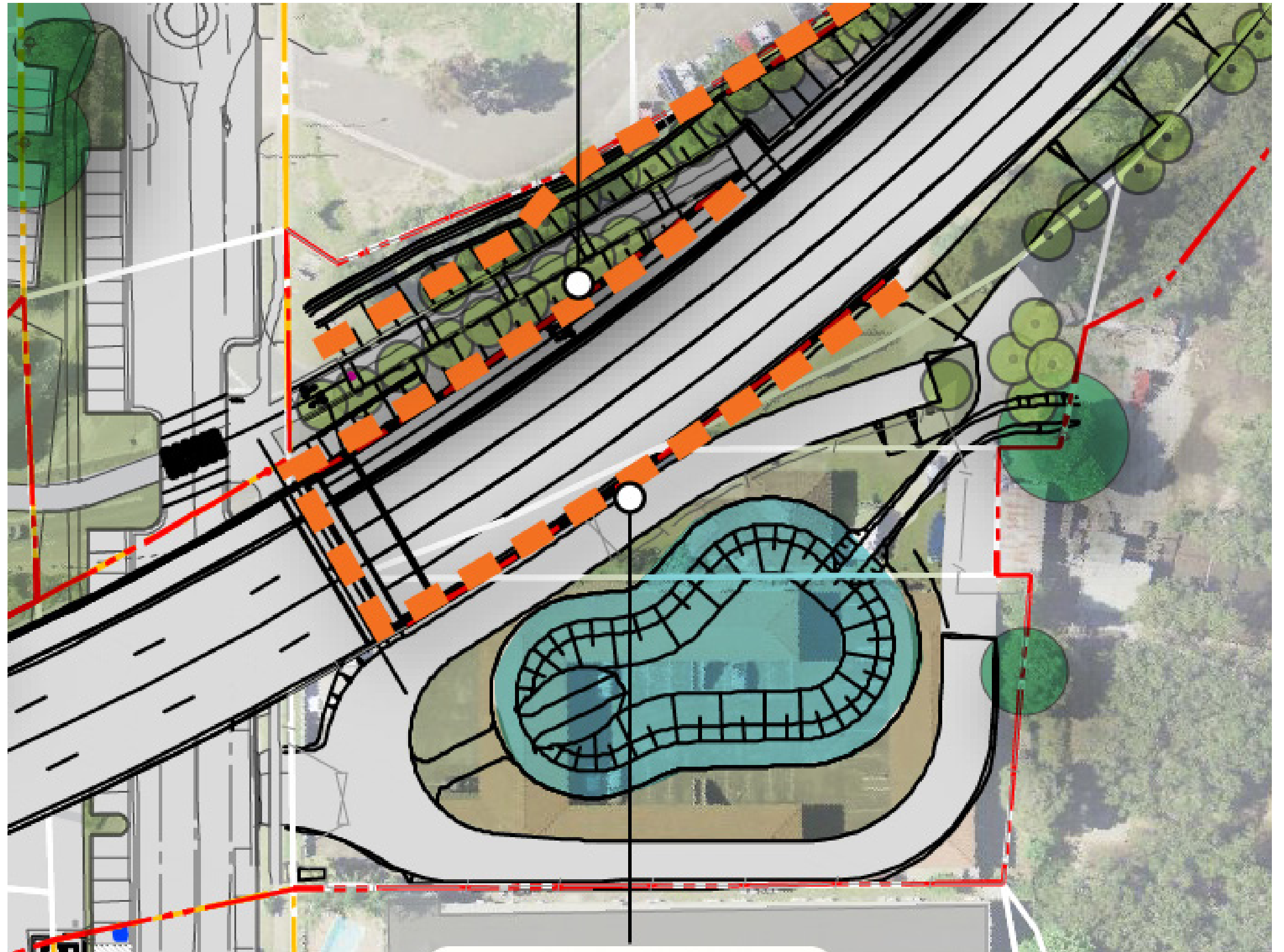
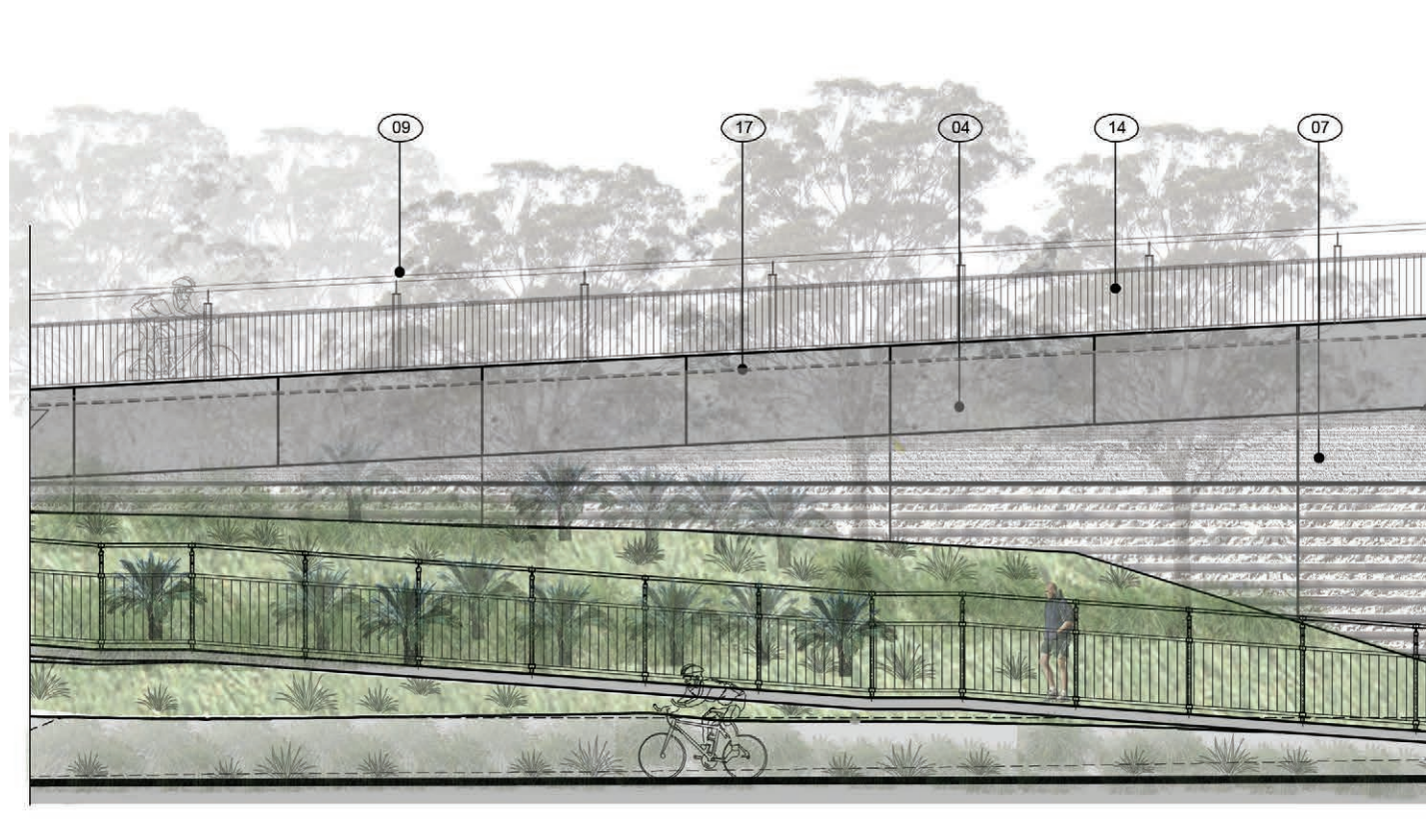


Figure 6-4: SUP and stair plan



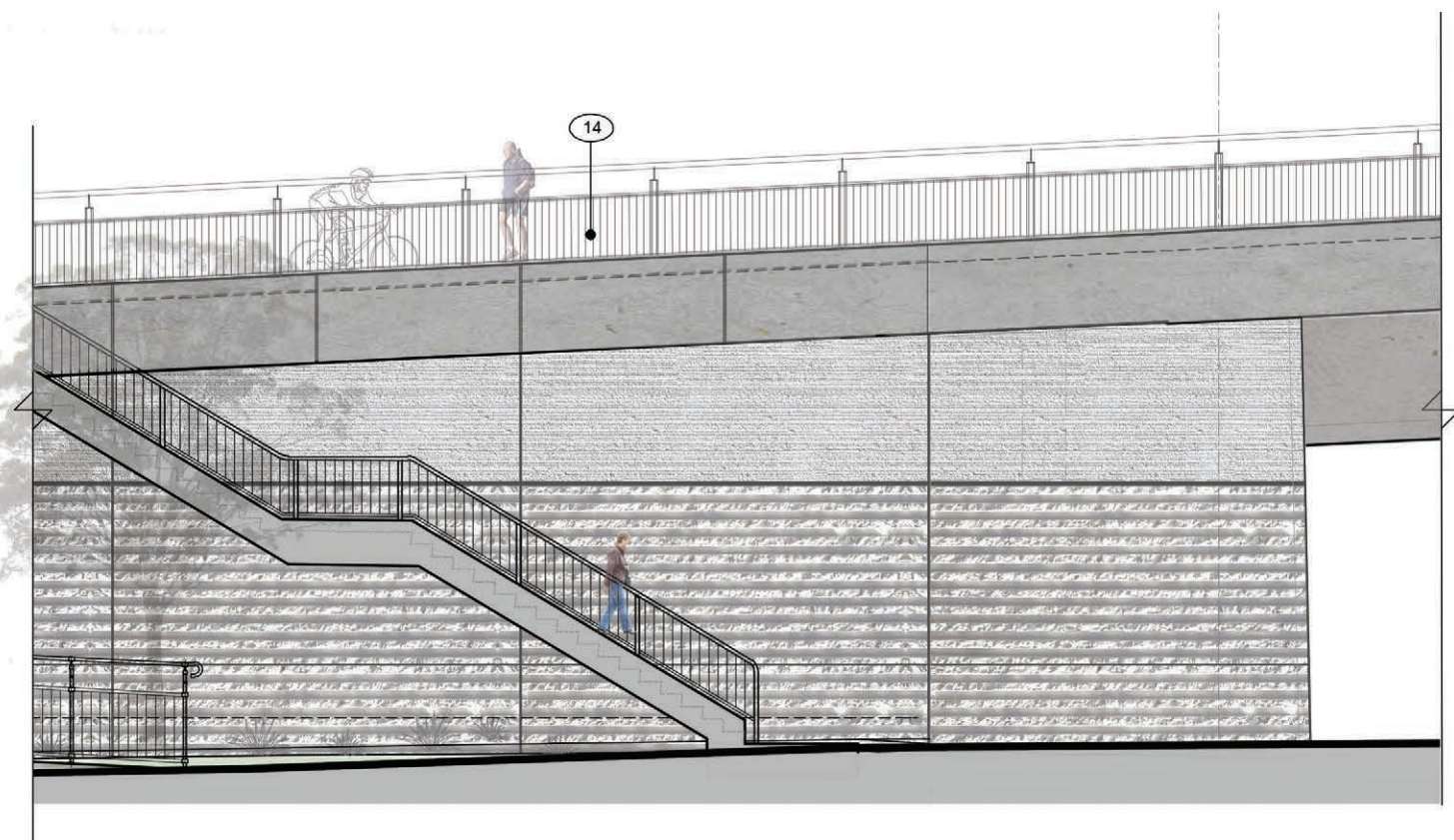
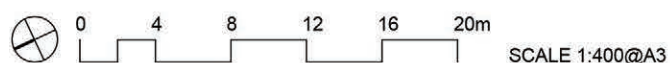
1 | SOUTHERN RETAINING WALL - ELEVATION
SCALE 1:250



2 | SOUTHERN RETAINING WALL - ELEVATION
SCALE 1:100

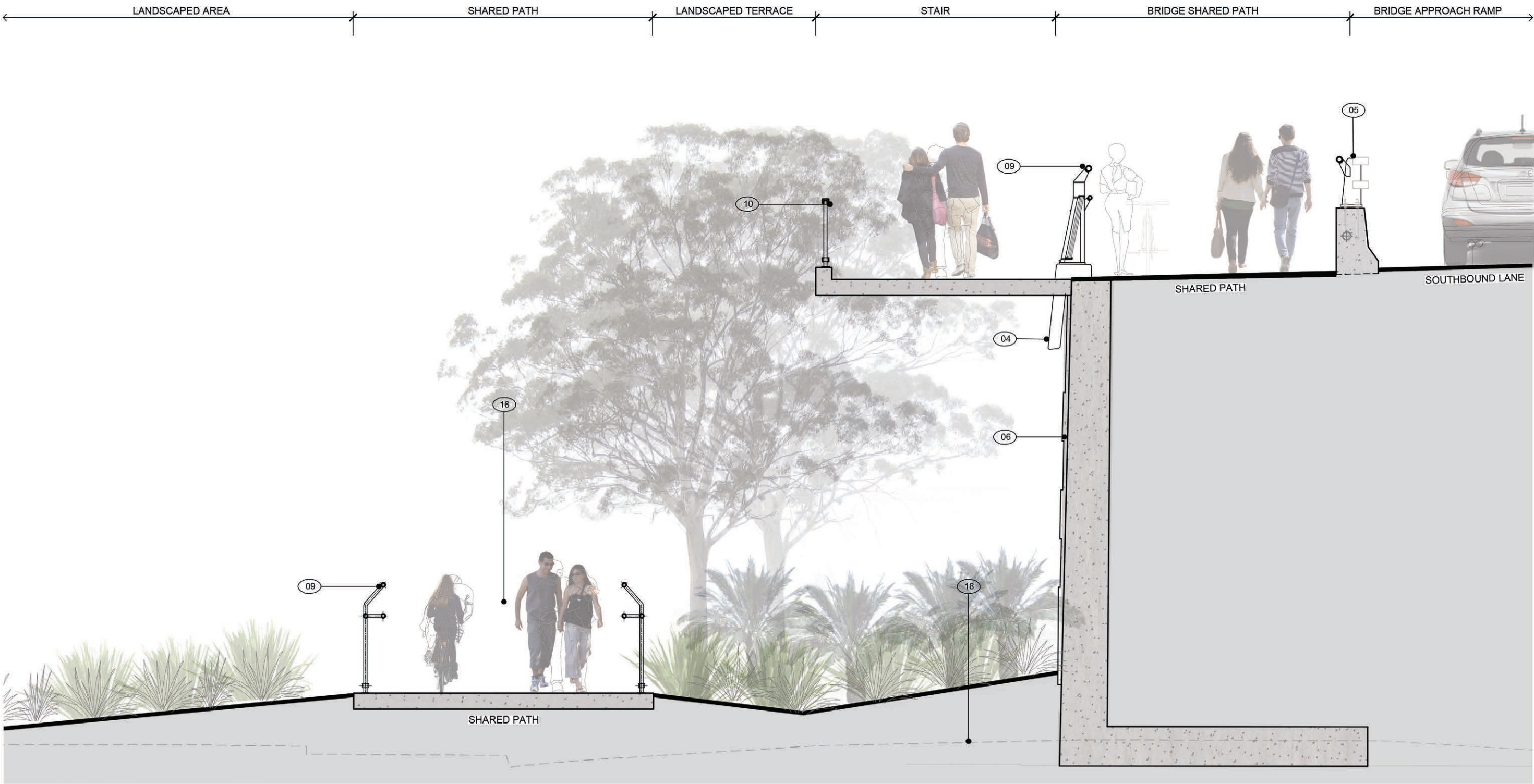
LEGEND

- | | | | | |
|-------------------------------------|--------------------------------|--|----------------------------|--|
| (01) SEGMENTAL CONCRETE BOX GIRDER | (05) PERFORMANCE BARRIER | (09) CYCLIST RAIL | (13) DRAINAGE | (17) FINISHED SURFACE LEVEL (INDICATIVE) |
| (02) CONCRETE PIER | (06) RETAINING WALL (PROPOSED) | (10) HANDRAIL | (14) BALUSTRADE | (18) EXISTING SURFACE LEVEL (INDICATIVE) |
| (03) CONCRETE PILE CAP (INDICATIVE) | (07) CONCRETE TEXTURE PANELS | (11) SHARED PATH LIGHTING (INDICATIVE) | (15) ARCHITECTURAL GROOVES | (19) STEEL POST |
| (04) PARAPET | (08) ROCK PITCHING | (12) ROAD LIGHTING (INDICATIVE) | (16) SHARED PATH | |



3 | SOUTHERN RETAINING WALL - ELEVATION
SCALE 1:100

Figure 6-5: Southern retaining wall elevation



4 | SOUTHERN RETAINING WALL SECTION
SCALE 1:50

- LEGEND
- 01

SEGMENTAL CONCRETE BOX GIRDER

02

CONCRETE PIER

03

CONCRETE PILE CAP (INDICATIVE)

04

PARAPET
- 05

PERFORMANCE BARRIER

06

RETAINING WALL (PROPOSED)

07

CONCRETE TEXTURE PANELS

08

ROCK PITCHING
- 09

CYCLIST RAIL

10

HANDRAIL

11

NOT USED

12

ROAD LIGHTING (INDICATIVE)
- 13

DRAINAGE

14

BALUSTRADE

15

ARCHITECTURAL GROOVES

16

SHARED PATH
- 17

FINISHED SURFACE LEVEL (INDICATIVE)

18

EXISTING SURFACE LEVEL (INDICATIVE)

19

STEEL POST

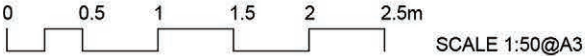


Figure 6-6: Southern retaining wall section

Southern retaining texture

The southern retaining walls (RW5, RW6 and face of Abutment B) consists of two textures, both with a linear emphasis.

The texture consist of a strong horizontal rib pattern anchoring the base of the retaining wall, then transitions to a finer, horizontal rib pattern near the parapet. The textures are different enough to provide visual interest and reduce the overall bulk of the wall, yet remain in the same pattern family to provide visual cohesiveness.

The transition point between the two textures takes into consideration its relationship with the abutment face, and the location of the abutment shelf so that the texture can appear to wrap around the abutment face seamlessly.

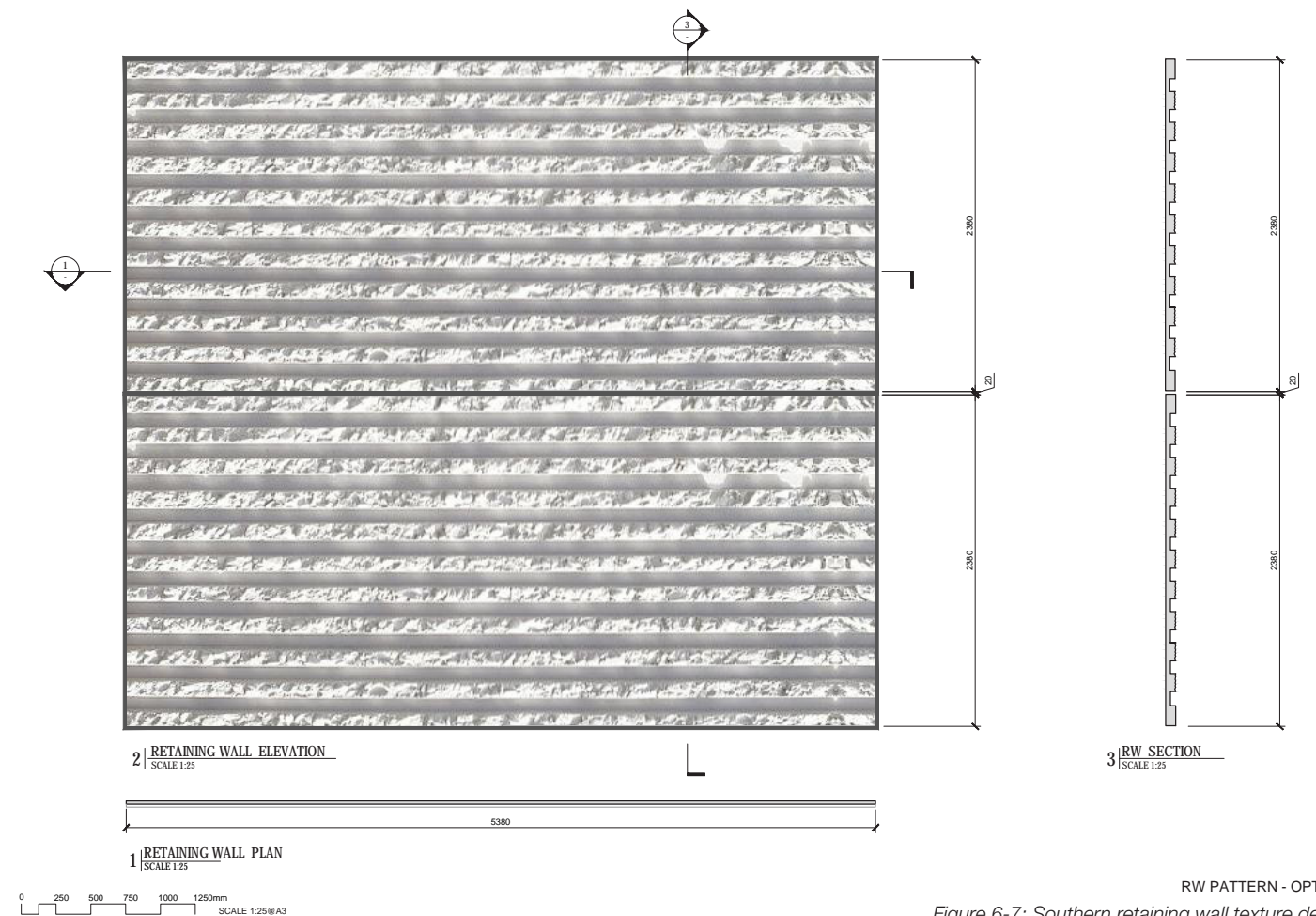
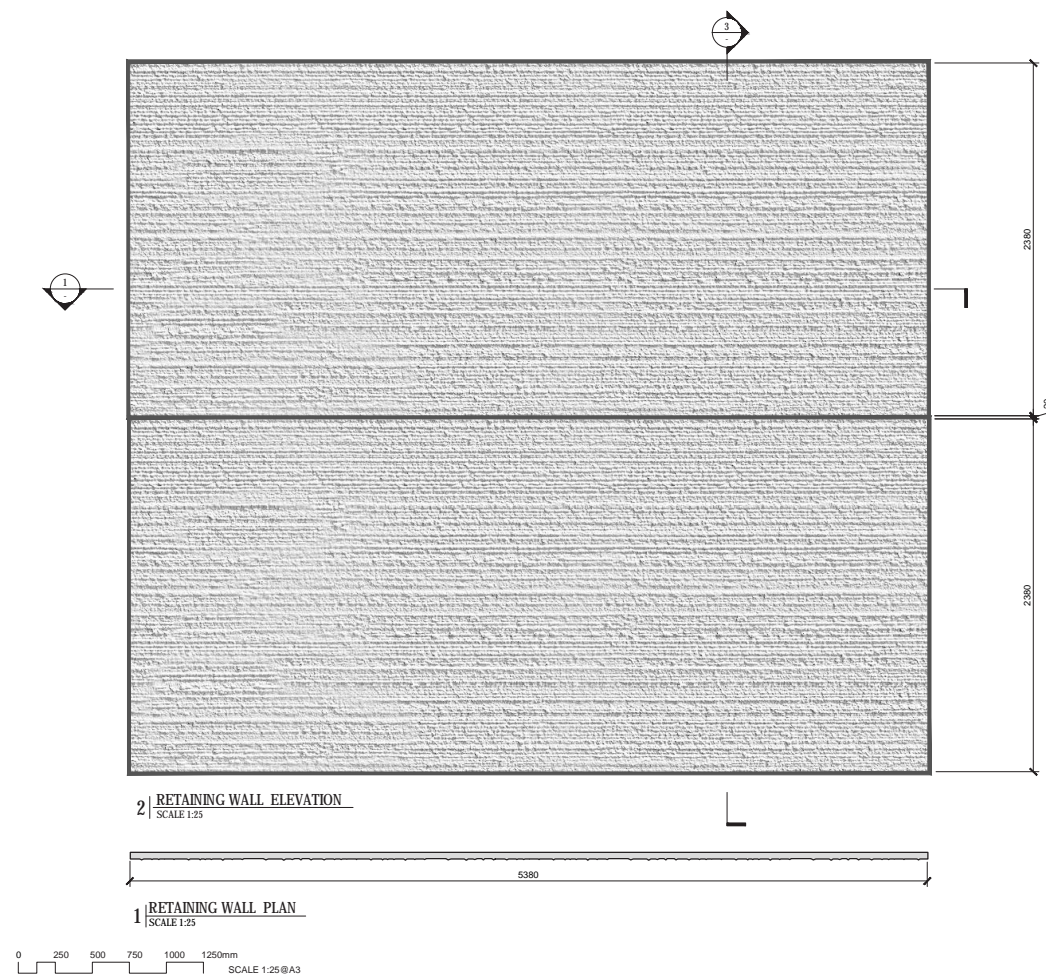


Figure 6-7: Southern retaining wall texture details

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 6-8: Southern retaining wall view from shared path

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 6-9: Southern retaining wall view from Clyde Street



Figure 6-10: Existing – view looking north on Clyde Street

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 6-11: Proposed – view looking north on Clyde Street

6.3 Retaining wall north

The northern retaining walls are soil nail walls with precast fascia panels. RW1 and RW2 are both located on the northern cutting. RW1 is located near the northbound carriageway of the HW1 Princes Highway, and RW2 is located near the Caltex service station.

Key design features include:

- A design that is developed as a simple, robust and integrated with the retaining finishes on the southern abutment
- A vertical emphasis, with a 1:40 lean to the appearance of the retaining wall as these are facing the motorway
- Use of neutral colours with non-reflective finishes, making the wall recessive in the environment
- The concrete fascia panels are 180 millimetres thick with a vertical pattern finish
- Integration with other road elements such as barriers and handrails.

Another feature at the north is RW9, located in front of the northern abutment. This wall reaches a maximum height of about 7 metres over a length of about 54 metres, with returns at both ends that tapers down to the ground. This is a cast in-situ wall with a 1:40 lean similar to the southern abutment.

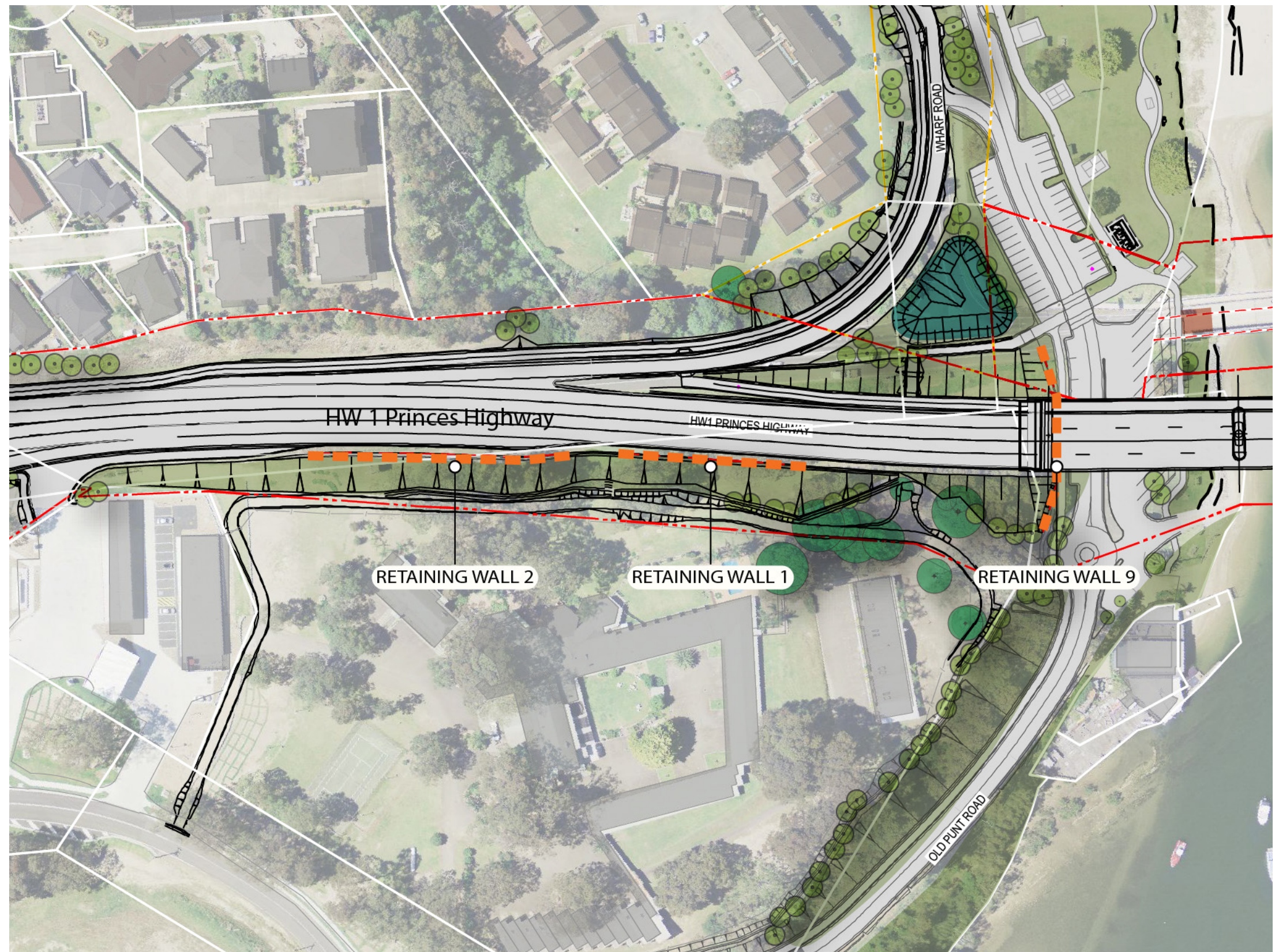


Figure 6-12: Northern retaining wall key plan

Northern retaining wall texture

The northern retaining walls consists of RW9, face of Abutment A and walls facing the motorway.

The northern abutment, being a cast in-situ retaining wall will have a natural concrete finish, the selection of a more simple treatment is to create a blank canvas for the potential integration of artwork, which will be further developed in consultation with local artist(s) and community.

RW1 and RW2 are both located on the northern cutting. They are soil nail walls with precast fascia panels with a maximum height of 1.75 metres and 2.75 metres respectively. Due to their proximity to the mainline carriageways, the pattern is also of a strong rib pattern similar to the south, however used vertically.



Figure 6-13: View looking towards the northern abutment retaining wall

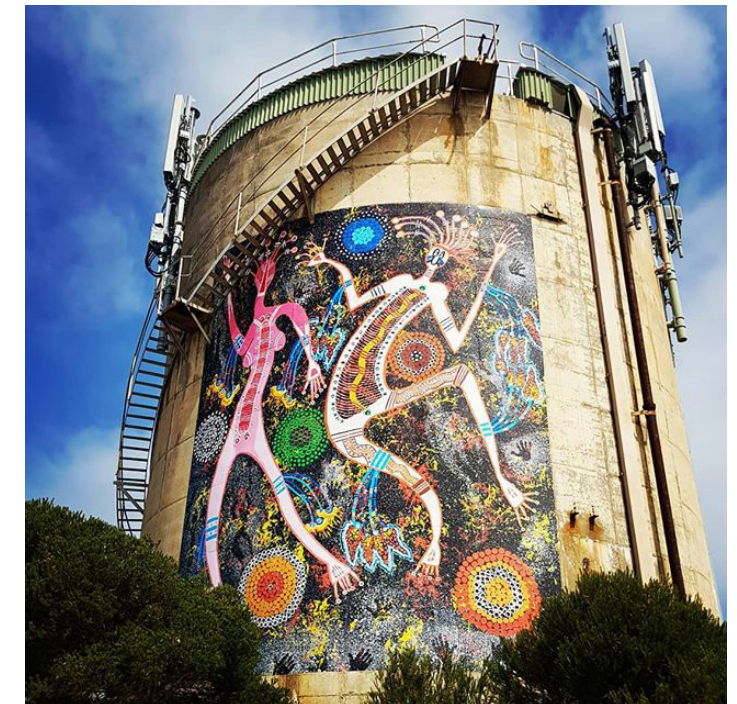
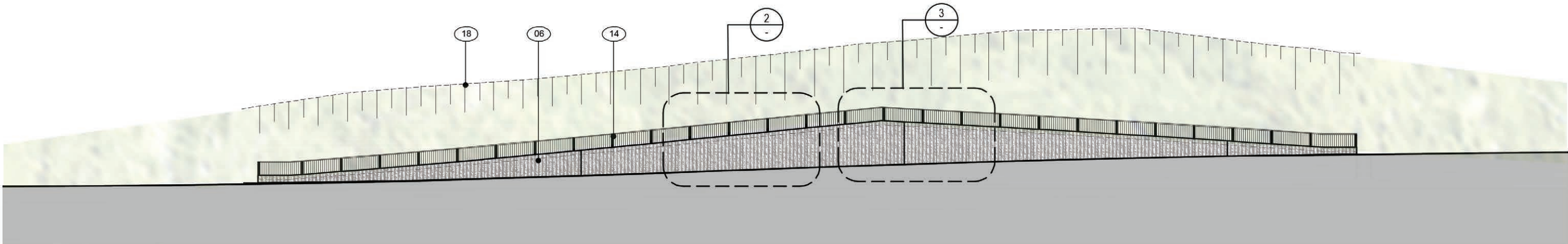


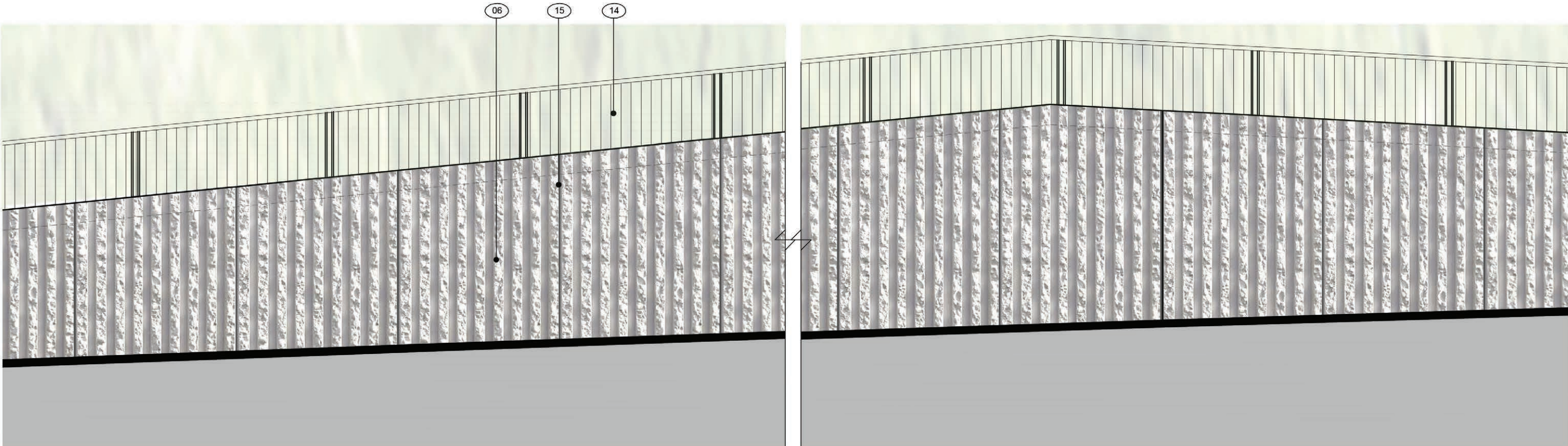
Figure 6-14: Example - Bermagui water tower mural



Figure 6-15: Example - photographic mural



1 | NORTHERN RETAINING WALL RW2 - ELEVATION
SCALE 1:250



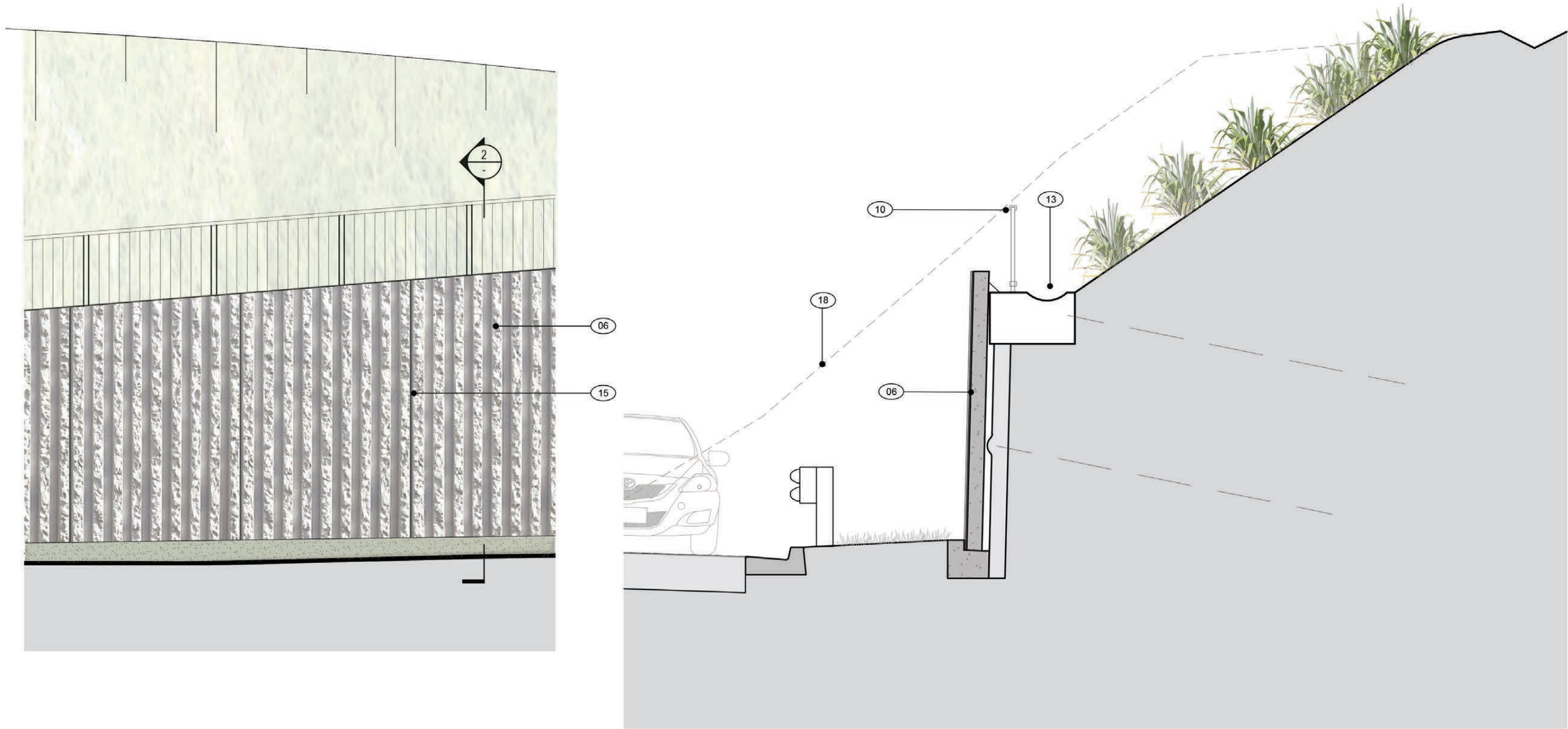
2 | NORTHERN RETAINING WALL RW2 - ELEVATION
SCALE 1:50

3 | NORTHERN RETAINING WALL RW2 - ELEVATION
SCALE 1:50

- LEGEND

01 SEGMENTAL CONCRETE BOX GIRDER	05 PERFORMANCE BARRIER	09 CYCLIST RAIL
02 CONCRETE PIER	06 RETAINING WALL (PROPOSED)	10 HANDRAIL
03 CONCRETE PILE CAP (INDICATIVE)	07 CONCRETE TEXTURE PANELS	11 SHARED PATH LIGHTING (INDICATIVE)
04 PARAPET	08 ROCK PITCHING	12 ROAD LIGHTING (INDICATIVE)
- | | |
|--------------------------|--|
| 13 DRAINAGE | 17 FINISHED SURFACE LEVEL (INDICATIVE) |
| 14 BALUSTRADE | 18 EXISTING SURFACE LEVEL (INDICATIVE) |
| 15 ARCHITECTURAL GROOVES | 19 STEEL POST |
| 16 SHARED PATH | |

Figure 6-16: Northern retaining wall long elevation



1 | NORTHERN RETAINING WALL - TYPICAL ELEVATION
SCALE 1:50

2 | RETAINING WALL SECTION
SCALE 1:50

LEGEND

01 SEGMENTAL CONCRETE BOX GIRDER

02 CONCRETE PIER

03 CONCRETE PILE CAP (INDICATIVE)

04 PARAPET

05 PERFORMANCE BARRIER

06 RETAINING WALL (PROPOSED)

07 CONCRETE FASCIA PANELS

08 ROCK PITCHING

09 CYCLIST RAIL

10 HANDRAIL

11 NOT USED

12 ROAD LIGHTING (INDICATIVE)

13 DRAINAGE

14 BALUSTRADE

15 ARCHITECTURAL GROOVES

16 SHARED PATH

17 FINISHED SURFACE LEVEL (INDICATIVE)

18 EXISTING SURFACE LEVEL (INDICATIVE)

19 STEEL POST

0 0.5 1 1.5 2 2.5m

SCALE 1:50@A3

Figure 6-17: Northern retaining wall typical

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7.0 Landscape design

7.1 Landscape design and implementation

The landscape strategy aims to respond to the context and character of the adjacent landscape through which it passes with re-vegetation of suitable species from the indigenous vegetation communities and cultural plantings associated with the Batemans bay riverside and promenade including Burrawangs, Spotted Gums, Water Gum, Swamp Oaks, Mangroves and wetland plants.



Figure 7-1: Burrawang cycads in a spotted gum forest between Batemans Bay and Durras

7.2 Landscape elements

The landscape design has been developed in accordance with Roads and Maritime’s *Landscape Guideline*, 2008 document and will involve Roads and Maritime’s urban and landscape design advisors throughout the design development process, and is consistent with the strategies outlined in the *Environmental Assessment and the Scope of Works and technical requirements Appendix 15*.

The design incorporates both the fundamental objectives of landscape design in road environments and the specific requirements of the scope as described below.

Table 1: Landscape strategies

Fundamental objectives	Specific requirements provided
Safety The design incorporates all required clear zone and safe sight distance setbacks and avoids the creation of hidden public places whilst maximising passive surveillance opportunities	<ul style="list-style-type: none">• Non-frangible planted and seeded areas conform to clear zone and roadside furniture requirements• Safe sight distances, signage and power lines are not obscured by planting and revegetation areas• Setbacks are provided for structures, roadside furniture and pathways to enable clear access for maintenance and visual inspections when the landscape matures• The layout has been optimised for maximum passive surveillance.
Integration with local setting The design achieves this through maintaining and enhancing existing landscape character and vegetation patterns	<ul style="list-style-type: none">• Maximises the retention of existing trees to assist in visual mitigation, especially existing large trees• Includes the planting of tall trees adjacent to the New Batemans Bay Bridge• Water gum planting used as shade trees within car parking matches existing street tree planting in Clyde Street.
Ecologically sound The design uses local species from existing and adjoining plant communities and assists in protecting and recovering local biodiversity	<ul style="list-style-type: none">• Uses native plants to reinforce natural ecologies• Introduces a riparian zone to the foreshore and a Swamp Oak buffer to Mangroves and wetland with a minimum buffer of 20 metres to revegetated foreshore areas• Maximises use of permeable surfacing for all car park bays and minor road connections• Integrates water sensitive drainage design strategies with sides of the basins planted with macrophytes to filter pollutants from road runoff.
Add character and value The design achieves this by responding to and drawing on the existing landscape patterns of the area	<ul style="list-style-type: none">• Provides safe cyclist connectivity from the northern abutment to the northern foreshore area• Retains platforms protruding into the river in the location of the existing bridge abutments as a historical element acknowledging the Existing Batemans Bay Bridge• Integrates and improves current open space buffers around the New Batemans Bay Bridge• Includes space for the planting of cultural landscape trees and shade trees within parking areas.

7.3 Revegetation

Revegetation across the project will be largely achieved through planting of containerised plant stock into prepared planting areas with selected native species. Seeding via compost blanket application will be used on the steep northern approach cut slope in combination with a specialised planting technique. All other planting establishment works will be undertaken in accordance with Roads and Maritime standard specifications, including:

- DCM 178 Vegetation
- DCM 179 Landscape Planting.

In locations where slopes are 2:1 or shallower, revegetation will be undertaken using direct planting, particularly in prominent locations. Endemic native species are used throughout the project. On 2:1 embankments, erosion control measures will be applied with the use of coir logs and organic fibre mat. Revegetation will be undertaken through direct planting of Forestry ‘Tubestock’ containers - 50mm² x 150mm deep along with 150mm container size.

In some instances seeding would be more appropriate such as steep 1.5:1 embankments. Seeding schedules contain a mix of native trees, shrubs, grasses and groundcovers selected from the surrounding indigenous vegetation communities.

Where seeding occurs it may be applied by:

- Hydromulching;
- Hydroseeding with strawmulching;
- Compost blanket; or
- a combination of the three methods

100 litre container sizes will be used for trees planted in prominent locations and 25 litre container stock will be used where trees are planted in mixed copses.

A riparian zone with a minimum buffer of 20 metres has been introduced to the northern foreshore. Therefore, new roads and carparking facilities are located beyond this zone.

7.3.1 Topsoils

While there may be a small quantity of topsoil won from stripping operations, it is most likely that all topsoil used for planting will be from imported weed-free organic topsoil mixes.

Topsoil will be tested for compliance with the relevant *Australian Standard AS4419* and for suitability for the intended location and ameliorated in accordance with the test result recommendations, prior to installation. In locations where compost blanket is used, no topsoil will be required.

7.3.2 Soil preparation

All work will be undertaken in accordance with Roads and Maritime standard specifications, including:

- All sub grades of areas to receive landscape treatments to be tested along with any site topsoil used in finished works
- Prior to placement of site topsoil in areas to be landscaped, eradicate weeds continuously so that the subgrades to receive topsoil are weed free
- The subgrade of all areas to be planted will be ripped and cultivated to a depth of 150 millimetres. Subgrades will also be tested for suitability to support plant growth and ameliorated in accordance with test results prior to installing topsoil. Topsoil depths include:
 - Hydromulched areas (where used): 50 millimetres
 - Turfed areas: 50 millimetres
 - General massed planting areas: 150 millimetres.

The stockpiled topsoil will be tested using a NATA accredited testing laboratory to ascertain its suitability for use in revegetation works.

All topsoil re-used within landscape areas will be prepared in the following manner:

(i) a representative program of soil sampling of all soils to be used in landscape areas to address any soil deficiencies, including soil pH analysis, will be carried out during the preparation and development of the Design Documentation and the results of these tests, together with advice from the soil scientist, must be used to specify the requirements for soil improvement and stabilisation to enable the establishment and maintenance of successful long term seed and plant growth and vegetation cover

(ii) all soils will be ameliorated, conditioned or improved to comply with recommendations of the soil scientist

(iii) prior to the placement of topsoil, the Contractor will continuously eradicate weeds by spraying, and monitor the weed cover four (4) weeks after each spray. When the monitoring indicates that weed cover is reduced to less than

five per cent, a final eradication spray will be carried out.

(iv) before use for vegetation subsoils will be ripped and surfaces roughened prior to spreading of topsoil. Topsoils will be screened or sorted to remove stumps, roots, clay lumps or stones greater than 50 millimetres in size.

A soil pedology survey and analysis must be undertaken within each vegetation community by the Contractor. Each vegetation community type will be tested. The vegetation communities include Spinifex Beach Strand Grassland, Grassy Woodland on Coastal Lowlands, Spotted Gum – Blackbutt Shrubby Open Forest and Swamp Oak Floodplain Forest. Soil testing must be undertaken by a National Association of Testing Authorities (NATA) registered laboratory. The test must include pH, salinity, cation exchange capacity, plant available phosphorus, total organic matter, total nitrogen and carbon/nitrogen.

7.3.3 Mulch

Site-won woodchip mulch and leaf litter supplemented with imported mulch will be used on all new planting areas on the project. Mulch will be spread to a depth of 75 millimetres to assist in weed suppression and erosion control and to prevent the soil drying out.

Discrete stockpiles will also be retained on site at selected locations to be used in topping up mulch areas during the landscape maintenance period.

7.3.4 Water quality control basins

There are two water quality control basins on the project.

The water quality control basins will be an asset to the visual and ecological amenity of the area as well as ensuring adjacent areas are not adversely affected by runoff during the construction and operational phases of the upgrade. The locations of water quality control basins are shown on the landscape concept plans on pages 71, 74, 79 and 81.

The basins will have an informal shape and will be graded to blend with existing adjoining landform. Fences will be required due to water depth, however these will be largely for wet basins hidden from view by perimeter planting.

The inner slopes of basins will be revegetated by planting with selected native sedge (macrophyte) species that occur in the Mcleods Creek wetland (to ensure that foreign species propagules cannot spread to the wetland). Planting will be located above and below the predicted average water level of the basin and from there it is anticipated that wetland plants will migrate into the water to their preferred depth.

The outer slopes of the basin will be supplemented with direct planting of containerised trees and shrubs at selected locations.

7.3.5 Water sensitive design and rain gardens

Car park surface runoff will fall to the landscape areas adjacent to car parks and be held for short periods within the 'rain garden' before draining to raised pit inlets. The rain garden planting in the Northern Foreshore carpark will remove suspended solids, rubbish and provide some nutrient uptake as well as provide additional passive irrigation to the planting. Flush kerbing will be used to allow stormwater to flow from pavement to garden.

In addition, a single pit within each rain garden will reduce the total quantity of pits required within the car parking areas.

Vegetated swales have been provided for storm water quality treatment in the carpark areas adjacent to Clyde Street and Wharf Road.



Figure 7-2: Edge planting in water quality control basin. Fencing is concealed within planting



Figure 7-3: Rain garden adjacent to car parking with flush kerbs and raised pit inlets (bottom right corner)



Figure 7-4: Rain garden



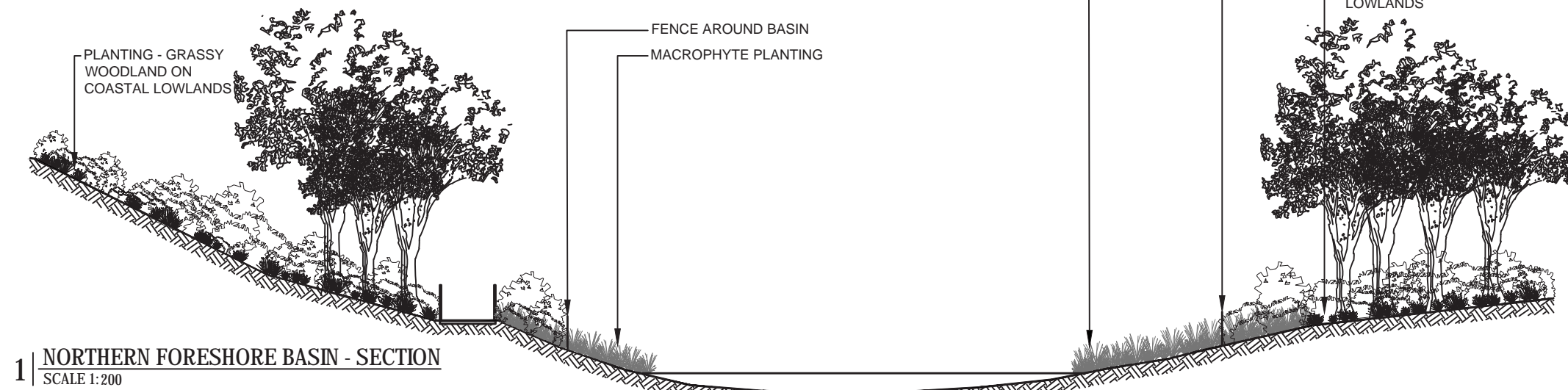
Figure 7-5: Mangroves Cullendulla Creek Batemans Bay

CM⁺ Northern Basin landscape treatment

JOHN
HOLLAND



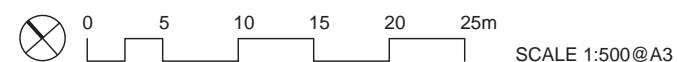
JACOBS



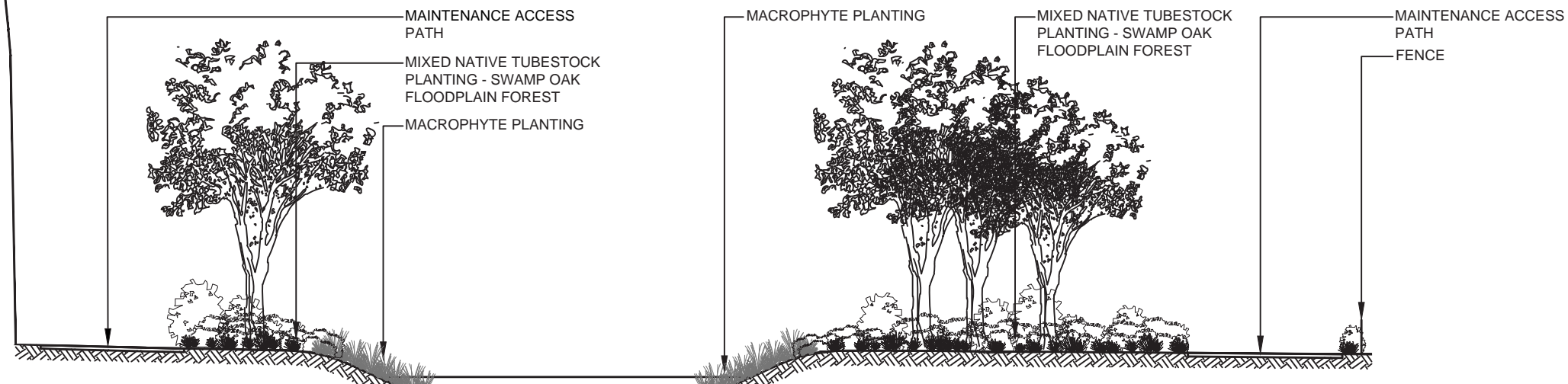
1 | NORTHERN FORESHORE BASIN - SECTION
SCALE 1:200



2 | NORTHERN FORESHORE BASIN - LANDSCAPE CONCEPT PLAN
SCALE 1:500



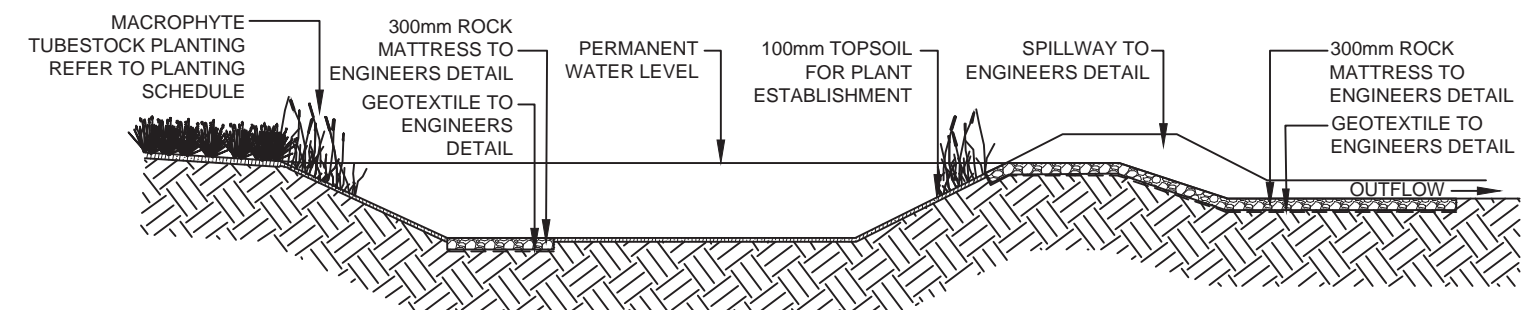
Edge planting in water quality control basin



1 SOUTHERN FORESHORE BASIN - SECTION
SCALE 1:500



2 SOUTHERN FORESHORE BASIN - LANDSCAPE CONCEPT PLAN
SCALE 1:500



3 WATER QUALITY CONTROL BASIN - INDICATIVE DETAIL
SCALE 1:200 @ A3



Edge planting in water quality control basin

7.3.6 Protection and recovery of local biodiversity

Remnant areas of native vegetation including threatened species will be fenced-off during construction to prevent unauthorised access or accidental damage. The road corridor will be revegetated using species consistent with the vegetation communities that exist along the upgrade, increasing the level of biodiversity along the corridor. The following general measures will be taken to protect and assist the recovery of local biodiversity.

‘Best practice’ management of erosion and sediment discharges during the construction phase would be implemented to ensure there is no significant discharge of sediment into watercourses or vegetation communities downslope and downstream of the roadworks. A range of measures is to be implemented during construction, including the use of silt fences, sediment ponds and hay bales, and the covering and protection of exposed soil surfaces as rapidly as possible

The construction and use of water quality control ponds would incorporate macrophyte vegetation, to ensure that the water quality of adjacent watercourses and waterbodies does not deteriorate as a consequence of discharges from the construction and operational phases of the upgrade.

Threatened species conservation and Endangered Ecological Community (EEC) vegetation will be protected through the following measures, refer to Table 2.

7.3.7 Seed supply and collection

Seed supply and collection (if undertaken) will be undertaken in accordance with Roads and Maritime guidelines.

7.4 Progressive installation

Landscape finishing works will be completed progressively throughout the duration of the project.

Typically, as cut and fill formations are completed, topsoil will be installed as soon as practicable to the formations. As topsoiling in individual areas is completed, they will either be:

1. Treated with hydromulching, hydroseeding with strawmulching, compost blanket or a combination of the three containing grass and shrub seed mixes, including annual cover crop species that will generate quickly to assist in stabilising the embankments and reduce erosion risk.
2. Mulched and planted with containerised plant stock.

All topsoiling and revegetation work will be co-ordinated with the earthworks programme to suit the construction sequence and prevailing weather conditions.

Small native shrubs, grasses and groundcovers for use on cut embankments have been selected to include in the seed mix. Installation is to be in accordance with supplier’s requirements and is to be supported by a guarantee of 80 per cent strike rate. See planting and seeding schedules for species composition and application rates.

7.6.2 Plants, planting and mulching

Planting and mulching methods will be in accordance with the Roads and Maritime’s specifications. The majority of planting will be Forestry ‘Tubestock’ containers - 50mm² x 150mm deep along with 150mm container size plantings at the roundabouts. 25 litre size planting will also be used at these locations.

100 litre container sizes will be used for trees planted in prominent locations, within the car parks for shade and near the town centre, and 25 litre container stock will be used where trees are planted in mixed copses.

7.5 Rehabilitation of temporary works

Temporary works that are constructed to enable construction of the upgrade will be progressively rehabilitated to the conditions present prior to construction of the temporary works. The process will include *Environmental Assessment*, consistency review and approval.

7.6 Planting and seeding

7.6.1 Seeding application

Where seeding is used it may be applied by hydromulching, hydroseeding with strawmulching, compost blanket or a combination of the three as follows;

Where hydromulch is specified it will comply with the Roads and Maritime’s Guideline for Batter Stabilisation – Fact Sheet 7: Hydromulching – Standard. Hydromulch comprises of organic fibrous materials mixed with water and sprayed onto the soil surface in slurry form. Hydromulched areas will require a topsoil depth of 50 millimetres.

Where hydroseeding is specified it will comply with the Roads and Maritime’s Guideline for Batter Stabilisation – Fact Sheet 5: Hydroseeding. Hydroseeding is a hydraulic application of seed and soil ameliorants.

Where compost blanket is specified it will comply with Roads and Maritime’s Guideline for Batter Stabilisation – Fact Sheet 13: Compost Blanket and must contain a minimum 8 kilogram per hectare of native seed as specified in the seed schedules. Compost blanket contains a growing media of compost and does not require topsoil or other growing media and can be applied directly over the prepared batter slope.

The engineering design team are committed to developing an alternative proposal for the eastern side of the southern bridge embankments using “Geofoam” to solve ground treatment issues in this area. This may result in relocation of tall trees or other changes to the proposed planting or planting methods due to soil depth constraints introduced by geofoam.

Table 2: Threatened Species Strategy

Strategy	Implementation
Conduct pre-clearing survey of native vegetation.	Undertake a survey, prior to final design, to locate the positions of threatened flora species within, or close to, the road footprint.
Where possible and practicable, translocate threatened species to areas not affected by the road-works prior to the commencement of clearing.	Monitor and maintain threatened species following translocation.
Protect threatened species retained within the road corridor during the construction period.	Manage construction activities to prevent the loss of existing vegetation. Install approved protective fencing around threatened species and EEC’s. Include a ‘buffer’ zone of sufficient distance to mitigate loss. Avoid any stockpiling of materials, parking of vehicles, or other unnecessary disturbance beneath vegetation and trees to be retained. Manage construction activities to prevent discharge of waste or contaminants into existing vegetation. Eradicate existing weed growth and exotic plant species, through herbicide control of pasture grasses and physical removal of exotic trees and shrubs.
Educate contractors on tree protection during construction.	No machinery or personnel is permitted outside the construction buffer without the approval of the Project Manager.
Rehabilitation and regeneration programs for threatened vegetation communities in the vicinity of the route alignment to enhance the quality and quantity of these communities in the locality.	Provide rehabilitation and regeneration programs as appropriate.

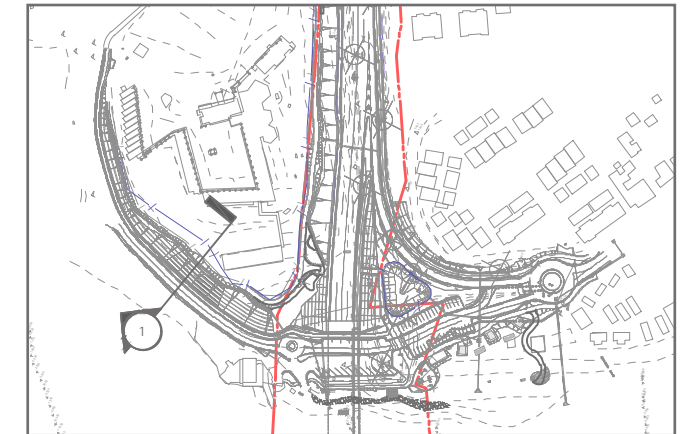
7.6.3 Old Punt Road landscape strategy

The landscape on Old Punt Road will comprise of plant species from the Spotted Gum - Blackbutt shrubby open forest.

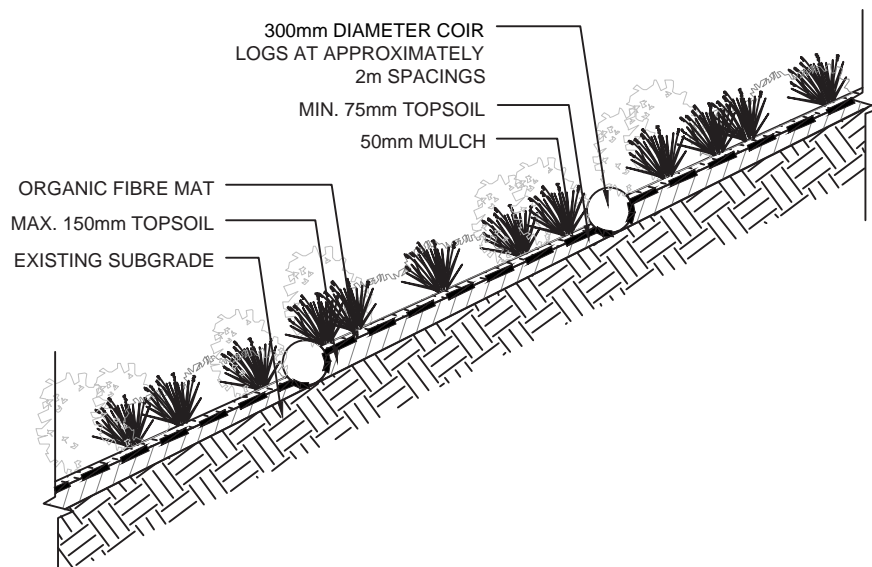
Where planting is used on 2:1 slopes additional erosion control measures will be applied with the use of coir logs and organic fibre mat which will reduce the steepness of the batter, improve plant establishment and retain soil and mulch on slopes.

Planting will be from forestry 'Tubestock' containers - 50mm² x 150mm deep along with 150mm container size.

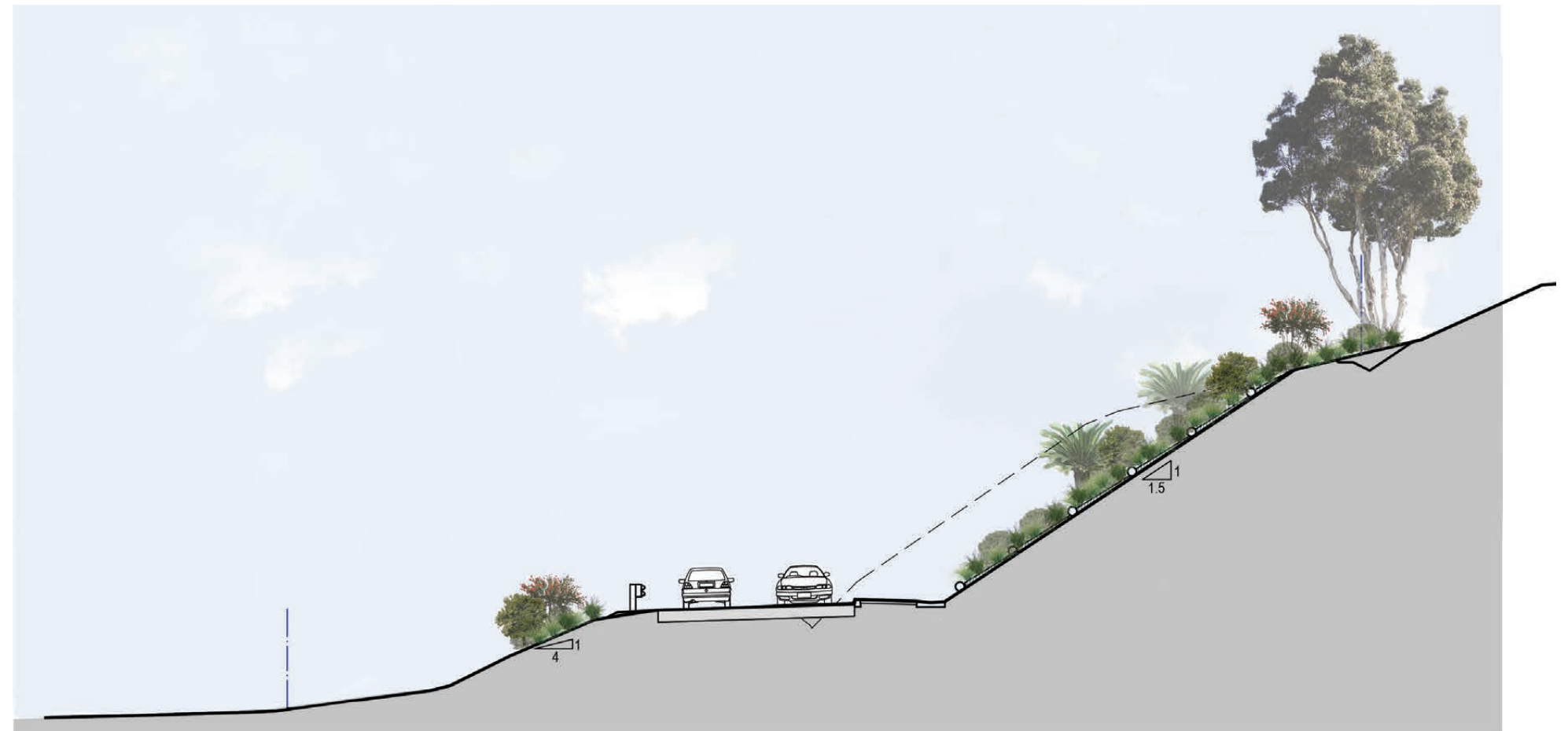
Slopes between 2:1 and 1.5:1 will either be seeded or additional erosion control measures will be applied with the use of coir logs and organic fibre mat.



KEY PLAN



1 | PLANTING ON SLOPES 2H:1V TO 1.5H:1V
SCALE 1:50 @ A3



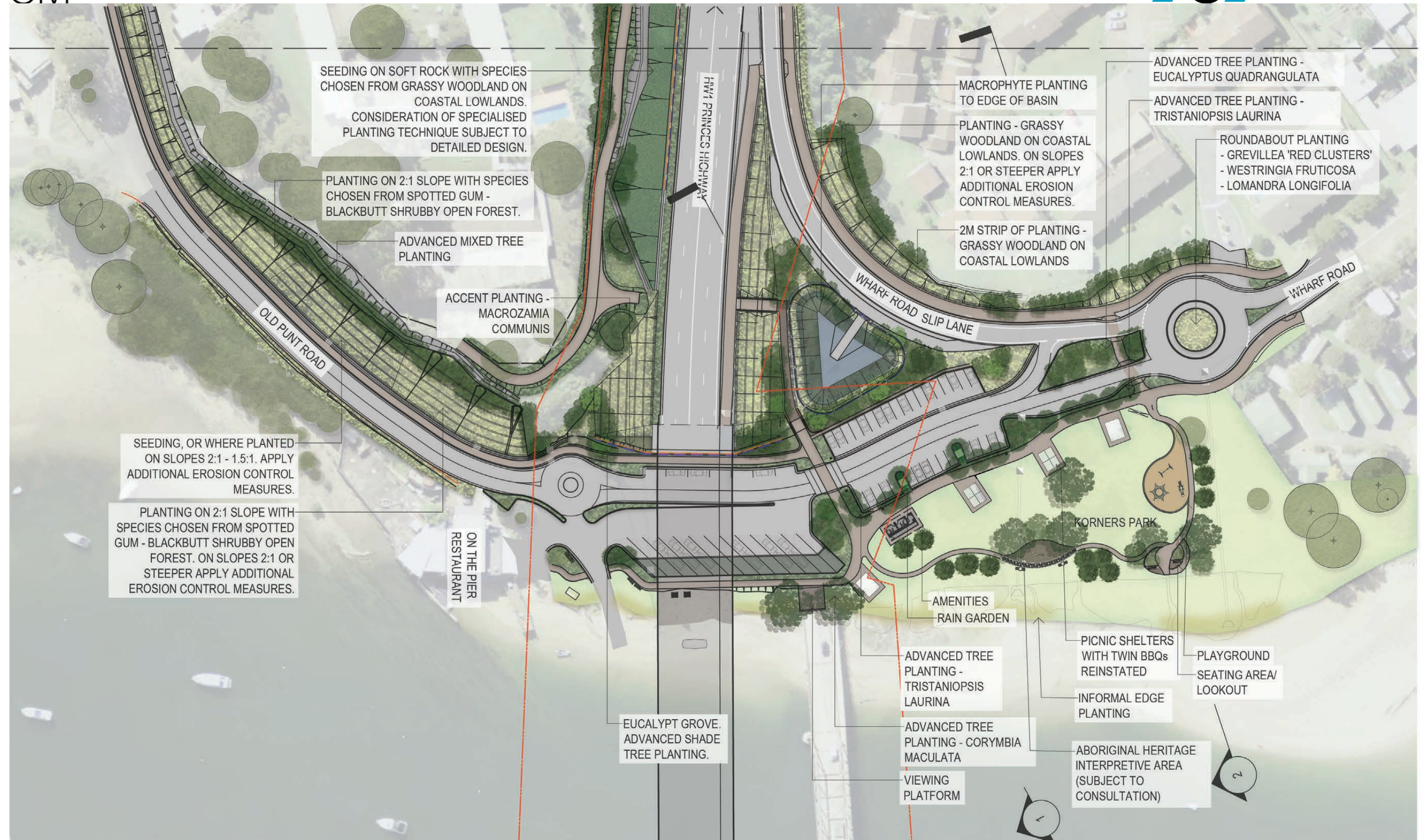
1 | OLD PUNT ROAD @CH M0H0 75
SCALE 1:200



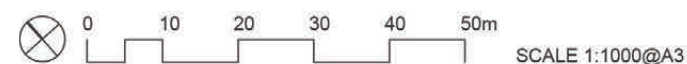
PLANTING - SPOTTED GUM - BLACKBUTT SHRUBBY OPEN FOREST
REFER TO PLANT SCHEDULE FOR PROPOSED SPECIES, SPACINGS AND POT SIZE

PLANTING - SPOTTED GUM - BLACKBUTT SHRUBBY OPEN FOREST
COIR LOGS USED TO REDUCE STEEPNESS OF THE SLOPE
REFER TO PLANT SCHEDULE FOR PROPOSED SPECIES, SPACINGS AND POT SIZE

Figure 7-6: Old Punt Road batter section



1 | NORTHERN FORESHORE - LANDSCAPE CONCEPT PLAN
SCALE 1:1000



LEGEND

- PROJECT BOUNDARY
- RETAINING WALL
- EXISTING TREE TO BE RETAINED

- NATIVE TREE PLANTING - 25L
- NATIVE TREE PLANTING - 100L
- PLANTING - GRASSY WOODLAND ON COASTAL LOWLANDS
- SEEDING AND NATIVE TUBESTOCK - GRASSY WOODLAND ON COASTAL LOWLANDS

- SPINIFEX BEACH STRAND GRASSLAND
- MACROPHYTE PLANTING
- NATIVE GRASS OR LAWN
- VEGETATED DRAINAGE SWALE
- RAIN GARDEN
- ROADWAY
- SHARED PATH
- PAVING TREATMENT UNDER BRIDGE

Figure 7-7: Northern foreshore - landscape concept plan 1 of 3

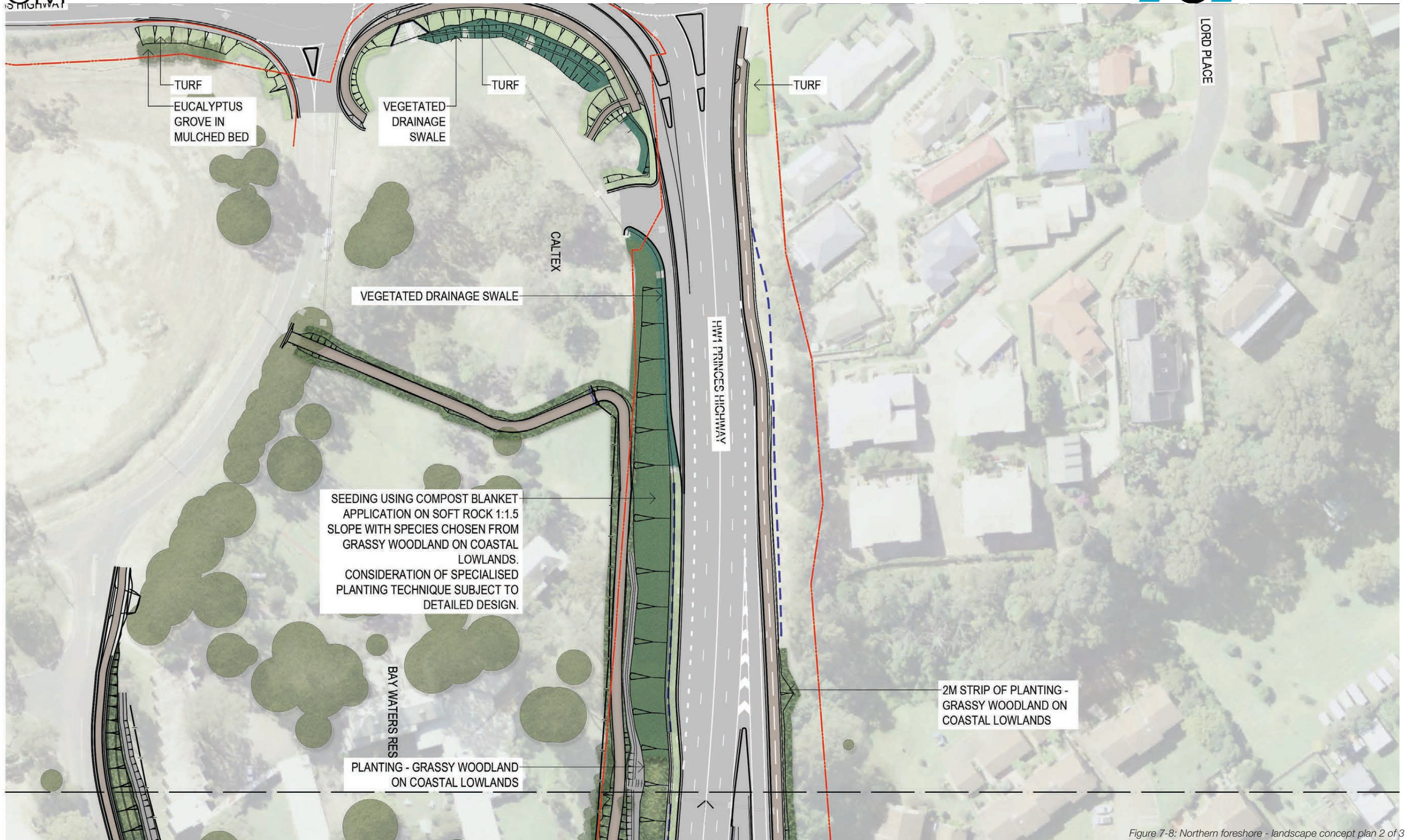


Figure 7-8: Northern foreshore - landscape concept plan 2 of 3

2 | NORTHERN FORESHORE - LANDSCAPE CONCEPT PLAN

SCALE 1:1000



0 10 20 30 40 50m

SCALE 1:1000@A3

LEGEND

— PROJECT BOUNDARY

— RETAINING WALL

● EXISTING TREE TO BE RETAINED

● NATIVE TREE PLANTING - 25L

● NATIVE TREE PLANTING - 100L

■ PLANTING - GRASSY WOODLAND ON COASTAL LOWLANDS

■ SEEDING AND NATIVE TUBESTOCK - GRASSY WOODLAND ON COASTAL LOWLANDS

■ SPINIFEX BEACH STRAND GRASSLAND

■ MACROPHYTE PLANTING

■ NATIVE GRASS OR LAWN

■ VEGETATED DRAINAGE SWALE

■ RAIN GARDEN

■ ROADWAY

■ SHARED PATH

■ PAVING TREATMENT UNDER BRIDGE

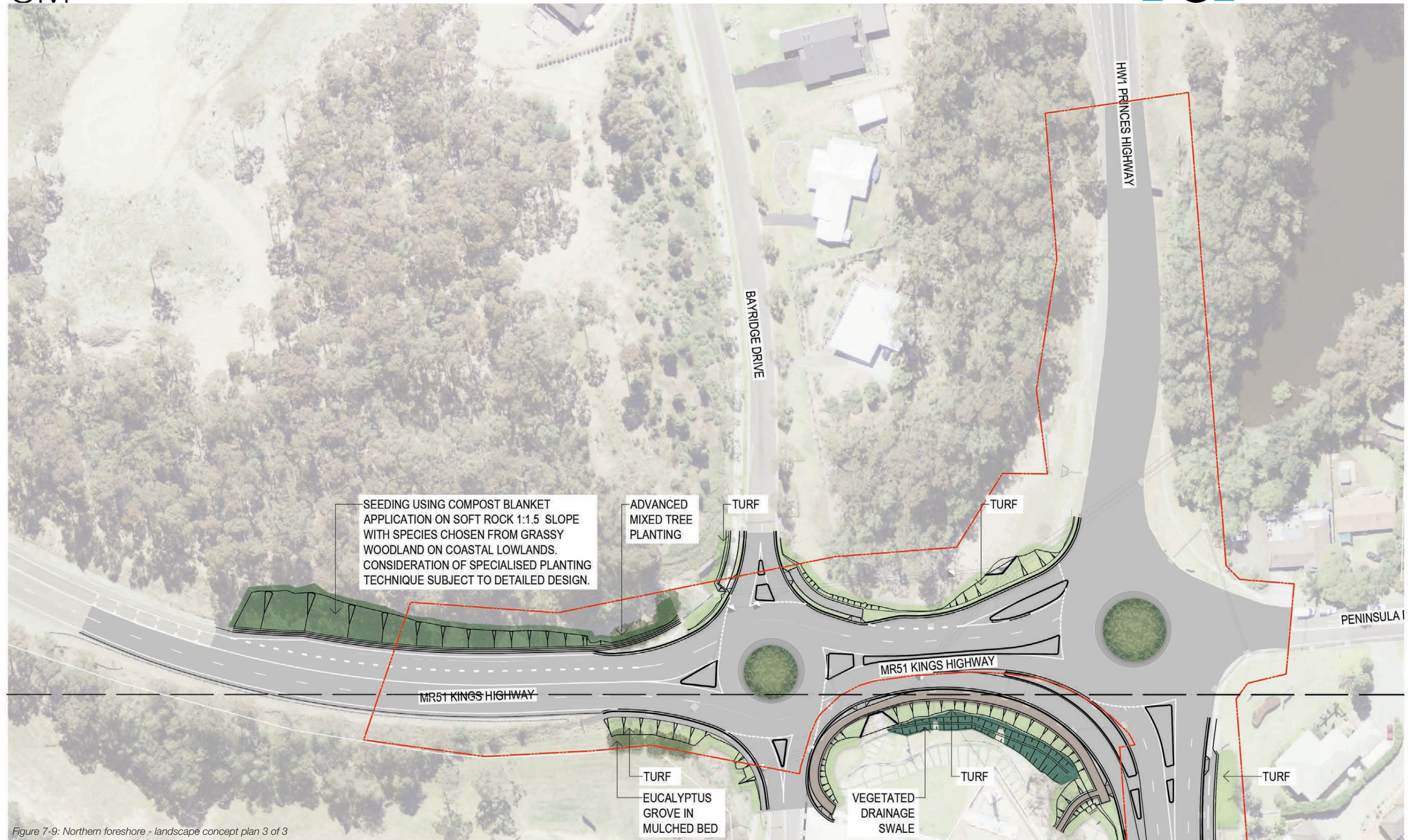
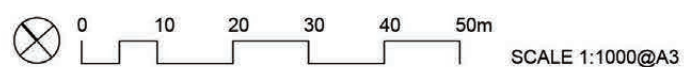


Figure 7-9: Northern foreshore - landscape concept plan 3 of 3

3 | NORTHERN FORESHORE - LANDSCAPE CONCEPT PLAN
SCALE 1:1000



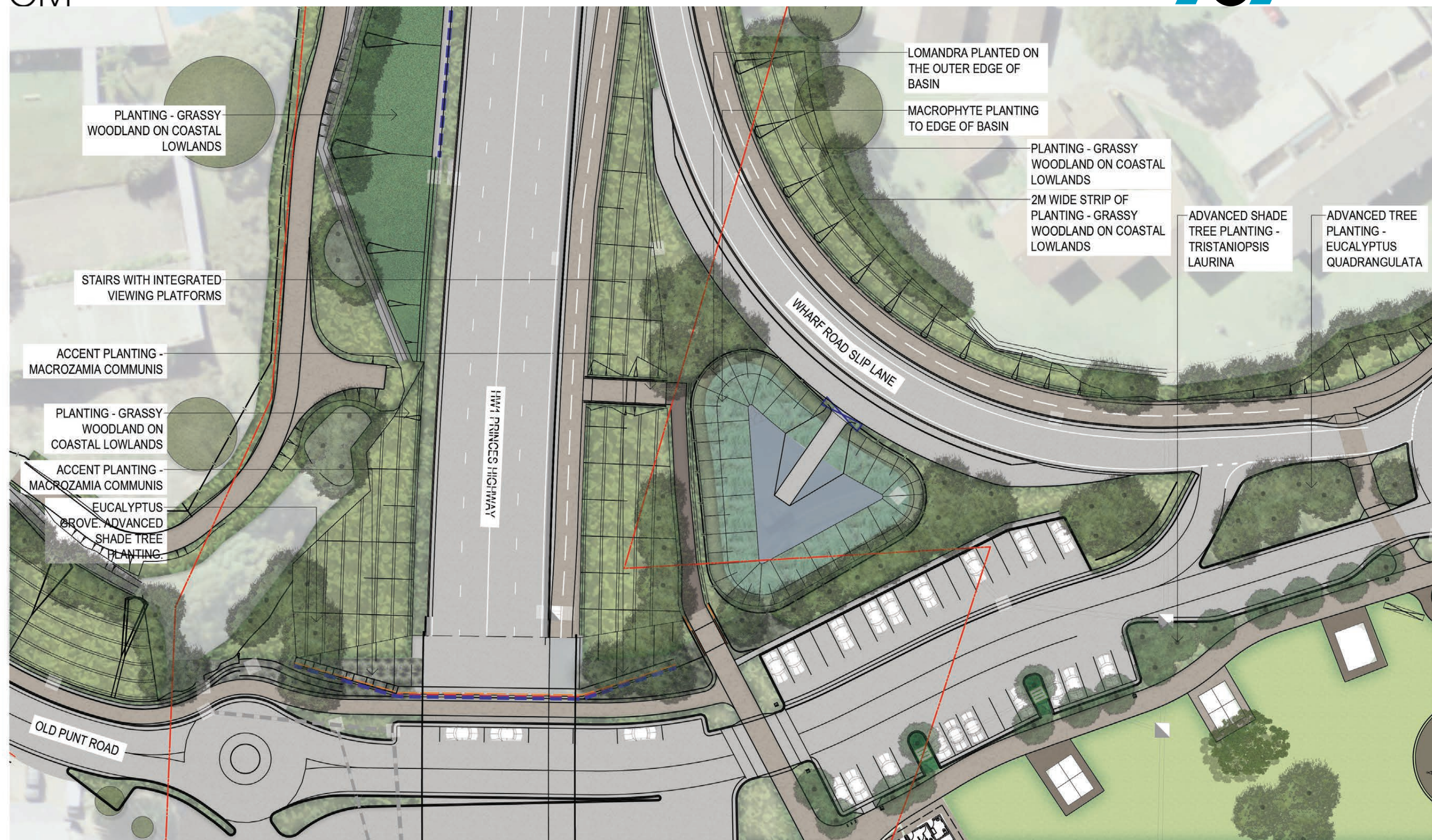
LEGEND

- PROJECT BOUNDARY
- RETAINING WALL
- EXISTING TREE TO BE RETAINED

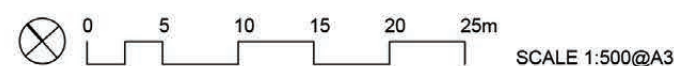
- NATIVE TREE PLANTING - 25L
- NATIVE TREE PLANTING - 100L
- PLANTING - GRASSY WOODLAND ON COASTAL LOWLANDS
- SEEDING AND NATIVE TUBESTOCK - GRASSY WOODLAND ON COASTAL LOWLANDS

- SPINIFEX BEACH STRAND GRASSLAND
- MACROPHYTE PLANTING
- NATIVE GRASS OR LAWN
- VEGETATED DRAINAGE SWALE

- RAIN GARDEN
- ROADWAY
- SHARED PATH
- PAVING TREATMENT UNDER BRIDGE



1 | NORTHERN FORESHORE - LANDSCAPE CONCEPT PLAN
SCALE 1:500



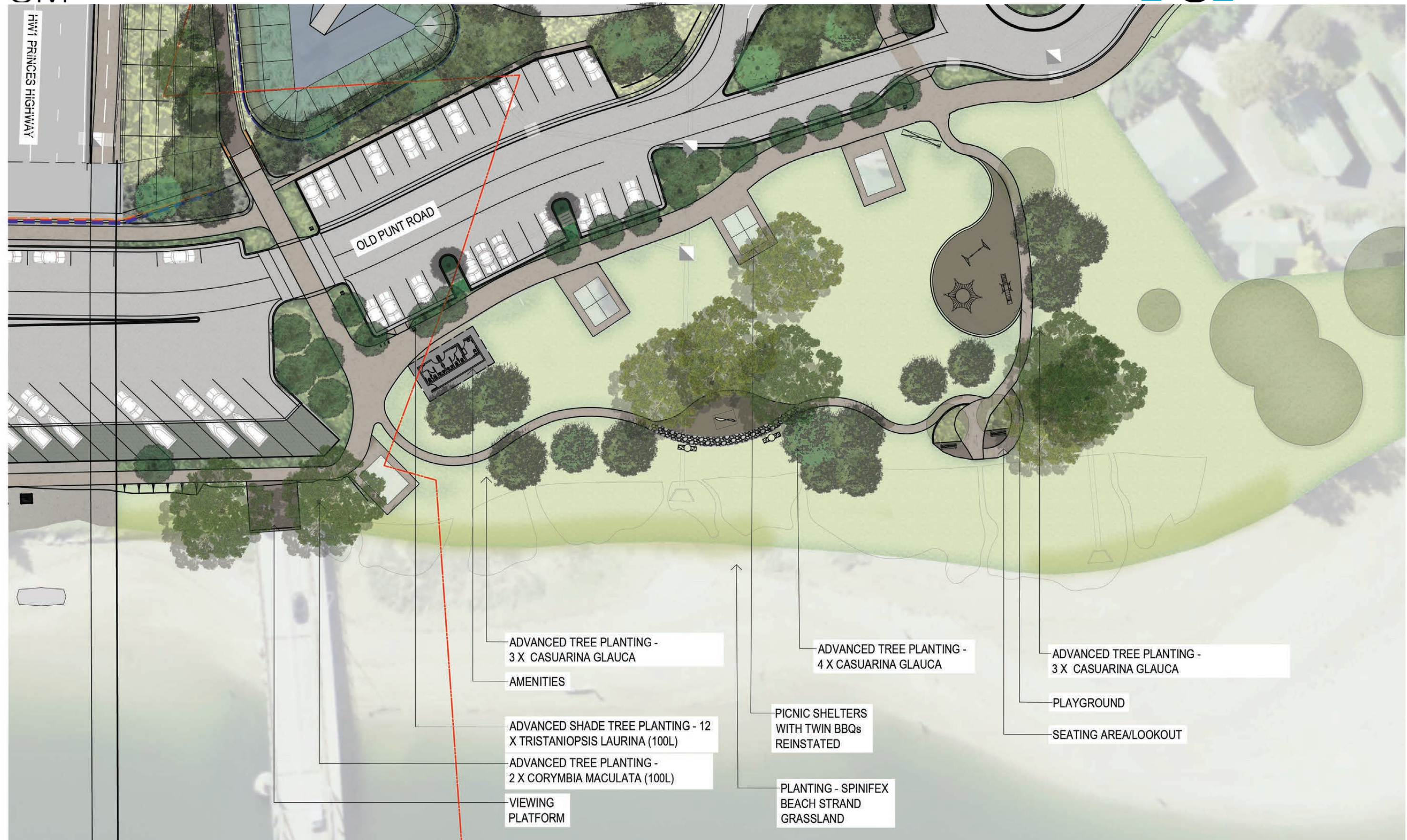
LEGEND

- PROJECT BOUNDARY
- RETAINING WALL
- EXISTING TREE TO BE RETAINED

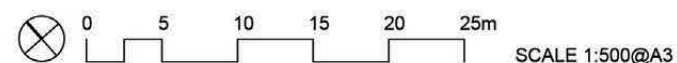
- NATIVE TREE PLANTING - 25L
- NATIVE TREE PLANTING - 100L
- PLANTING - GRASSY WOODLAND ON COASTAL LOWLANDS
- SEEDING AND NATIVE TUBESTOCK - GRASSY WOODLAND ON COASTAL LOWLANDS

- SPINIFEX BEACH STRAND GRASSLAND
- MACROPHYTE PLANTING
- NATIVE GRASS OR LAWN
- VEGETATED DRAINAGE SWALE
- RAIN GARDEN
- ROADWAY
- SHARED PATH
- PAVING TREATMENT UNDER BRIDGE

Figure 7-10: Northern foreshore - landscape concept detailed plan 1 of 2



2 | NORTHERN FORESHORE - LANDSCAPE CONCEPT PLAN
SCALE 1:500



BATEMANS BAY BRIDGE PROJECT- BRIDGE OVER CLYDE RIVER

LEGEND

- PROJECT BOUNDARY
- RETAINING WALL
- EXISTING TREE TO BE RETAINED

- NATIVE TREE PLANTING - 25L
- NATIVE TREE PLANTING - 100L
- PLANTING - GRASSY WOODLAND ON COASTAL LOWLANDS
- SEEDING AND NATIVE TUBESTOCK - GRASSY WOODLAND ON COASTAL LOWLANDS

- SPINIFEX BEACH STRAND GRASSLAND
- MACROPHYTE PLANTING
- NATIVE GRASS OR LAWN
- VEGETATED DRAINAGE SWALE
- RAIN GARDEN
- ROADWAY
- SHARED PATH
- PAVING TREATMENT UNDER BRIDGE

Figure 7-11: Northern foreshore - landscape concept detailed plan 2 of 2
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Figure 7-12: View from corner of Old Punt Road and Wray Road-5 years



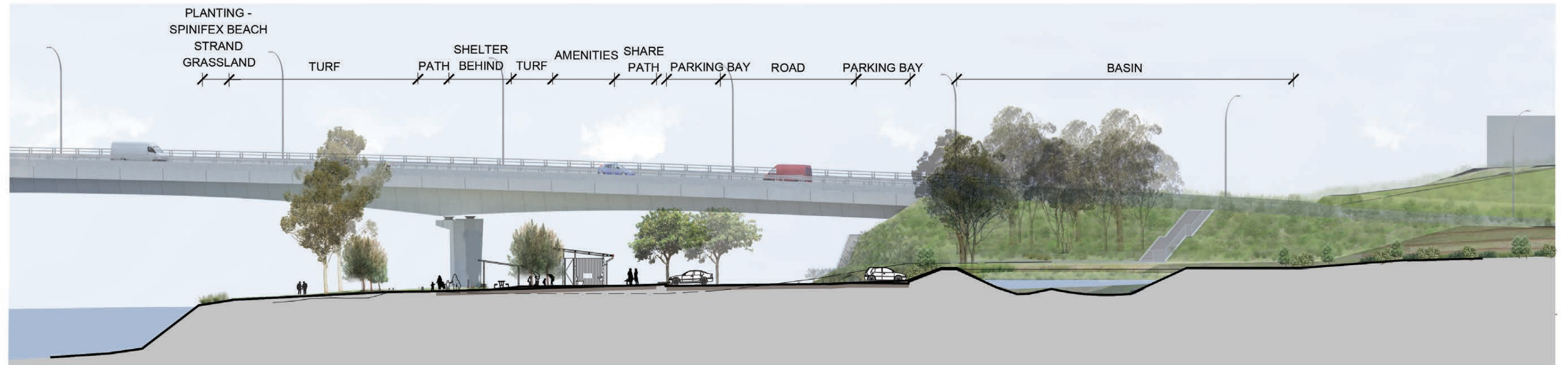
Figure 7-13: View from corner of Old Punt Road and Wray Road-10 years



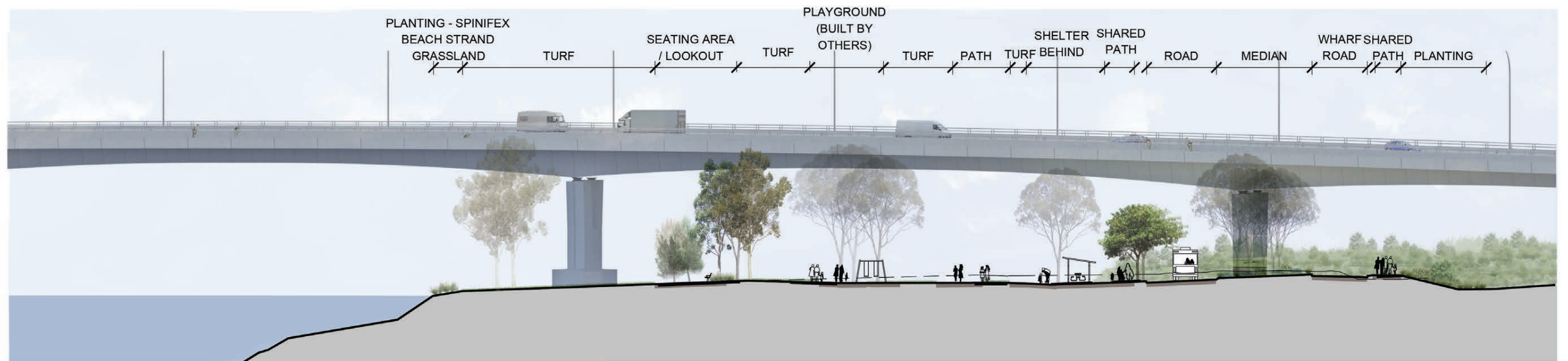
Figure 7-14: View from bottom of Old Punt Road-5 years



Figure 7-15: View from bottom of Old Punt Road-10 years



1 | SECTION - LOCAL ROAD @CH M0E0 100
SCALE 1:400



2 | SECTION - LOCAL ROAD @CH M0E0 25
SCALE 1:400

Figure 7-16: Northern foreshore - landscape sections

NORTHERN APPROACH - PLANT SCHEDULE							
Maritime Grasslands - Spinifex Beach Strand Grassland (for rehabilitation if required)							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Shrubs / Grasses / Groundcovers							
Area (m²)							
Bi	<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Coastal Banksia	7%	1	150mm		<i>Elaeocarpus reticulatus</i> , <i>Pittosporum revolutum</i>
Hs	<i>Hibbertia serpyllifolia</i>	Guinea Flower	5%	4	150mm		<i>Hibbertia scandens</i> , <i>Clematis asiatica</i> , <i>Pandorea pandorana</i>
Lp	<i>Leucopogon parviflorus</i>	Coastal Bearded-Heath	9%	1	150mm		<i>Westringia fruticosa</i> , <i>Pultenaea villosa</i> , <i>Ozothamnus diosmifolius</i>
Pm	<i>Pultenaea maritima</i>	Bacon and Eggs	5%	1	150mm		<i>Hardenbergia violacea</i> , <i>Hibbertia scandens</i>
Rc	<i>Rhagodia candolleana</i> subsp. <i>candolleana</i>	Coastal Saltbush	5%	3	150mm		<i>Westringia fruticosa</i> , <i>Ozothamnus diosmifolius</i>
Wf	<i>Westringia fruticosa</i>	Coastal Rosemary	7%	2	150mm		<i>Pultenaea villosa</i> , <i>Ozothamnus diosmifolius</i>
Ac	<i>Atriplex cinerea</i>	Grey Saltbush	5%	1	150mm		<i>Westringia fruticosa</i> , <i>Pultenaea villosa</i> , <i>Ozothamnus diosmifolius</i>
Cg	<i>Carpobrotus glaucescens</i>	Pigface	5%	2	NT		<i>Hardenbergia violacea</i> , <i>Hibbertia scandens</i>
Fn	<i>Ficinia nodosa</i>	Knobby Club-Rush	10%	4	NT		<i>Lomandra longifolia</i> , <i>Cymbopogon refractus</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
LI	<i>Lomandra longifolia</i>	Spiny-Headed Mat-Rush	10%	5	NT		<i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Pp	<i>Poa pojiformis</i>	Coast Tussock-Grass	5%	6	NT		<i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ss	<i>Spinifex sericeus</i>	Hairy Spinifex	5%	5	NT		<i>Ficinia nodosa</i> , <i>Cymbopogon refractus</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Sv	<i>Sporobolus virginicus</i>	Marine Couch	5%	6	NT		<i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ta	<i>Themeda australis</i>	Kangaroo Grass	10%	5	NT		<i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Zm	<i>Zoysia macrantha</i>	Prickly Couch	7%	6	NT		<i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Total			100%				
Grassy Woodland on Coastal Lowlands							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Trees							
Af	<i>Angophora floribunda</i>	Rough-Barked Apple	N/A	N/A	25 Litre	5	<i>Eucalyptus resinifera</i> , <i>Syncarpia glomulifera</i>
Cm	<i>Corymbia maculata</i>	Spotted Gum	N/A	N/A	25 Litre	33	<i>Angophora floribunda</i> , <i>Eucalyptus pilularis</i> , <i>Eucalyptus paniculata</i>
Cm (100L)	<i>Corymbia maculata</i>	Spotted Gum	N/A	N/A	25 Litre	13	<i>Angophora floribunda</i> , <i>Eucalyptus pilularis</i> , <i>Eucalyptus paniculata</i>
Ea	<i>Eucalyptus amplifolia</i> ssp. <i>amplifolia</i>	Cabbage Gum	N/A	N/A	25 Litre	6	<i>Eucalyptus pilularis</i> , <i>Eucalyptus resinifera</i>
Ebs	<i>Eucalyptus bosistoana</i>	Coast Grey Box	N/A	N/A	25 Litre	17	<i>Eucalyptus pilularis</i> , <i>Eucalyptus resinifera</i>
Ebt	<i>Eucalyptus botryoides</i>	Bangalay	N/A	N/A	25 Litre	10	<i>Eucalyptus paniculata</i> , <i>Eucalyptus resinifera</i>
Ee	<i>Eucalyptus eugenioides</i>	Thin-Leaved Stringybark	N/A	N/A	25 Litre	12	<i>Eucalyptus paniculata</i> , <i>Eucalyptus resinifera</i>
Eg	<i>Eucalyptus globoides</i>	White Stringybark	N/A	N/A	25 Litre	2	<i>Eucalyptus resinifera</i> , <i>Syncarpia glomulifera</i>
El	<i>Eucalyptus longifolia</i>	Woollybutt	N/A	N/A	25 Litre	1	<i>Angophora floribunda</i> , <i>Eucalyptus pilularis</i> , <i>Eucalyptus paniculata</i>
Epa	<i>Eucalyptus paniculata</i> ssp. <i>paniculata</i>	Grey Ironbark	N/A	N/A	25 Litre	3	<i>Eucalyptus pilularis</i> , <i>Eucalyptus resinifera</i>
Epi	<i>Eucalyptus pilularis</i>	Blackbutt	N/A	N/A	25 Litre	15	<i>Angophora floribunda</i> , <i>Eucalyptus paniculata</i> , <i>Eucalyptus resinifera</i>
Eq	<i>Eucalyptus quadrangulata</i>	Coastal White Box	N/A	N/A	25 Litre	14	<i>Angophora floribunda</i> , <i>Eucalyptus resinifera</i>
Et	<i>Eucalyptus tereticornis</i>	Forest Red Gum	N/A	N/A	25 Litre	22	<i>Angophora floribunda</i> , <i>Eucalyptus pilularis</i>
Tl	<i>Tristania laurina</i>	Water Gum	N/A	N/A	100 Litre	11	<i>Waterhousea floribunda</i>
Total						164	
Accent Plants							
Mc	<i>Macrozamia Communis</i>	Burrawang	N/A	N/A	25 Litre	85	
Total						85	
Shrubs / Grasses / Groundcovers							
Area (m²)		2720					
Bo	<i>Breynia oblongifolia</i>	Coffee Brush	5%	1	150mm	136	<i>Elaeocarpus reticulatus</i> , <i>Ceratopetalum gummiferum</i>
Hv	<i>Hardenbergia violacea</i>	Purple coral pea	5%	4	150mm	544	<i>Clematis asiatica</i> , <i>Pandorea pandorana</i>
Lj	<i>Leucopogon juniperinus</i>	Prickly Beard-Heath	2%	1	150mm	54	<i>Pultenaea villosa</i> , <i>Ozothamnus diosmifolius</i>
Lp	<i>Leptospermum polygalifolium</i>	Yellow Tea Tree	5%	0.5	150mm	330	<i>Elaeocarpus reticulatus</i> , <i>Ceratopetalum gummiferum</i> , <i>Melaleuca linariifolia</i> , <i>Podocarpus elatus</i>
Od	<i>Ozothamnus diosmifolius</i>	Rice Flower	5%	3	150mm	408	<i>Pultenaea villosa</i> , <i>Westringia fruticosa</i>
Pu	<i>Pittosporum undulatum</i>	Sweet Pittosporum	5%	1	150mm	136	<i>Elaeocarpus reticulatus</i> , <i>Pittosporum revolutum</i> , <i>Ceratopetalum gummiferum</i> , <i>Melaleuca linariifolia</i> , <i>Podocarpus elatus</i>
Sr	<i>Scaevola ramosissima</i>	Purple Fan-flower	5%	3	150mm	408	<i>Hardenbergia violacea</i> , <i>Pratia purpurascens</i>
Cl	<i>Carex longebrachiata</i>	Drooping Sedge	5%	6	NT	816	<i>Dianella caerulea</i> , <i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Poa affinis</i>
Cr	<i>Cymbopogon refractus</i>	Barbed Wire Grass	5%	5	NT	680	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
DI	<i>Dianella longifolia</i>	Flax Lily	8%	6	NT	1305	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ec	<i>Echinopogon caespitosus</i>	Bushy Hedgehog Grass	8%	5	NT	1089	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
EI	<i>Eragrostis leptostachya</i>	Paddock Love Grass	8%	5	NT	1089	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Lla	<i>Lepidosperma laterale</i>	Variable Sword-Sedge	5%	5	NT	680	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
LI	<i>Lomandra longifolia</i>	Spiny-Headed Mat-Rush	5%	5	NT	8870	<i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ms	<i>Microlaena stipoides</i>	Weeping Grass	8%	6	NT	1305	<i>Dianella caerulea</i> , <i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i>
PI	<i>Poa labillardieri</i>	Tussock Grass	8%	6	NT	1305	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i>
Ta	<i>Themeda australis</i>	Kangaroo Grass	8%	5	NT	1089	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Total			100%			20244	

Maritime Grasslands - Spinifex Beach Strand Grassland



Hibbertia serpyllifolia



Carpobrotus glaucescens



Westringia fruticosa



Spinifex sericeus

Grassy Woodland on Coastal Lowlands

Trees



Angophora floribunda



Corymbia maculata



Eucalyptus pilularis



Melaleuca styphelioides

Accent plant



Macrozamia communis

Shrubs / Grasses / Groundcovers



Leptospermum polygalifolium



Dianella longifolia



Themeda australis



Pratia purpurascens

Figure 7-17: Northern foreshore -plant schedule 1 of 3

Spotted Gum - Blackbutt Shrubby Open Forest							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Trees							
Al	<i>Allocasuarina littoralis</i>	Black She-oak	N/A	As Shown	25 Litre	12	<i>Allocasuarina torulosa</i> , <i>Casuarina glauca</i> , <i>Elaeocarpus reticulatus</i>
Cg	<i>Casuarina glauca</i>	Swamp Oak	N/A	As Shown	25 Litre	5	<i>Allocasuarina littoralis</i> , <i>Acacia implexa</i> , <i>Acacia parramattensis</i> , <i>Elaeocarpus reticulatus</i>
Cg (100L)	<i>Casuarina glauca</i>	Swamp Oak	N/A	As Shown	100 Litre	13	<i>Allocasuarina littoralis</i> , <i>Acacia implexa</i> , <i>Acacia parramattensis</i> , <i>Elaeocarpus reticulatus</i>
Cm	<i>Corymbia maculata</i>	Spotted Gum	N/A	As Shown	25 Litre	11	<i>Angophora floribunda</i> , <i>Eucalyptus pilularis</i> , <i>Eucalyptus paniculata</i>
Epi	<i>Eucalyptus pilularis</i>	Blackbutt	N/A	As Shown	25 Litre	9	<i>Angophora floribunda</i> , <i>Eucalyptus paniculata</i> , <i>Eucalyptus resinifera</i>
Epi (100L)	<i>Eucalyptus pilularis</i>	Blackbutt	N/A	As Shown	25 Litre	4	<i>Angophora floribunda</i> , <i>Eucalyptus paniculata</i> , <i>Eucalyptus resinifera</i>
Et	<i>Eucalyptus tereticornis</i>	Forest Red Gum	N/A	As Shown	25 Litre	12	<i>Angophora floribunda</i> , <i>Eucalyptus pilularis</i>
Et (100L)	<i>Eucalyptus tereticornis</i>	Forest Red Gum	N/A	As Shown	25 Litre	7	<i>Angophora floribunda</i> , <i>Eucalyptus pilularis</i>
Pu	<i>Pittosporum undulatum</i>	Sweet Pittosporum	N/A	As Shown	25 Litre	6	<i>Elaeocarpus reticulatus</i> , <i>Pittosporum revolutum</i> , <i>Ceratopetalum gummiferum</i> , <i>Melaleuca linariifolia</i> , <i>Podocarpus elatus</i>
		Total				79	
Shrubs / Grasses / Groundcovers							
Area (m ²)		2480					
Bs	<i>Bursaria spinosa</i>	Sweet Bursaria	10%	2	150mm	496	<i>Elaeocarpus reticulatus</i> , <i>Pittosporum revolutum</i>
Bo	<i>Breynia oblongifolia</i>	Coffee Bush	8%	2	150mm	396	<i>Elaeocarpus reticulatus</i> , <i>Ceratopetalum gummiferum</i>
Dt	<i>Dodonaea triquetra</i>	Large-leaf Hop-bush	10%	2	150mm	496	<i>Elaeocarpus reticulatus</i> , <i>Ceratopetalum gummiferum</i> , <i>Melaleuca linariifolia</i> , <i>Podocarpus elatus</i>
Go	<i>Goodenia ovata</i>	Hop Goodenia	9%	4	150mm	892	<i>Westringia fruticosa</i> , <i>Ozothamnus diosmifolius</i>
Lj	<i>Leucopogon juniperinus</i>	Prickly-beard heath	10%	2	150mm	694	<i>Pultenaea villosa</i> , <i>Ozothamnus diosmifolius</i>
Hv	<i>Hardenbergia violacea</i>	Blue Coral Pea	7%	4	150mm	694	<i>Clematis asiatica</i> , <i>Pandorea pandorana</i>
Pl	<i>Persoonia linearis</i>	Narrow-leaved Geebung	8%	2	150mm	396	<i>Elaeocarpus reticulatus</i> , <i>Pittosporum revolutum</i> , <i>Ceratopetalum gummiferum</i> , <i>Melaleuca linariifolia</i> , <i>Podocarpus elatus</i>
Dc	<i>Dianella caerulea</i> var. <i>caerulea</i>	Blue Flax-lily	10%	4	NT	992	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Li	<i>Lomandra longifolia</i>	Spiny-head Mat-rush	10%	4	NT	992	<i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ms	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	8%	4	NT	794	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Poa affinis</i>
Tt	<i>Themeda triandra</i>	Kanearoo Grass	10%	4	NT	992	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>

Spotted Gum - Blackbutt Shrubby Open Forest
Trees



Allocasuarina littoralis



Corymbia maculata



Eucalyptus pilularis



Pittosporum undulatum

Shrubs / Grasses / Groundcovers



Acacia longifolia



Bursaria spinosa



Hardenbergia violacea



Lomandra longifolia

Figure 7-18: Northern foreshore -plant schedule 2 of 3

1:1.5 soft rock face planting							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Area (m ²)		3244					
Cl	<i>Carex longebrachiata</i>	Drooping Sedge	15%	1 plant/1.5m ²	NT	324	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Cr	<i>Cymbopogon refractus</i>	Barbed Wire Grass	10%	1 plant/1.5m ²	NT	216	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
DI	<i>Dianella longifolia</i>	Flax Lily	15%	1 plant/1.5m ²	NT	324	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ec	<i>Echinopogon caespitosus</i>	Bushy Hedgehog Grass	10%	1 plant/1.5m ²	NT	216	<i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
EI	<i>Eragrostis leptostachya</i>	Paddock Love Grass	10%	1 plant/1.5m ²	NT	216	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Lla	<i>Lepidosperma laterale</i>	Variable Sword-Sedge	10%	1 plant/1.5m ²	NT	216	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ms	<i>Microlaena stipoides</i>	Weeping Grass	10%	1 plant/1.5m ²	NT	216	<i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Poa affinis</i>
PI	<i>Poa labillardieri</i>	Tussock Grass	15%	1 plant/1.5m ²	NT	324	<i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ta	<i>Themeda australis</i>	Kangaroo Grass	5%	1 plant/1.5m ²	NT	108	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
	Total		100%			2163	
Macrophyte planting							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Area (m ²)		354					
Bj	<i>Baumea juncea</i>	Bare Twigrush	20%	4	NT	283	<i>Imperata cylindrica</i> , <i>Juncus usitatus</i> , <i>Ficinia nodosa</i> , <i>Gahnia melanocarpa</i>
Bc	<i>Bolboschoenus caldwellii</i>	Sea Club-sedge	10%	4	NT	142	<i>Themeda triandra</i> , <i>Carex appressa</i> , <i>Ficinia nodosa</i> , <i>Juncus usitatus</i>
Ca	<i>Carex appressa</i>	Tall Sedge	20%	4	NT	283	<i>Imperata cylindrica</i> , <i>Juncus usitatus</i> , <i>Ficinia nodosa</i> , <i>Gahnia melanocarpa</i> , <i>Lomandra longifolia</i>
Fn	<i>Ficinia nodosa</i>	Knobby Club-Rush	20%	4	NT	283	<i>Imperata cylindrica</i> , <i>Juncus usitatus</i> , <i>Carex appressa</i> , <i>Gahnia melanocarpa</i>
JK	<i>Juncus kraussii</i> subsp. <i>Australiensis</i>	Sea Rush	10%	4	NT	142	<i>Themeda triandra</i> , <i>Carex appressa</i> , <i>Ficinia nodosa</i> , <i>Juncus usitatus</i> , <i>Lomandra longifolia</i>
Ju	<i>Juncus usitatus</i>	Common Rush	10%	4	NT	142	<i>Themeda triandra</i> , <i>Carex appressa</i> , <i>Ficinia nodosa</i> , <i>Lomandra longifolia</i>
Gm	<i>Gahnia melanocarpa</i>	Black-fruit Saw sedge	10%	4	NT	142	<i>Imperata cylindrica</i> , <i>Juncus usitatus</i> , <i>Ficinia nodosa</i> , <i>Lomandra longifolia</i>
	Total		100%			1417	
Roundabout Planting							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Area (m ²)		608					
Gr	<i>Grevillea</i> 'Red Clusters'	Red Clusters	N/A	3	150mm	292	<i>Pultenaea villosa</i> , <i>Ozothamnus diosmifolius</i>
Wf	<i>Westringia fruticosa</i>	Coastal Rosemary	N/A	As Shown	150mm	80	<i>Pultenaea villosa</i> , <i>Ozothamnus diosmifolius</i>
LI	<i>Lomandra longifolia</i>	Spiny-Headed Mat-Rush	N/A	4	150mm	1107	<i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Turf							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Area (m ²)		8910					
	<i>Cynodon Dactylon</i> (batters)	Common Couch	N/A	N/A	Turf rolls	1655m ²	
	<i>Cynodon Dactylon</i> (foreshore)	Common Couch	N/A	N/A	Turf rolls	7255m ²	

NT = Native Tubestock (100mm)

NORTHERN APPROACH - SEED MIX					
Grassy Woodland on Coastal Lowlands					
Symbol	Botanical Name	Common Name	Application Rate of Seed (Kg/Ha)	Total (Kg)	Replacement Options
Shrubs / Grasses / Groundcovers					
Area (m ²)		2801			
Bo	<i>Breytia oblongifolia</i>	Coffee Brush	0.6	0.17	<i>Bursaria spinosa</i> , <i>Leptospermum polygalifolium</i>
Lj	<i>Leucopogon juniperinus</i>	Prickly Beard-Heath	0.6	0.17	<i>Ozothamnus diosmifolius</i> , <i>Westringia fruticosa</i>
Lp	<i>Leptospermum polygalifolium</i>	Yellow Tea Tree	0.6	0.17	<i>Bursaria spinosa</i> , <i>Breytia oblongifolia</i>
Od	<i>Ozothamnus diosmifolius</i>	Rice Flower	0.3	0.08	<i>Cymbopogon juniperinus</i> , <i>Westringia fruticosa</i>
Pu	<i>Pittosporum undulatum</i>	Sweet Pittosporum	0.6	0.17	<i>Elaeocarpus reticulatus</i> , <i>Pittosporum revolutum</i> , <i>Ceratopetalum gunniferum</i> , <i>Melaleuca linariifolia</i> , <i>Podocarpus elatus</i>
Cl	<i>Carex longebrachiata</i>	Drooping Sedge	0.6	0.17	<i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Cr	<i>Cymbopogon refractus</i>	Barbed Wire Grass	0.6	0.17	<i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
DI	<i>Dianella longifolia</i>	Flax Lily	0.7	0.20	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ec	<i>Echinopogon caespitosus</i>	Bushy Hedgehog Grass	0.6	0.17	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Es	<i>Entolasia stricta</i>	Wiry Panic	0.6	0.17	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
EI	<i>Eragrostis leptostachya</i>	Paddock Love Grass	0.6	0.17	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ic	<i>Imperata cylindrica</i>	Blady Grass	0.7	0.20	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Lla	<i>Lepidosperma laterale</i>	Variable Sword-Sedge	0.6	0.17	<i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ms	<i>Microlaena stipoides</i>	Weeping Grass	0.6	0.17	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Poa affinis</i>
Pp	<i>Protia purpurascens</i>	Whiteroot	0.3	0.08	<i>Clematis asiatica</i> , <i>Pandorea pandorana</i>
PI	<i>Poa labillardieri</i>	Tussock Grass	0.7	0.20	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i>
Ta	<i>Themeda australis</i>	Kangaroo Grass	0.7	0.20	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
	Total		10	2.80	
Cover Crop					
Area (m ²)		2801			
Sc	<i>Secale cereale</i> (Apr-Aug)	Rye Corn (Apr-Aug)	15	4.20	
Eu	<i>Echinochloa utilis</i> (Sep-Mar)	Japanese Millet (Sep-Mar)	15	4.20	
	Total		30	8.40	

1:1.5 soft rock face planting



Cymbopogon refractus



Dianella longifolia



Lepidosperma laterale



Themeda australis

Macrophyte planting



Baumea juncea



Carex appressa



Ficinia nodosa



Juncus usitatus

SEEDING APPLICATION ALTERNATIVES

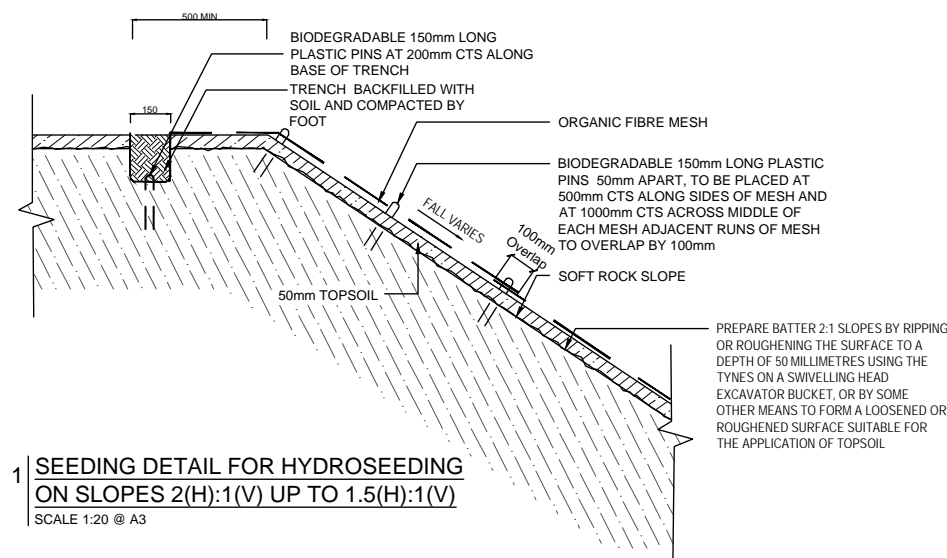
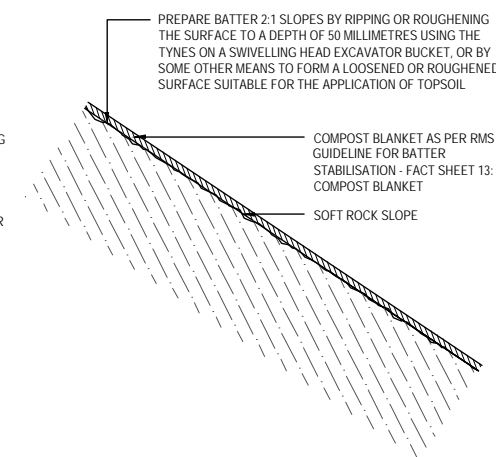
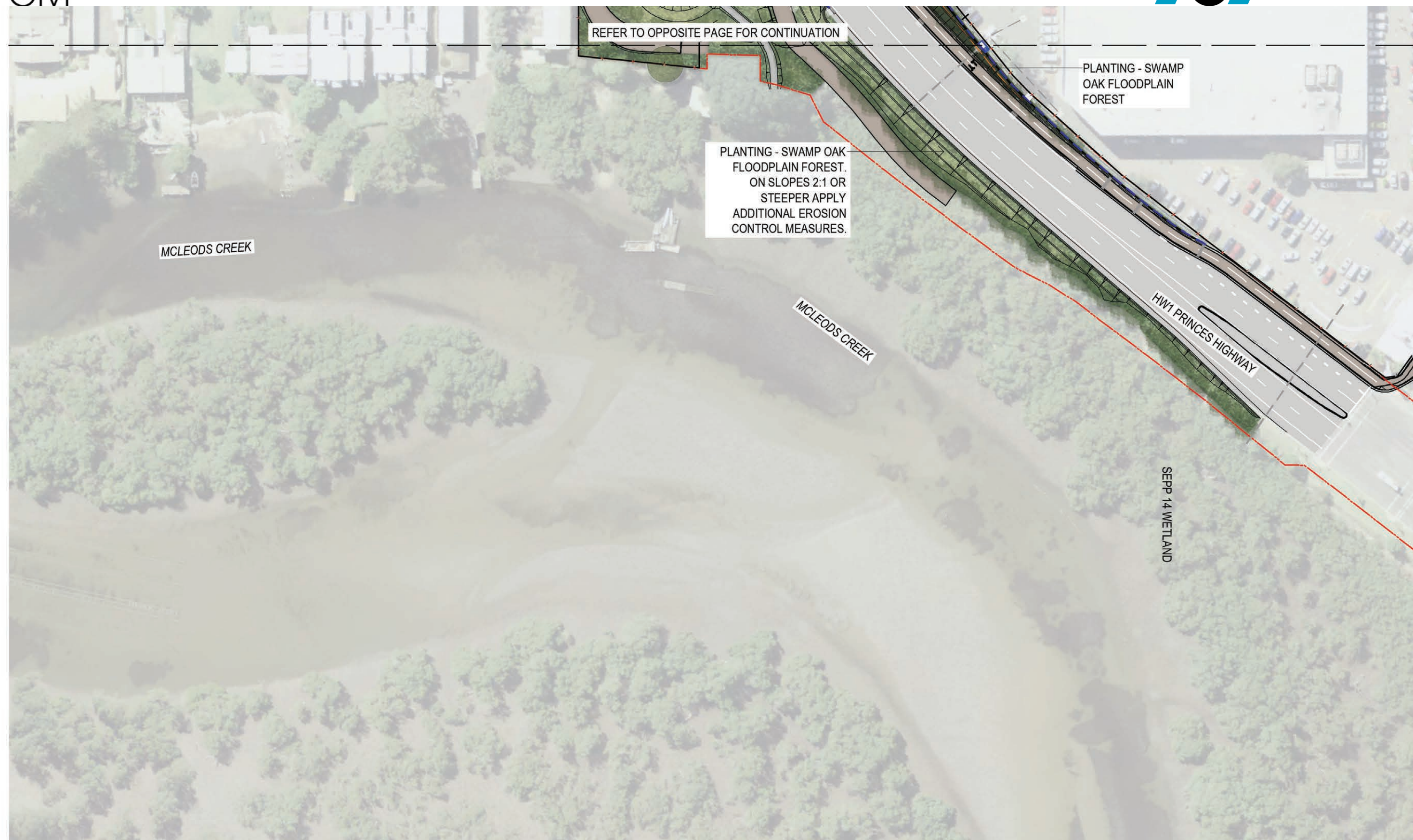
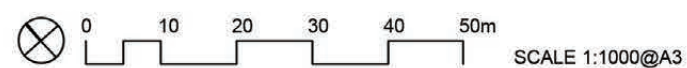
NOTE: FOR ALL VEGETATED AREAS
REFER QA SPECIFICATION R178.**2 | SEEDING DETAIL FOR HYDROMULCHING ON SLOPES 2(H):1(V) UP TO 1.5(H):1(V)**
SCALE 1:20 @ A3**3 | SEEDING DETAIL FOR COMPOST ON SLOPES 2(H):1(V) UP TO 1.5(H):1(V)**
SCALE 1:20 @ A3

Figure 7-19: Northern foreshore - planting schedule 3 of 3



2 | SOUTHERN FORESHORE - LANDSCAPE CONCEPT PLAN
SCALE 1:1000



LEGEND

— PROJECT BOUNDARY

— RETAINING WALL

● EXISTING TREE TO BE RETAINED

● NATIVE TREE PLANTING - 25L

● NATIVE TREE PLANTING - 100L

■ NATIVE GRASS OR LAWN

■ PLANTING - SWAMP OAK FLOODPLAIN FOREST

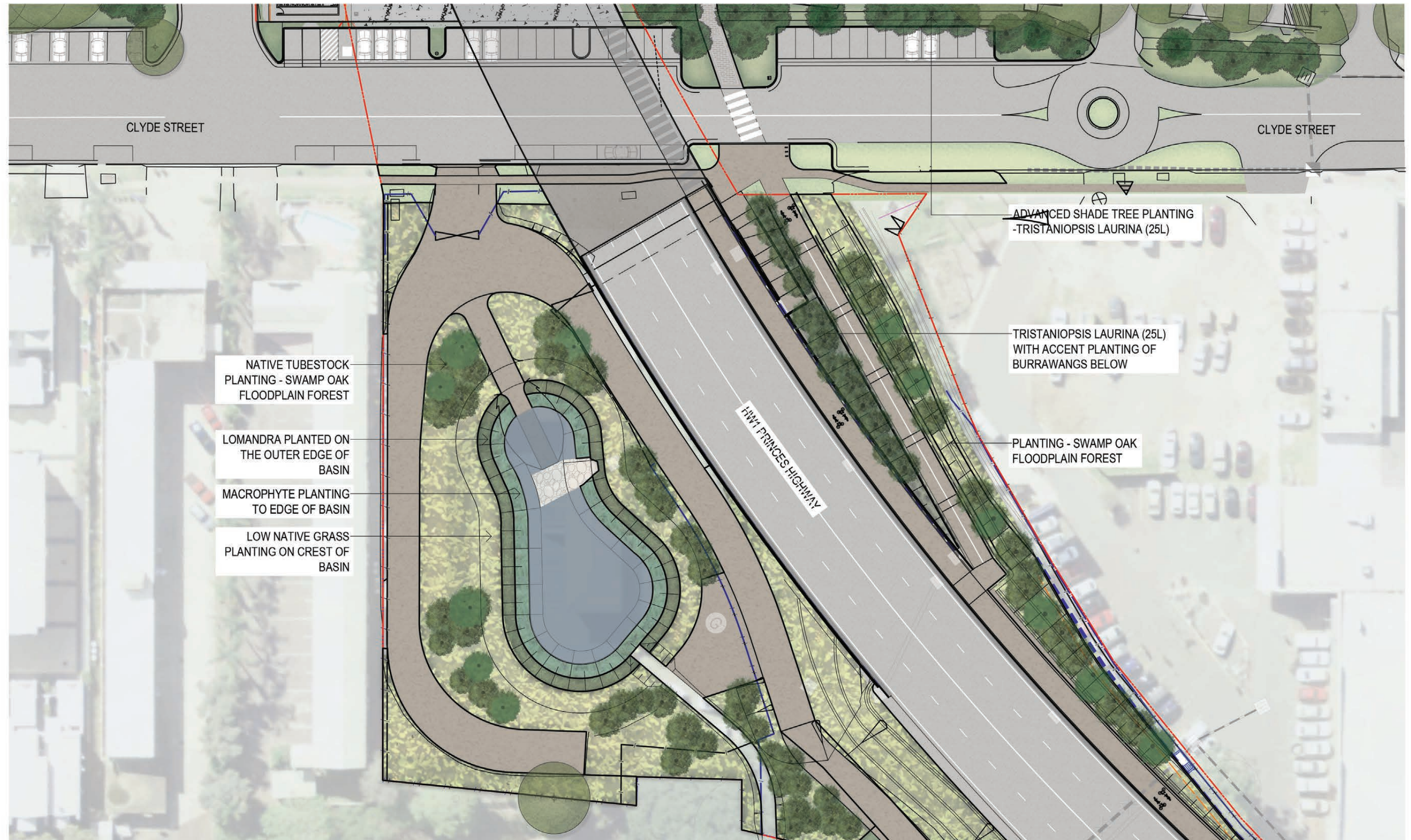
■ MACROPHYTE PLANTING

■ ROADWAY

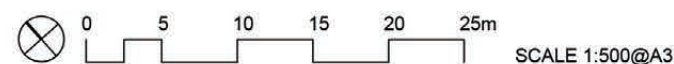
■ SHARED PATH

■ PAVING TREATMENT UNDER BRIDGE

Figure 7-21: Southern foreshore - landscape concept plan 2 of 2



1 | SOUTHERN FORESHORE - LANDSCAPE CONCEPT PLAN
SCALE 1:500



LEGEND

PROJECT BOUNDARY

RETAINING WALL

EXISTING TREE TO BE RETAINED



NATIVE TREE PLANTING - 25L



NATIVE TREE PLANTING - 100L



NATIVE GRASS OR LAWN

PLANTING - SWAMP OAK FLOODPLAIN FOREST

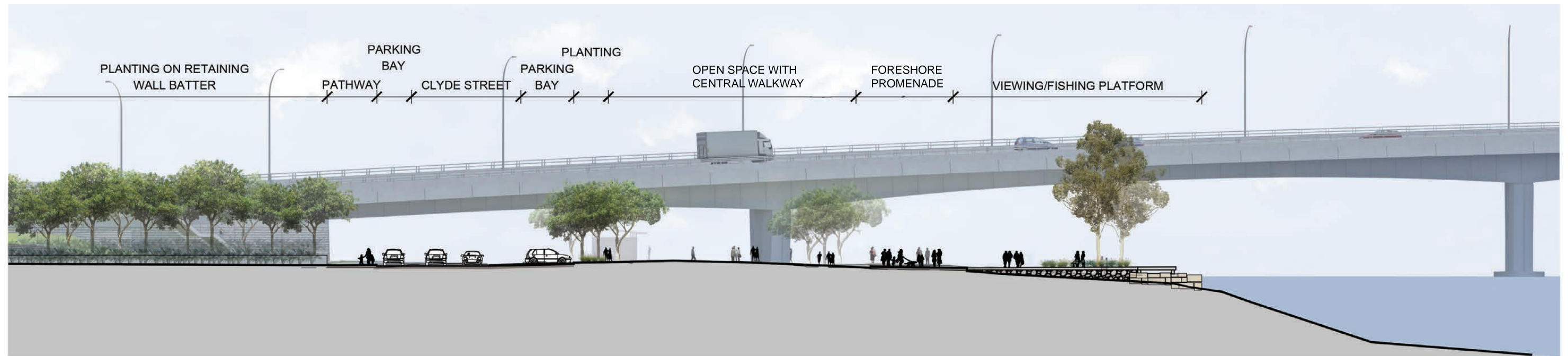
MACROPHYTE PLANTING

ROADWAY

SHARED PATH

PAVING TREATMENT UNDER BRIDGE

Figure 7-22: Southern foreshore - landscape concept detailed plan



1 | SECTION - LOCAL ROAD @CH M0J0 100
SCALE 1:400

0 4 8 12 16 20m
SCALE 1:400@A3

Drawing is illustrative only and is subject to detailed design and consultation. Landscape shown is indicative only

Figure 7-23: Southern foreshore - landscape section

SOUTHERN APPROACH - PLANT SCHEDULE							
Swamp Oak Floodplain Forest							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Trees							
As	<i>Acmena smithii</i>	Lilly Pilly	N/A	N/A	150mm	24	<i>Elaeocarpus reticulatus</i> , <i>Pittosporum rhombifolium</i>
Ae	<i>Alphitonia excelsa</i>	Red Ash	N/A	N/A	25 Litre	3	<i>Eucalyptus pilularis</i> , <i>Eucalyptus resinifera</i>
Cg	<i>Casuarina glauca</i>	Swamp Oak	N/A	N/A	25 Litre	19	<i>Allocasuarina littoralis</i> , <i>Allocasuarina torulosa</i>
Cm	<i>Corymbia maculata</i>	Spotted Gum	N/A	N/A	25 Litre	9	<i>Angophora floribunda</i> , <i>Eucalyptus pilularis</i> , <i>Eucalyptus paniculata</i>
TI	<i>Tristaniopsis laurina</i>	Water Gum	N/A	N/A	100 Litre	52	<i>Waterhousia floribunda</i>
Gf	<i>Glochidion ferdinandi</i>	Cheese Tree	N/A	N/A	150mm	7	<i>Eucalyptus paniculata</i> , <i>Eucalyptus resinifera</i>
Ls	<i>Lophostemon suaveolens</i>	Swamp Turpentine	N/A	N/A	25 Litre	4	<i>Eucalyptus pilularis</i> , <i>Eucalyptus resinifera</i>
Mq	<i>Melaleuca quinquenervia</i>	Broad Leaved Paperbark	N/A	N/A	25 Litre	3	<i>Angophora floribunda</i> , <i>Eucalyptus pilularis</i> , <i>Eucalyptus paniculata</i>
Ms (100L)	<i>Melaleuca styphelioides</i>	Prickly-Leaved Tea Tree	N/A	N/A	100 Litre	3	<i>Angophora floribunda</i> , <i>Eucalyptus pilularis</i> , <i>Eucalyptus paniculata</i>
					Total	124	
Accent Plants							
Mc	<i>Macrozamia Communis</i>	Burrawang	N/A	N/A	25 Litre	79	
					Total	79	
Small Trees & Shrubs / Grasses / Groundcovers / Ferns							
Area (m²)	3416						
Cs	<i>Callistemon salignus</i>	Sweet Willow Bottlebrush	6%	1	150mm	104	<i>Elaeocarpus reticulatus</i> , <i>Pittosporum revolutum</i> , <i>Ceratopetalum gummiferum</i> , <i>Melaleuca linariifolia</i> , <i>Podocarpus elatus</i>
Cs	<i>Callistemon salignus</i>	Sweet Willow Bottlebrush	6%	1	NT	101	<i>Elaeocarpus reticulatus</i> , <i>Pittosporum revolutum</i> , <i>Ceratopetalum gummiferum</i> , <i>Melaleuca linariifolia</i> , <i>Podocarpus elatus</i>
Hp	<i>Homalanthus populifolius</i>	Bleeding Heart	5%	1	150mm	87	<i>Pittosporum rhombifolium</i> , <i>Ceratopetalum gummiferum</i> , <i>Elaeocarpus reticulatus</i>
Hp	<i>Homalanthus populifolius</i>	Bleeding Heart	5%	1	NT	84	<i>Pittosporum rhombifolium</i> , <i>Ceratopetalum gummiferum</i> , <i>Elaeocarpus reticulatus</i>
Ma	<i>Melaleuca alternifolia</i>	Narrow-Leaved Paperbark	6%	1	150mm	104	<i>Elaeocarpus reticulatus</i> , <i>Pittosporum revolutum</i> , <i>Ceratopetalum gummiferum</i> , <i>Melaleuca linariifolia</i> , <i>Podocarpus elatus</i>
Ma	<i>Melaleuca alternifolia</i>	Narrow-Leaved Paperbark	6%	1	NT	101	<i>Elaeocarpus reticulatus</i> , <i>Pittosporum revolutum</i> , <i>Ceratopetalum gummiferum</i> , <i>Melaleuca linariifolia</i> , <i>Podocarpus elatus</i>
Mac	<i>Myoporum acuminatum</i>	Boobialla	4%	2	150mm	139	<i>Pittosporum rhombifolium</i> , <i>Ceratopetalum gummiferum</i> , <i>Elaeocarpus reticulatus</i>
Mac	<i>Myoporum acuminatum</i>	Boobialla	4%	2	NT	135	<i>Pittosporum rhombifolium</i> , <i>Ceratopetalum gummiferum</i> , <i>Elaeocarpus reticulatus</i>
Sr	<i>Scaevola ramosissima</i>	Purple Fan-flower	5%	3	150mm	260	<i>Viola banksii</i> , <i>Hibbertia scandens</i>
Sr	<i>Scaevola ramosissima</i>	Purple Fan-flower	5%	3	NT	252	<i>Viola banksii</i> , <i>Hibbertia scandens</i>
Bj	<i>Baumea juncea</i>	Bare Twig Rush	5%	3	NT	512	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Bi	<i>Blechnum indicum</i>	Swamp Water-Fern	5%	3	NT	512	<i>Doodia aspera</i> , <i>Blechnum nudum</i>
Ca	<i>Carex appressa</i>	Tall Sedge	5%	6	NT	1025	<i>Lomandra longifolia</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Cp	<i>Crinum pedunculatum</i>	Swamp Lily	5%	4	NT	683	<i>Dianella caerulea</i> , <i>Lomandra longifolia</i>
Dc	<i>Dianella caerulea</i>	Blue Flax Lily	8%	6	NT	1639	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Gc	<i>Gahnia clarkei</i>	Tall Saw-Sedge	2%	4	NT	274	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Hm	<i>Hypolepis muelleri</i>	Harsh Ground Fern	5%	4	NT	683	<i>Doodia aspera</i> , <i>Blechnum nudum</i> , <i>Blechnum indicum</i>
Ic	<i>Imperata cylindrica</i> var. <i>major</i>	Blady Grass	5%	5	NT	854	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Ficinia nodosa</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ii	<i>Isolepis inundata</i>	Swamp Club-Sedge	5%	4	NT	683	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ik	<i>Juncus kraussii</i> subsp. <i>australiensis</i>	Sea Rush	3%	5	NT	512	<i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Ju	<i>Juncus usitatus</i>	Common Rush	5%	5	NT	854	<i>Lomandra longifolia</i> , <i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
La	<i>Lobelia anceps</i>	Angled Lobelia	4%	5	NT	683	<i>Scaevola ramosissima</i> , <i>Hardenbergia violacea</i>
Li	<i>Lomandra longifolia</i>	Spiny-Headed Mat-Rush	8%	5	NT	2107	<i>Aristida vagans</i> , <i>Cymbopogon refractus</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Pa	<i>Phragmites australis</i>	Common Reed	4%	5	NT	683	<i>Aristida vagans</i> , <i>Danthonia tenuior</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> , <i>Poa affinis</i>
Vb	<i>Viola banksii</i>	Violet	5%	6	NT	1025	<i>Hibbertia scandens</i> , <i>Clematis asiatica</i> , <i>Pandorea pandorana</i>
		Total				14096	

Swamp Oak Floodplain Forest

Trees



Alphitonia excelsa



Casuarina glauca



Cupaniopsis anacardioides



Melaleuca styphelioides

Accent plant



Macrozamia communis

Shrubs / Grasses / Groundcovers



Callistemon salignus



Myoporum acuminatum



Lobelia anceps



Lomandra longifolia

Macrophyte planting



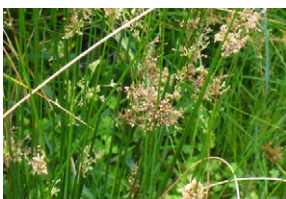
Baumea juncea



Carex appressa



Ficinia nodosa



Juncus usitatus

Figure 7-24: Southern foreshore - landscape plant schedule

Macrophyte planting							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Area (m²)		181					
Bj	Baumea juncea	Bare Twigrush	20%	4	NT	145	Imperata cylindrica, Juncus usitatus, Ficinia nodosa, Gahnia melanocarpa
Bc	Bolboschoenus caldwellii	Sea Club-sedge	10%	4	NT	72	Themeda triandra, Carex appressa, Ficinia nodosa, Juncus usitatus
Ca	Carex appressa	Tall Sedge	20%	4	NT	145	Imperata cylindrica, Juncus usitatus, Ficinia nodosa, Gahnia melanocarpa, Lomandra longifolia
Fn	Ficinia nodosa	Knobby Club-Rush	20%	4	NT	145	Imperata cylindrica, Juncus usitatus, Carex appressa, Gahnia melanocarpa
Jk	Juncus kraussii subsp. Australiensis	Sea Rush	10%	4	NT	72	Themeda triandra, Carex appressa, Ficinia nodosa, Juncus usitatus, Lomandra longifolia
Ju	Juncus usitatus	Common Rush	10%	4	NT	72	Themeda triandra, Carex appressa, Ficinia nodosa, Lomandra longifolia
Gm	Gahnia melanocarpa	Black-fruit Saw sedge	10%	4	NT	72	Imperata cylindrica, Juncus usitatus, Ficinia nodosa, Lomandra longifolia
		Total	100%			723	
Median Planting							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Area (m²)		809					
Dc	Dianella caerulea var.caerulea	Blue Flax-lily	25%	5	150mm	792	Lomandra longifolia, Aristida vagans, Cymbopogon refractus, Danthonia tenuior, Imperata cylindrica, Microlaena stipoides, Poa affinis
Hv	Hardenbergia violacea	Purple coral pea	25%	4	150mm	809	Clematis asiatica, Pandorea pandorana
Li	Lomandra longifolia	Spiny-Headed Mat-Rush	25%	5	150mm	911	Aristida vagans, Cymbopogon refractus, Danthonia tenuior, Imperata cylindrica, Microlaena stipoides, Poa affinis
Wf	Westringia fruticosa	Coastal Rosemary	25%	1	150mm	790	Pultenaea villosa, Ozothamnus diosmifolius
					Total	3302	
Turf							
Symbol	Botanical Name	Common Name	Percentage of species within area	Spacing	Pot Size	Total	Replacement Options
Area (m²)		1106					
	Cynodon Dactylon	Common Couch	N/A	N/A	Turf rolls	1106m²	

NT = Native Tubestock (100mm)

7.6 Cuttings and embankments

Cuttings and embankments will be integrated into the existing landform to minimise their visual impact. This will be achieved where possible through rounding of the top of cut batters and fill embankments and the gradual transitioning of end slopes into the existing grade.

Seeding via compost blanket application will be used on the northern foreshore where slopes are steeper than 2:1. Consideration of a specialised planting technique will be subject to detailed design and pending identification of rock locations.

On slopes 2:1 or flatter planting will be forestry 'Tubestock' containers - 50mm² x 150mm deep along with 150mm container size.

See planting and seeding schedules for species composition and application rates.

The opportunity for landscape treatment on the 2:1 northern batter is currently under investigation. The batter is currently shown on the drawing transitioning from 1.5:1 to 2:1.

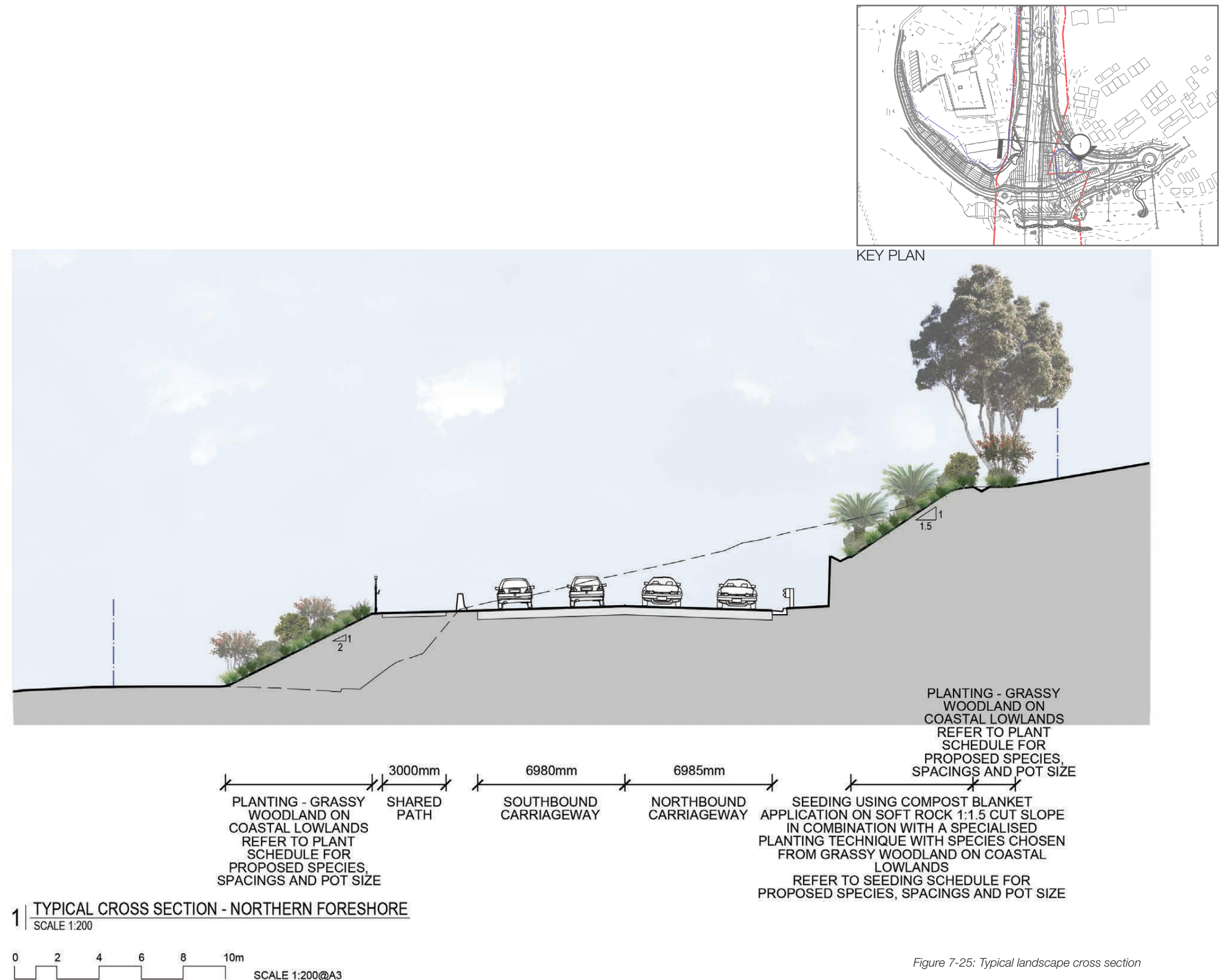
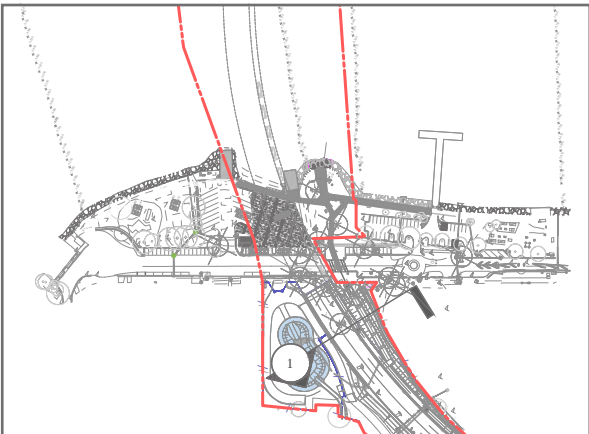


Figure 7-25: Typical landscape cross section



KEY PLAN

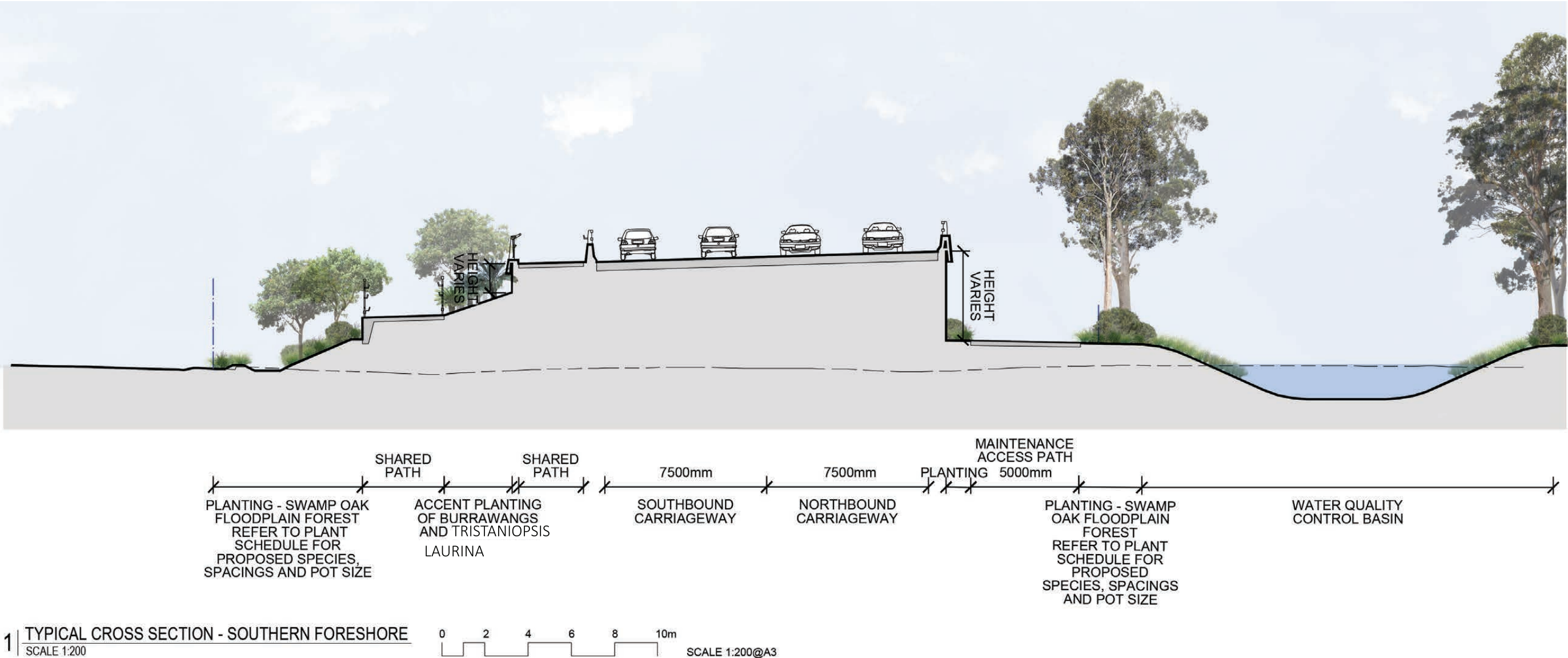


Figure 7-26: Typical landscape cross section

7.7 Landscape management

7.7.1 Landscape establishment and maintenance

A landscape maintenance plan will be prepared with the specification covering standards and methods for all the normal tasks required for landscape/horticultural maintenance. The scope of this work comprises:

- Weeding
- Pruning
- Mulching
- Fertilising
- Pest and disease control
- Replacement planting
- Mowing.

The maintenance work begins at the time of occupation of the site and together with measures designed to protect the biodiversity of the corridor will be carried out over the duration of the construction works and maintenance period covered by the contract.

Particular attention will be given to the monitoring of planted areas within the first 18 months after planting. This is the most sensitive time for newly installed planting and compost blanket areas.

7.7.2 Summary table of maintenance

The following table summarises the landscape maintenance actions/tasks required during the 36 months maintenance period, including their time frames and frequencies required under the Landscape Maintenance Plan.

Table 3 : Table of maintenance

Maintenance Actions	Tasks	Timeframes / Frequency							As Required	As Specified Below
		Weekly	Monthly	Seasonal						
				Su	Au	Wi	Sp			
All Areas										
1. Pruning of Vegetation for Safety	Maintaining driver and pedestrian sightlines									
	Vegetation in intersection traffic islands									
	Pruning trees over carriageways, roads, paths and cycle ways.									
2. Management of Non Frangible Vegetation	Remove woody "non-frangible" vegetation in setbacks									Annually, as needed
3. Noxious Weed Control	Treat noxious weeds according to control category									
4. Rubbish Removal	All rubbish left by contractors to be removed. Site to be left in a clean and tidy condition.									Prior to mowing
5. Auditing and Reporting	Audit and report on maintenance and additional works									
Grassed Areas (Mown) Only										
1. Mowing	Mow grass to a minimum height of 5cm/ maximum height of 10cm									Every 4 weeks
										Every 6 weeks
										Every 12 weeks
										Every 6 weeks
2. Replacement of Damaged Grass	Re-establish damaged turf.									
3. Weed Control in Grass	Control weeds in turf areas using selective biodegradable herbicides.									
4. Watering	Turf must not be allowed to dry out during the establishment period.									

Vegetation areas (Compost Blanket)										
1. Weeding	Weed garden beds (manual or biodegradable herbicide) before weed seed set.								Use biodegradable herbicide only	
	Replace landscape plants damaged or killed by herbicide.								Should this happen it suggests improper use. Review manufacturer instructions and application method	
2. Herbicide Spraying	Comply with requirements specified in 3.1.1 'Herbicide Spraying' in RMS D&C R178 – Vegetation.									
4. Remove Dead/Dying Vegetation	Cut back and remove dead, dying planting or planting with poor growth planting material. Do not pull root out. Replace topsoil as required. Prepare topsoil by loosening surface. Ensure topsoil depth is even across affected area and has a smooth transition into the existing vegetation.									
5. Replacement Hydroseeding/hydromulching	Reapply seeding as per specification. Seed mix as per vegetation plans and equal to what has been applied previously. Apply sufficient seeding to achieve consistent vegetation cover over affected area	Water replacement plantings weekly							When possible, apply seeding during optimum seasonal conditions	
Tubestock planting areas										
1. Weeding	Weed planting area (manual or biodegradable herbicide) before plant flowers.								Use biodegradable herbicide only	
	Herbicide application. After spraying lop any dead weeds flush with the ground surface and dispose of cuttings.									
	Replace landscape plants damaged or killed by herbicide.								Should this happen it suggests improper use. Review manufacturer instructions	

										instructions and application method
2. Disease and Insect Control	Spraying must only occur on windless days and records of weed conditions must be retained. Sprays should not be used where there is risk of entering a watercourse or wind could cause drifting outside area to be treated.									
3. Mulching	Re-apply mulch to individual Tubestock and maintain to a depth of 75 mm min Do not apply mulch in areas within water zone ie: ponds, creek lines and wetlands									Every two years
4. Removal of Dead / Dying Plant Material	Remove dead or dying planting material and replace.									
5. Replacement Plantings	Replace failed plantings with specified species and densities.									Within 28 days of detection
	Water replacement plantings for 12 weeks.									
6. Timber Stakes	Check and repair timber stakes if damaged or removed prior to plant establishment.									
	Remove timber stakes.									As required until final removal at 12 months after planting
7. Fertilising and Pruning	Fertilise all plantings at specified rates.									At time of planting
	Prune all plantings in specified manner									Refer "All Areas", Point 1

Landscape Bed Plantings Only										
1. Weeding	Weed planting area (manual or biodegradable herbicide) before plant flowers.								Use biodegradable herbicide only	
	Herbicide application. After spraying lop any dead weeds flush with the ground surface and dispose of cuttings.									
	Replace landscape plants damaged or killed by herbicide.								Should this happen it suggests improper use. Review manufacturer instructions and application method	
2. Disease and Insect Control	Spraying must only occur on windless days and records of weed conditions must be retained. Sprays should not be used where there is risk of entering a watercourse or wind could cause drifting outside area to be treated.									
3. Mulching	Reapply mulch to maintain a depth of 75 mm min.								Every 2 years	
4. Removal of Dead / Dying Plant Material	Remove dead or dying planting material and replace.									
5. Replacement Plantings	Replace failed plantings with specified species and densities.								Within 28 days of detection	
	Water replacement plantings for 12 weeks.									
6. Timber Stakes	Check and repair timber stakes if damaged or removed prior to plant establishment.									
	Remove timber stakes.								As required until final removal at 12 months after planting	
7. Fertilising and Pruning	Fertilise all plantings at specified rates.									
	Prune all plantings in specified manner:									

	Trees									refer All Areas Point 1
	Tall / Medium / Low Shrubs									After Flowering. Allow to grow to full potential
	Climbers									Once per year. Allow to grow to full potential
	Groundcover / Tussocks									After Flowering. Allow to grow to full potential Every 4 years
Areas of Special Consideration										
Batter Revegetation Management Strategy										
Water Quality Ponds										
Threatened Species										
Site Works										
Riparian Zones										

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8.0 Foreshore works

The foreshore areas are the zones along the river banks under the northern and southern approaches to the new Batemans Bay Bridge. Vehicular access to these areas is via the Princes Highway. Pedestrians and cyclists access to these areas from existing paths along the foreshore and from the shared path proposed on the eastern side of the bridge.

8.1 Northern foreshore

The northern foreshore is associated with the residential and recreational neighbourhoods located north of the bridge. It is accessed by vehicles through a slip lane off the Princes Highway southbound carriageway on to Wharf Road and then to a roundabout. This area contains upgraded parking facilities and amenities arranged to allow maximum community use of the foreshore edge. Pedestrian and cyclist access is via the shared path on the bridge.

Key design features include:

- Maintaining clear thoroughfare between Old Punt Road and Wharf Road
- Improved parking facilities with the provision of 39 car spaces, one accessible parking space, 13 car and trailer spaces and bicycle parking
- Improve pedestrian and vehicular access to On The Pier Restaurant, through the provision additional on-street parallel parking opposite the restaurant and improved shared path connections
- A basin with an integrated deck serves as a viewing platform, with potential seating and heritage interpretation
- Exit stairs from the bridge transitioning to the deck area and parking level, creating multiple opportunities for panoramic views of the river and the ocean improving the visual amenity of the foreshore
- Relocated community amenities such as picnic shelters, playground, picnic shelters with integrated BBQs and a toilet block along the foreshore edge accessed via a continuous shared path
- Opportunities to introduce a heritage trail along the shared path, with paved areas for display of community artwork
- Improved pedestrian access to the beach
- Opportunity for integration of artwork with retaining wall at northern abutment
- Reinstatement of potential extended zones along the shared path at the eastern foreshore, which can be used as contemplation areas with provision for seating and lookouts
- A viewing platform at the location of the existing abutment
- A space greater than 25m² for potential permanent display of community artwork
- Retain the existing boat ramp and the heritage punt ramp
- Increased buffer landscape areas with shade trees
- Feature landscape treatments at the abutments and in the public domain
- Water sensitive urban design (WSUD) initiatives such as basins, natural swales and the use of permeable paving in the parking zones
- An extension of the shared path along Old Punt Road
- A raised threshold along Old Punt Road to promote the area as a shared pedestrian and vehicular zone
- Provision for use of spaces along the foreshore for activity generators, such as outdoor café areas and exercise stations.



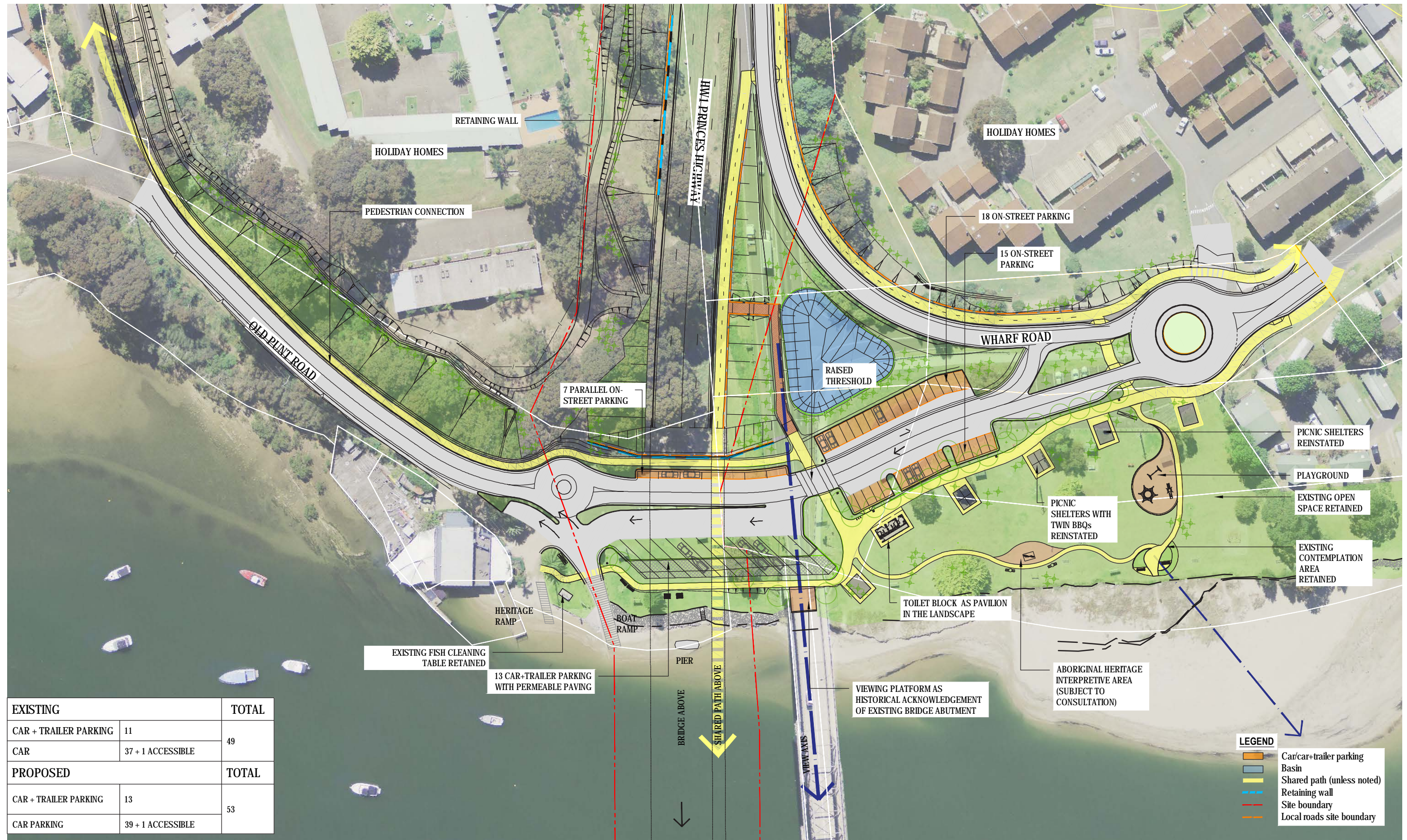
Figure 8-1: View of Batemans Bay Bridge from beach, on northern foreshore

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 8-2: Aerial view of northern foreshore



1 | NORTHERN FORESHORE - URBAN DESIGN CONCEPT PLAN
SCALE 1:1000

Drawing is illustrative only and is subject design development and consultation.



Figure 8-3: Northern foreshore - urban design concept plan

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 8-4: Aerial view of northern foreshore from Wharf Road

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 8-5: View of northern foreshore from raised threshold



Figure 8-6: View of northern foreshore from contemplation area

8.2 Southern foreshore

The southern foreshore is integrated with the Batemans Bay town centre located just south of the bridge. It is accessed by vehicles via North Street, off the Princes Highway. Pedestrian and cyclist access is via the shared path on the bridge.

Key design features include:

- Maintaining clearance at Clyde Street to allow for thoroughfare through Clyde Street
- Improved parking facilities with the provision of 109 total parking spaces, both on-street and off-street
- A seamless tie-in of the new parking layout with the existing, by retaining, as much as possible, existing parking spaces
- An allowance for increased on-street parking zone along the western side of Clyde Street
- Extension of the pedestrian connection to the western side of the bridge, to create a continuous shared path between eastern and western sides of Clyde Street
- An improved pedestrian and vehicular access to the foreshore via an accessible ramp on the eastern side of the bridge eastern side of the bridge
- Creation of a central open space with feature landscape treatments, to facilitate activities along the foreshore, and to act as an arrival point for pedestrians
- A basin located along the western side of the bridge, which is integrated with SEPP 14 wetlands, by maintaining location of existing discharge points and implementing water sensitive design practices
- Community amenities such as picnic shelters along the foreshore edge are accessed via a continuous shared path
- Enhance connection from the built form edge to the waters edge
- Opportunities to introduce a heritage trail along the shared path, with paved areas for the display of community artwork
- Special architecturally treated retaining walls at the abutment with signature pattern and texture to soften impact of the wall on the neighbourhood
- A fishing and viewing platform in the location and of the general shape of the existing Batemans Bay Bridge abutment
- Reinstate existing memorial plaque along foreshore edge
- Retain the existing boat ramp and the heritage punt
- Increased buffer landscape areas with shade trees
- Feature landscape treatments at the abutments and in the public domain
- Provision of WSUD initiatives such as basins and natural swales in the parking zones
- Areas to accommodate future smart parking facilities in consultation with Council
- Upgrade of the existing pontoon along the promenade to include a T-shaped floating structure with Gangway
- Relocation of existing bin housings located in buffer zones accessible from Clyde Street
- A raised threshold along Clyde Street to promote the area as a shared pedestrian and vehicular zone
- Provision for use of space along the foreshore, and under the bridge for local markets and events with activity generators such as food trucks, outdoor cafes.



Figure 8-7: View of Batemans Bay Bridge from Lion Park on southern foreshore

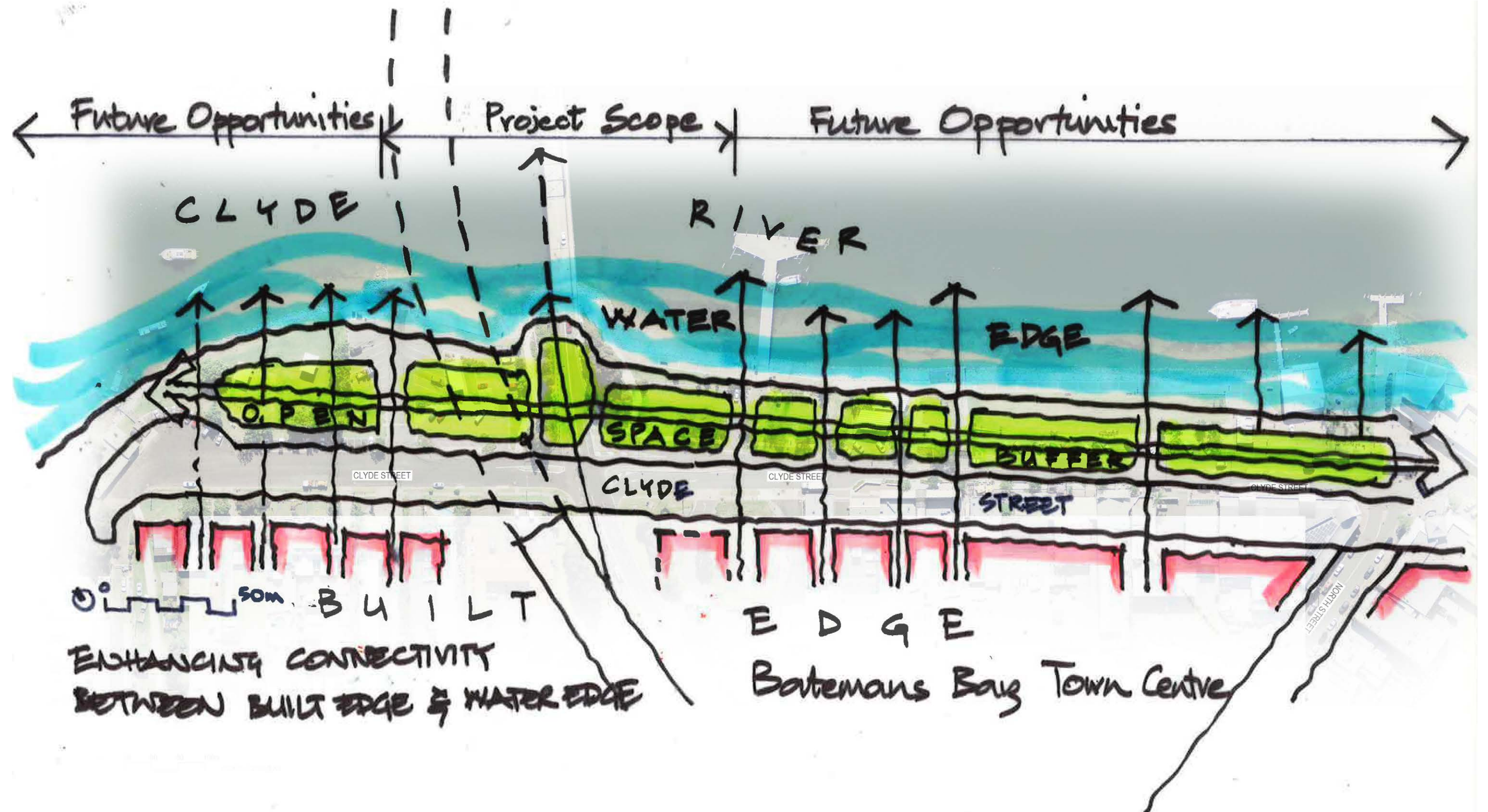
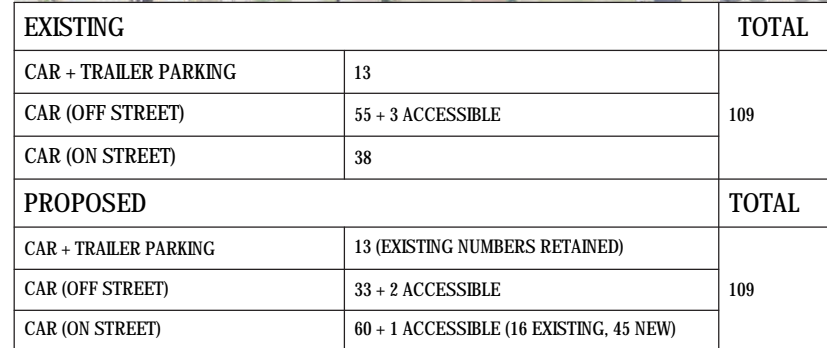


Figure 8-8: Southern foreshore built edge relationship



Drawing is illustrative only and is subject design development and consultation.





1 | SECTION THROUGH SOUTHERN FORESHORE
SCALE 1:400

Drawing is illustrative only and is subject to detailed design and consultation. Landscape shown is indicative only

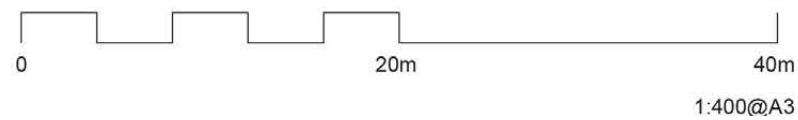
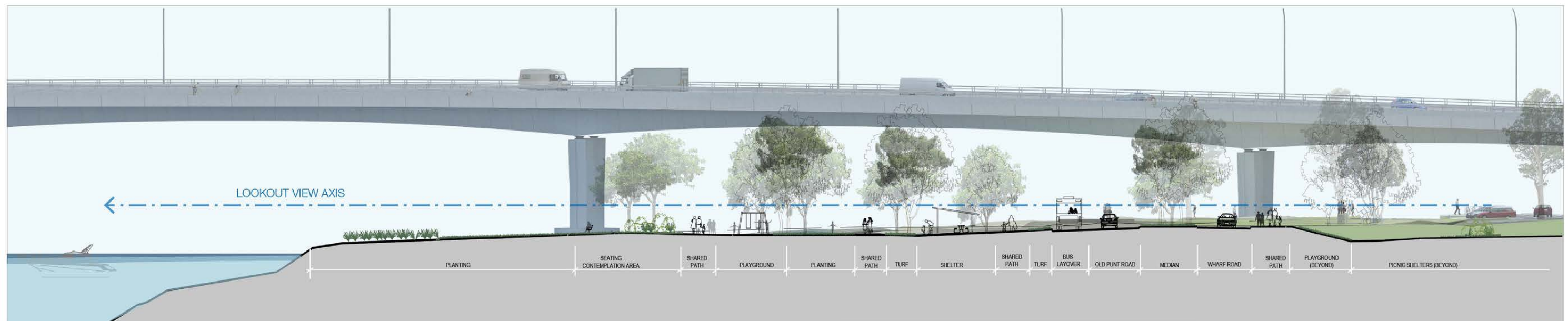


Figure 8-10: Section – southern foreshore



SECTION THROUGH NORTHERN BASIN
SCALE 1:400



SECTION THROUGH CONTEMPLATION AREA
SCALE 1:400

Drawing is illustrative only and is subject to detailed design and consultation. Landscape shown is indicative only

Figure 8-11: Sections – northern foreshore

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 8-12: Aerial view of southern foreshore

Artist impression

Drawing is illustrative only and is subject to design development and consultation. Landscape shown is indicative only



Figure 8-13: Southern foreshore - view from stairs

8.3 Public domain strategies

Public domain furniture

The public domain elements are perceived as a gallery of community art features, which compliment the concept of providing a narrative and creating a sense of place for the project.

Principles and strategies include:

- Bins and seats to be carefully placed, and at regular intervals so they do not obstruct major views.
- Playground to be located to allow passive surveillance and do not obstruct major views
- Furniture to be grouped along shared paths/footpaths for easy access
- Furniture to be grouped in clusters in areas of high activity such as picnic shelters/BBQs, playgrounds and toilets
- Furniture to have consistent aesthetic with the existing in terms of materials, finishes and colour
- Furniture provided should enhance connectivity with other public domain elements
- Furniture to have the potential for provision of smart technologies
- Minimise life cycle costs and maintenance requirements
- Combine furniture design, where possible so they are integrated into lesser entities and reduce visual clutter
- Integrate services as part of the public domain furniture design.

Lighting

The lighting objectives for the public domain are to:

- Provide appropriate illumination at night to ensure public safety, public enjoyment, night-time entertainment, for pedestrians, cyclists and motorists
- Implement high environmental lighting standards to conserve energy and minimise the unnecessary emission of light pollution
- Minimise glare for traffic and pedestrians
- Utilise the latest technology for effective conversion of light into illumination.

Fencing

Fencing is an integral part of road safety, as it defines the security perimeter and prevents access to dangerous and restricted areas. The primary urban design objectives for fencing is to minimise the visual impact of the fences on the surrounding environment. Planting should be provided and fencing is to be set back from the cadastral boundary, where possible.

Key principles and strategies include:

- Ensure design is integrated with other urban design elements and the landscape intent
- Ensure their appearance is recessive in the environment to minimize visual impact
- Ensure the design does not obstruct major view
- Ensure the design prevents pedestrians from accessing the roadway
- Allow provision for planting such as screening to provide visual relief
- Minimise the number of fence types
- Ensure a minimum of one metre buffer is provided, where possible.

Pavement

The key principles governing the choice of paving materials include:

- Sustainable, locally sourced (where possible), high durability, low embodied energy
- Flexible and easy to remove and re-lay
- Create a high quality pedestrian environment with materials that are robust, durable and easy to maintain
- Choice of materials are consistent with northern and southern foreshores, local streets and shared zones
- Reinforce streetscape hierarchy
- Enhances the character of the northern and southern foreshores, as well as surrounding neighbourhoods, including targeted application of higher quality pavement for areas around public amenities area and recreational uses

The public domain furniture plan illustrated in Figure 8-10 is indicative only. Provisions has been allowed for additional furniture to be added, which is subject to consultation with community and stakeholders.

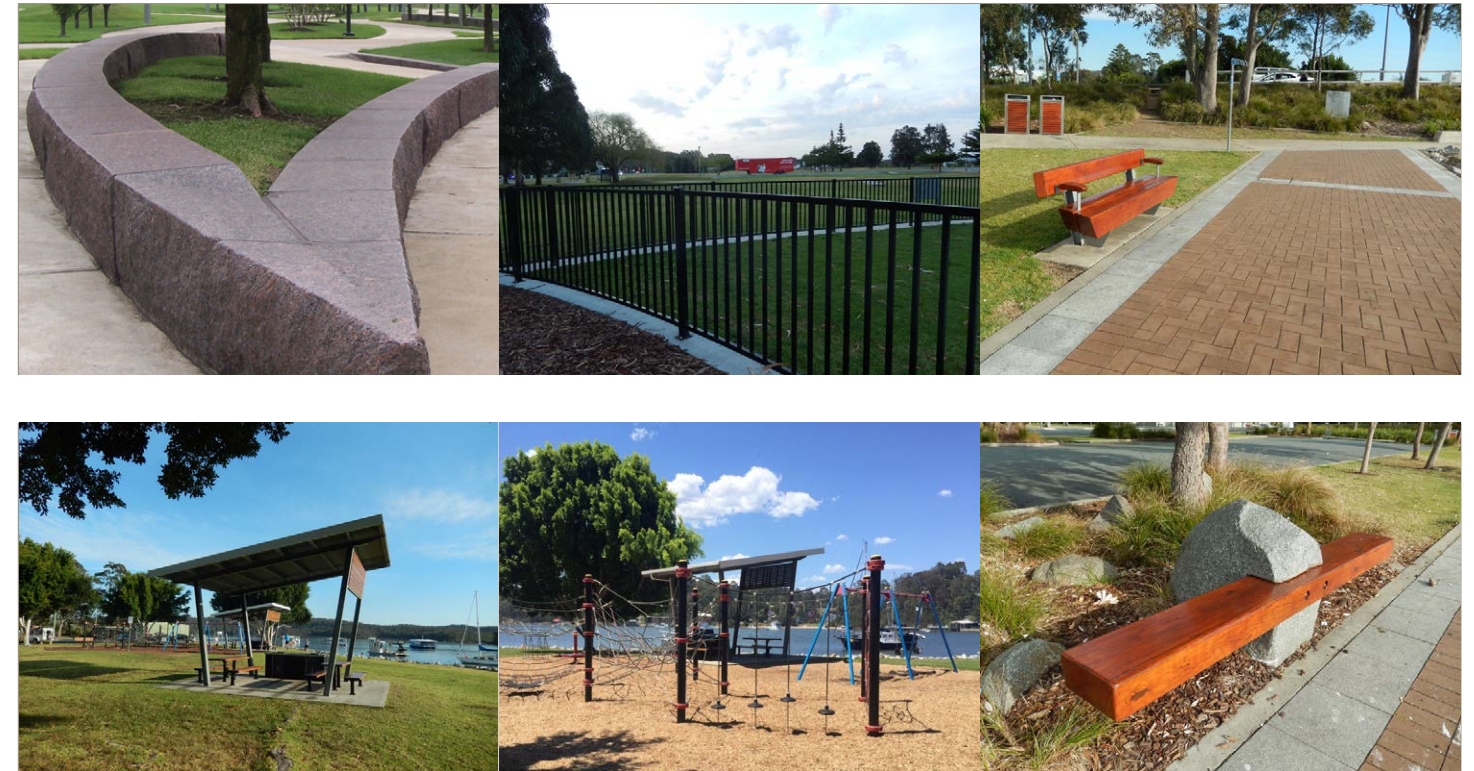


Figure 8-14: Examples of public domain furniture

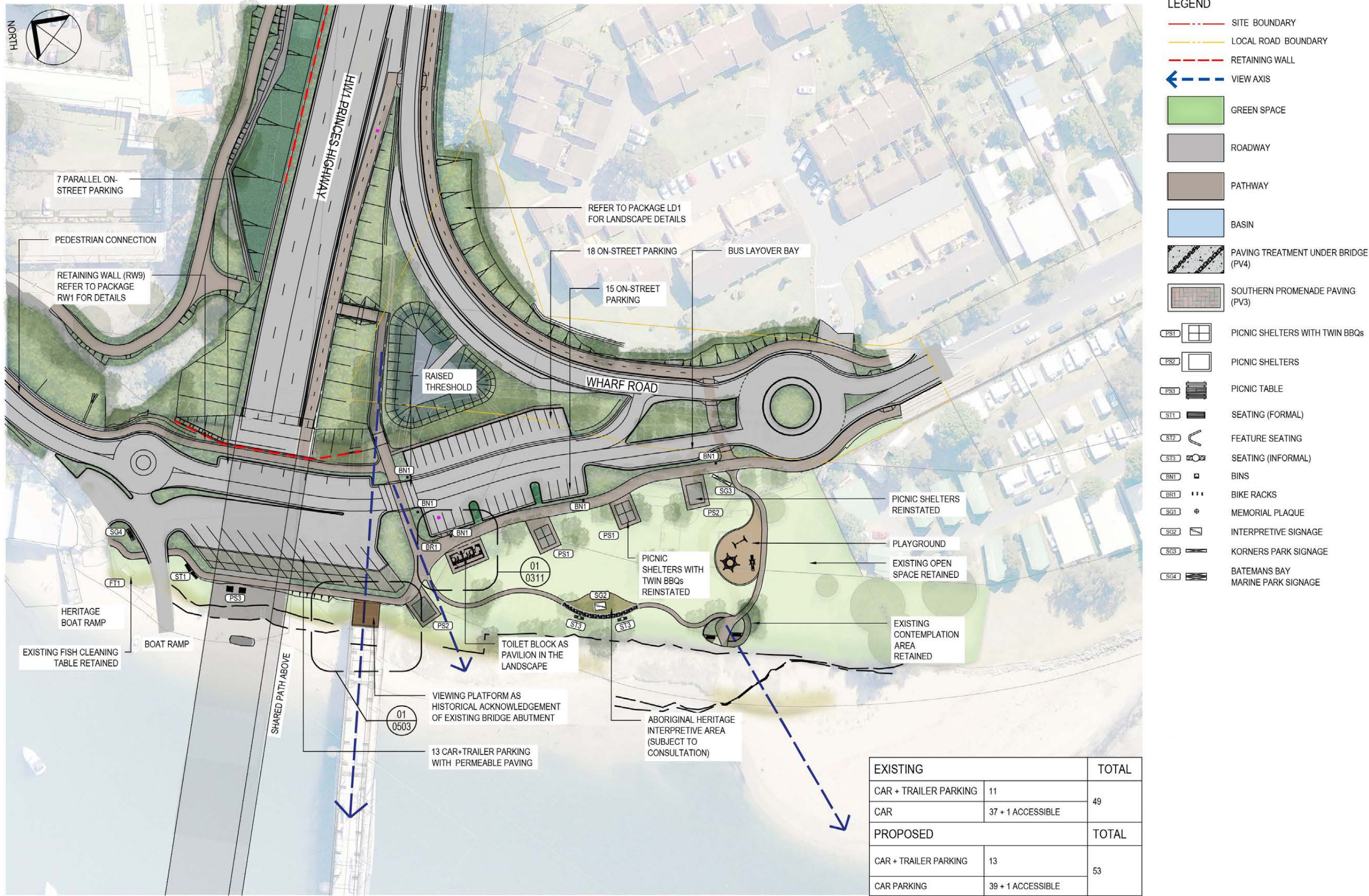


Figure 8-15: Public domain furniture plan- north

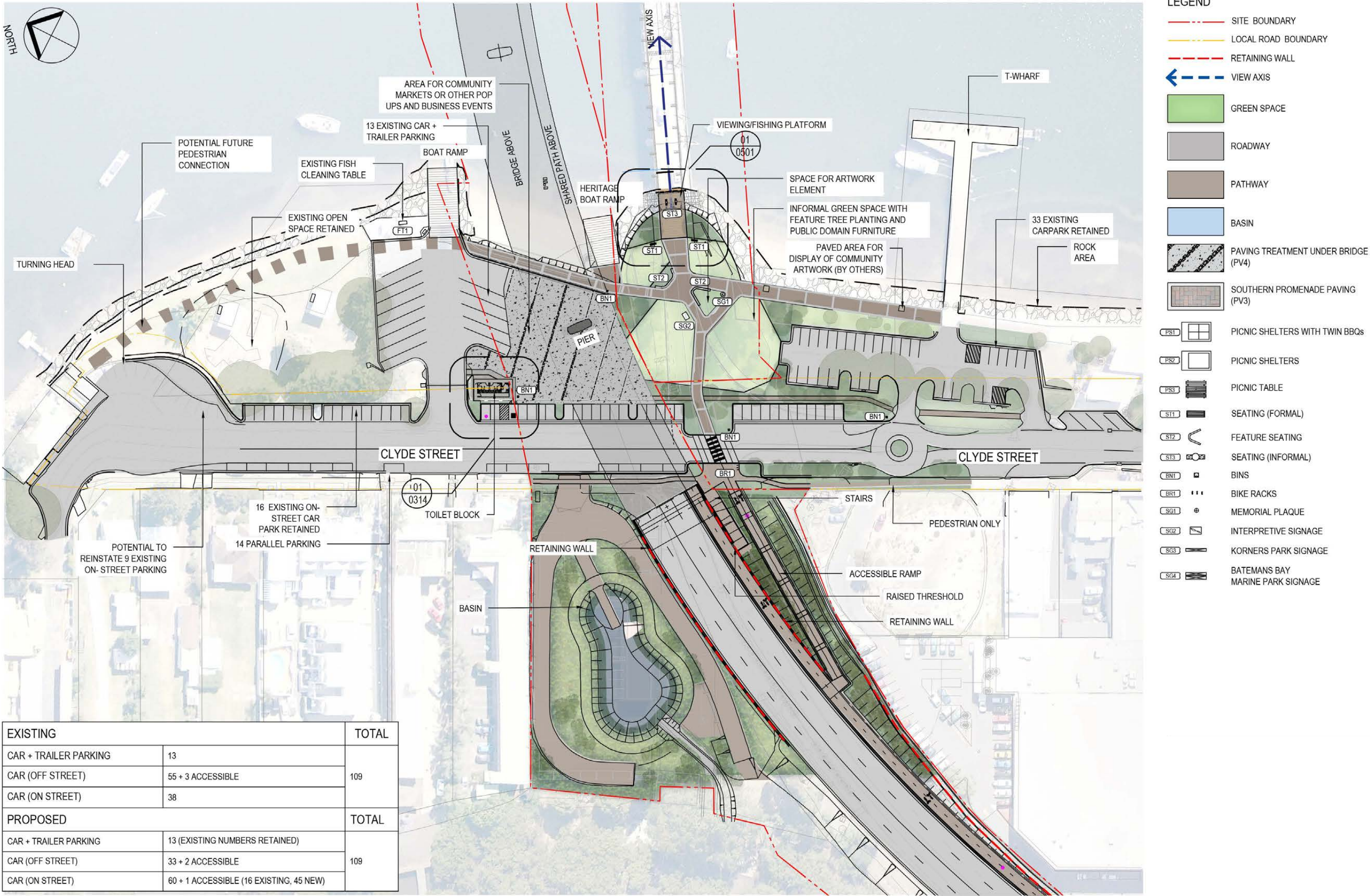


Figure 8-16: Public domain furniture plan- south

Southern foreshore fishing/viewing platform

The southern foreshore fishing/viewing platform is situated at the location of the existing bridge abutment, and its size and shape echoes the alignment of the existing Batemans Bay Bridge, creating a view axis towards the northern foreshore.

The design of the platform is integrated with the southern promenade and the central green space, creating an arrival point for pedestrians accessing the southern foreshore. It can be used both as a viewing platform offering uninterrupted views towards the northern foreshore, as well as a fishing platform with access to the water via multiple Moruya granite courses on either side.

It is large enough to accommodate outdoor seating and 25m² dedicated artwork display area. It has an integrated landscape approach, with signature planting that maintains sightlines, create shade and meets CPTED requirements, refer to Chapter 7.0 for more details.

The platform itself is of a timber deck construction, partly supported on piles with bearer and concrete slab substructure on land. The varying heights of the balustrade takes into the consideration wheelchair accessibility to the platform's edge, allowing all members of the community to enjoy this space.



Figure 8-17: Southern foreshore viewing/fishing platform plan



Figure 8-19: Close up view of southern foreshore viewing/fishing platform



Figure 8-18: Southern foreshore viewing/fishing platform sections

Northern foreshore viewing platform

The northern foreshore viewing platform is along the same view axis as the south, and also situated at the location of the existing bridge abutment. It is located centrally on the foreshore, close to parking, playground, shelters and amenities and can be access from the footpath along the foreshore.

Similar to the south, it is a timber deck construction and setback on the beach.



Figure 8-20: Northern foreshore viewing platform plan



Figure 8-21: Northern foreshore viewing platform sections

Southern foreshore green space and paving

The central open space on the southern foreshore; as a point of arrival is characterised by feature landscape treatments as well as surface treatments.

The vegetation on the central open space takes into account the provision of shade whilst incorporating CPTED principles, by providing low planting for passive surveillance and open lawn areas to provide opportunities for passive recreation. Refer to Chapter 7.0 for details.

As a space that links the eastern and western sides of the foreshore, the paving treatments take into consideration the existing material palette and adopts the existing promenade paving for the central walkway, as it meanders through the oval, and extends to the boat ramp. This allows a seamless integration between the existing and the new, and the promenade can be experienced as a continuous journey.

The area under the bridge can be used for vehicular access as well as for local markets and events. The undercroft of the bridge provides shade and protection for vendors with access to amenities. It will be finished in concrete with mosaic infill which align with the promenade paving.



Figure 8-22: Southern foreshore paving

Toilet block
The Batemans Bay Bridge amenities are a communal facility. The amenities are housed in precast panel concrete walls with a separate DDA facility to allow for privacy. The design features a lightweight, roof canopy with concealed gutters, float elegantly above the concrete structure below, like a pavilion in the landscape.



Figure 8-23: Concrete box house, Houston, Robertson Design



Figure 8-24: Lizard log amenities, Wetherill Park, Chrofi

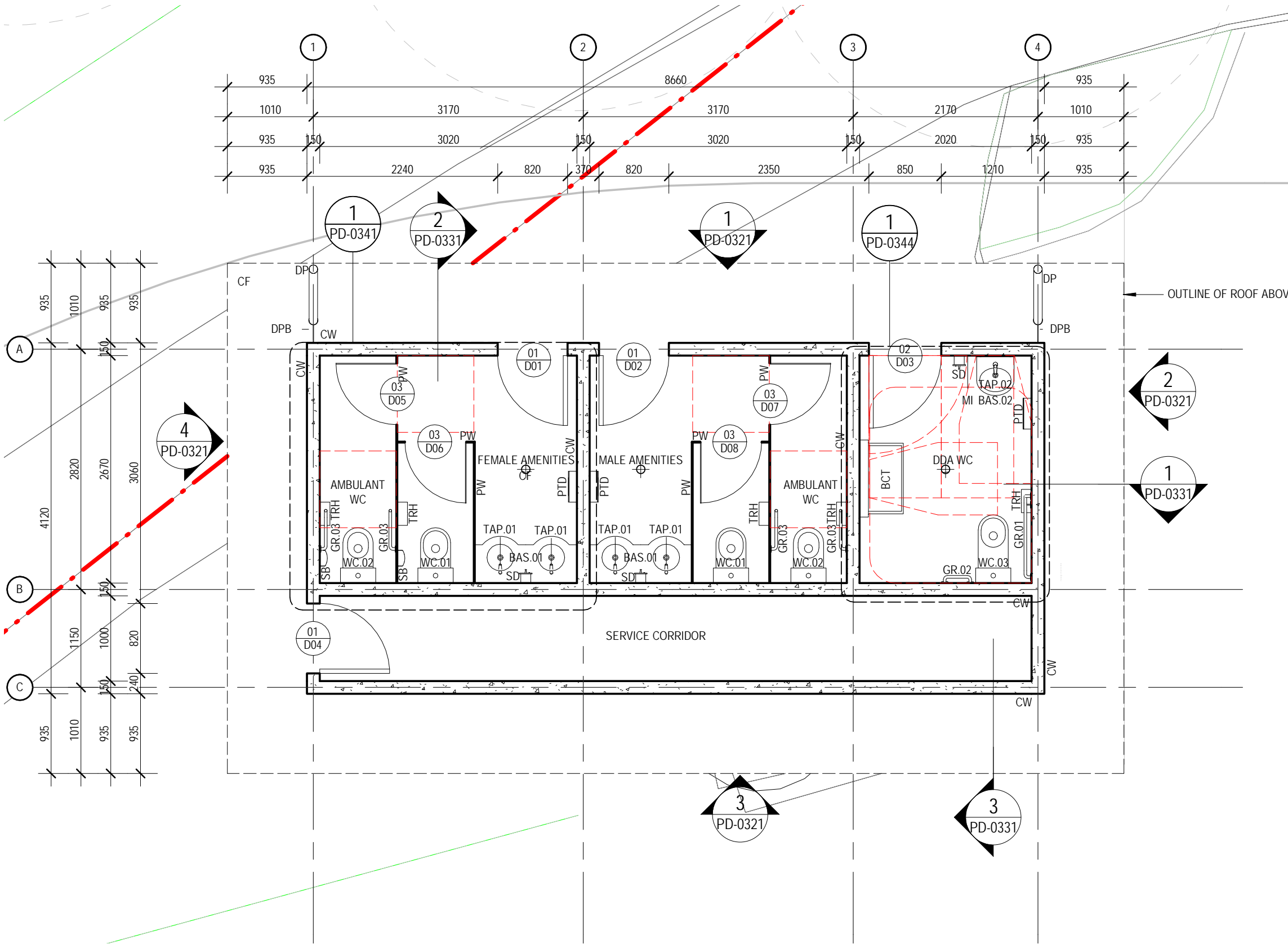
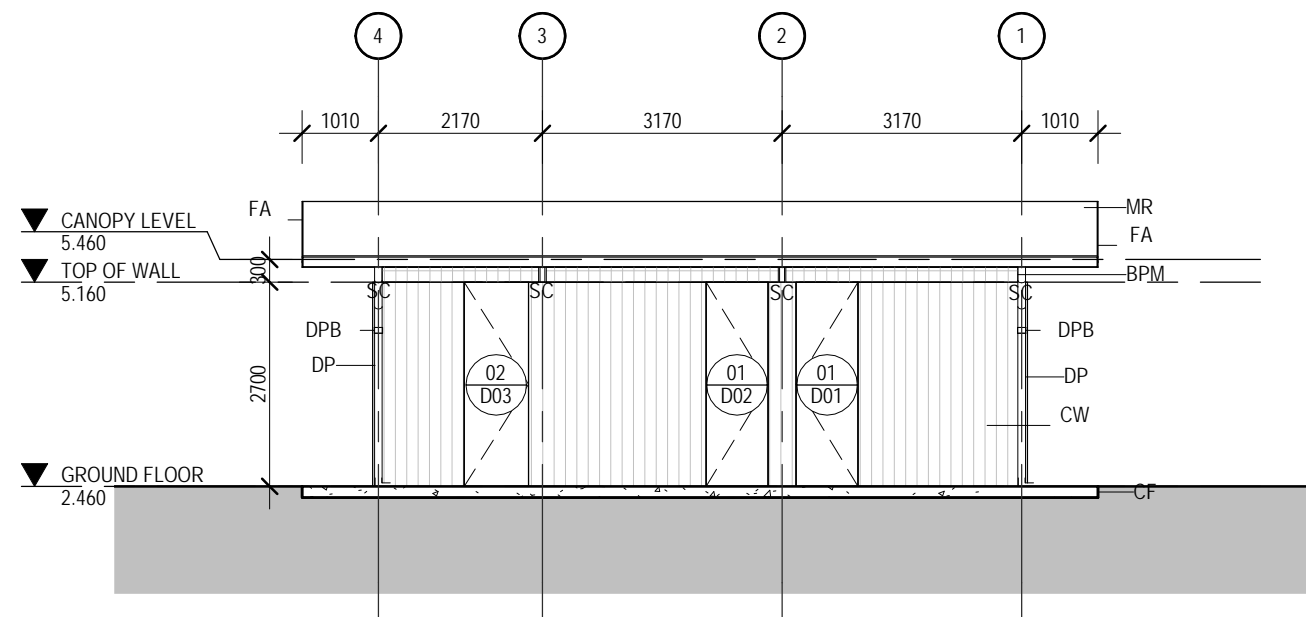
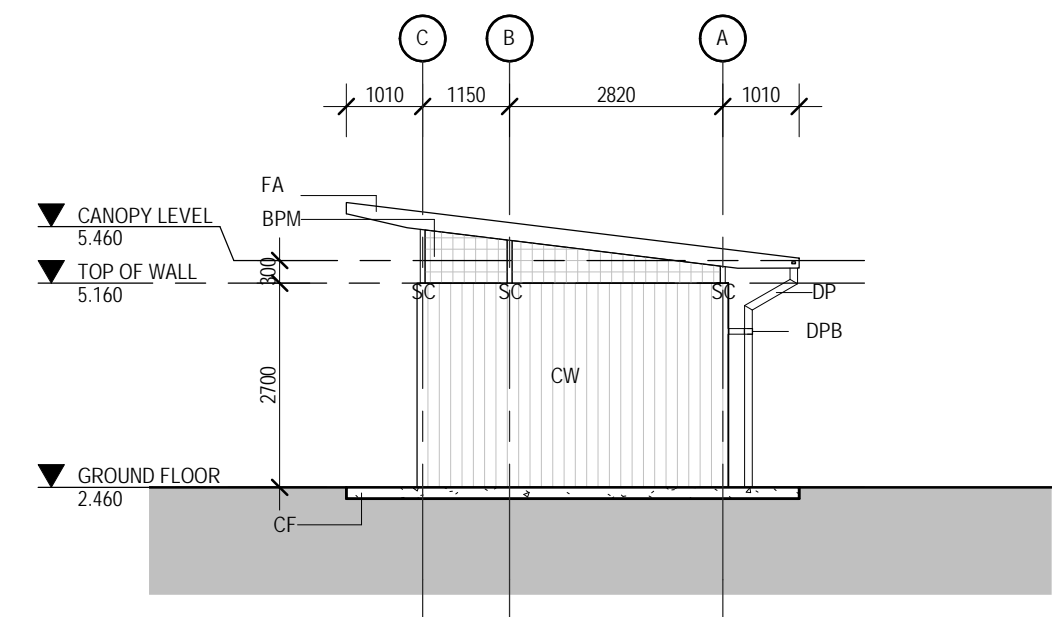


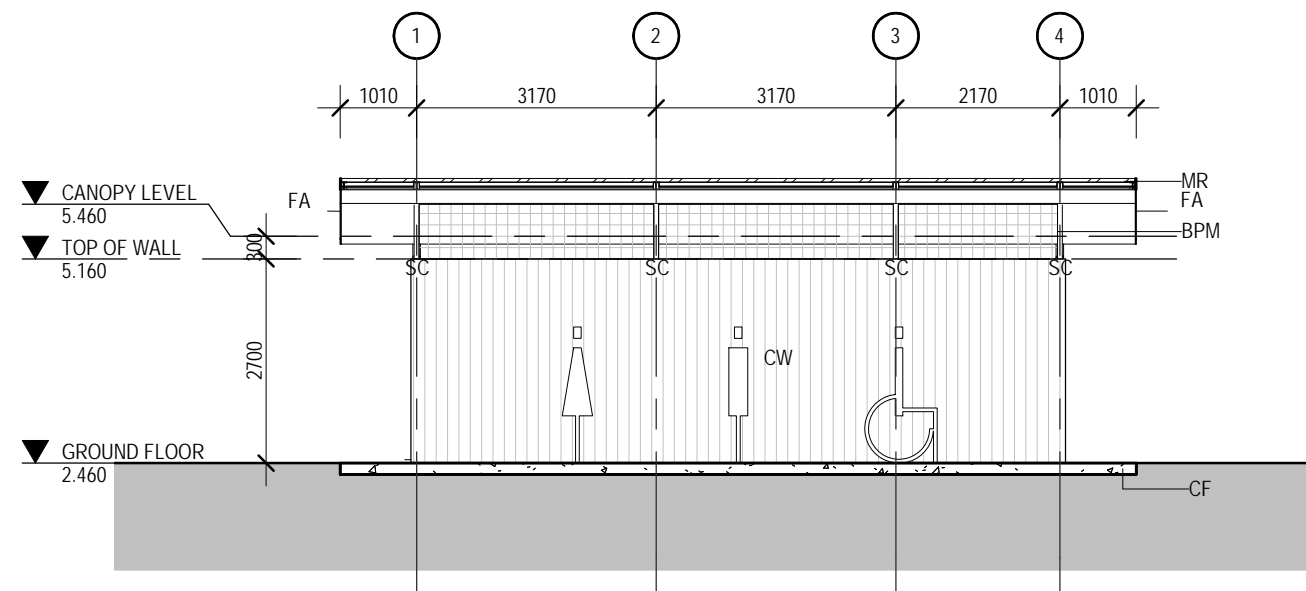
Figure 8-25: Toilet block plan



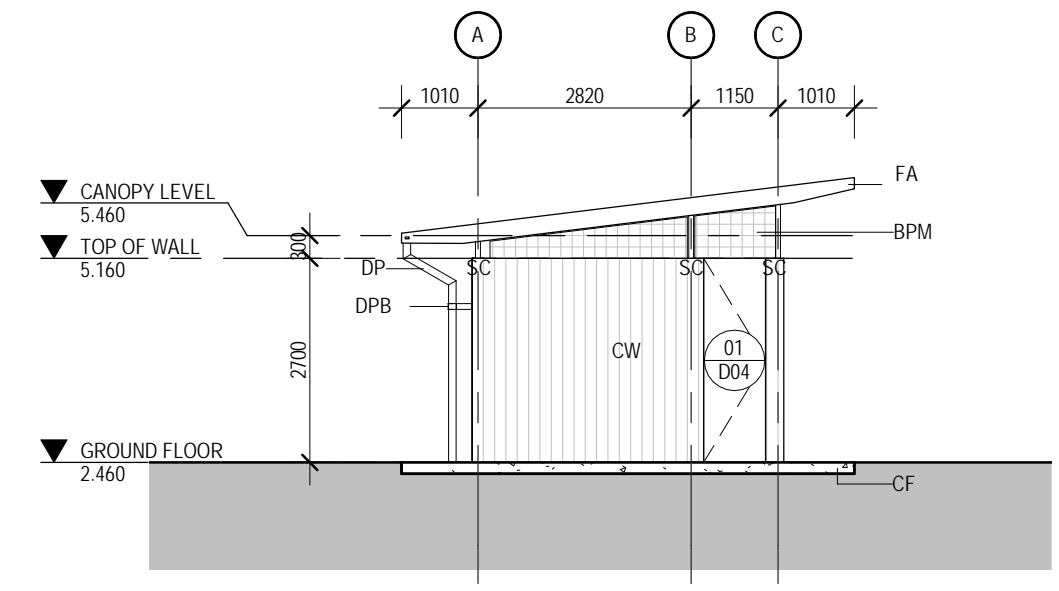
1 | NORTHERN AMENITIES - NORTH ELEVATION.
1 : 100



2 | NORTHERN AMENITIES - EAST ELEVATION.
1 : 100



3 | NORTHERN AMENITIES - SOUTH ELEVATION.
1 : 100



4 | NORTHERN AMENITIES - WEST ELEVATION.
1 : 100

Figure 8-26: Toilet block sections

8.4 Materials

The selection of materials and colours for the project is based on the following principles:

- Compliments the natural setting of the area
- Integrates with existing finishes
- Responds to the history of the place
- Durability and ease of maintenance
- Provides opportunities for interpretation
- Derived from a consistent palette of colours that complement each other

The existing materials are predominantly timber, granite and metal, in earthy colours ranging from light grey to reddish brown.

The materials and colours proposed for the project illustrated on the following pages.

The materials and colours are indicative only and will be subject to resolution during detailed design and consultation.

Existing colour palette

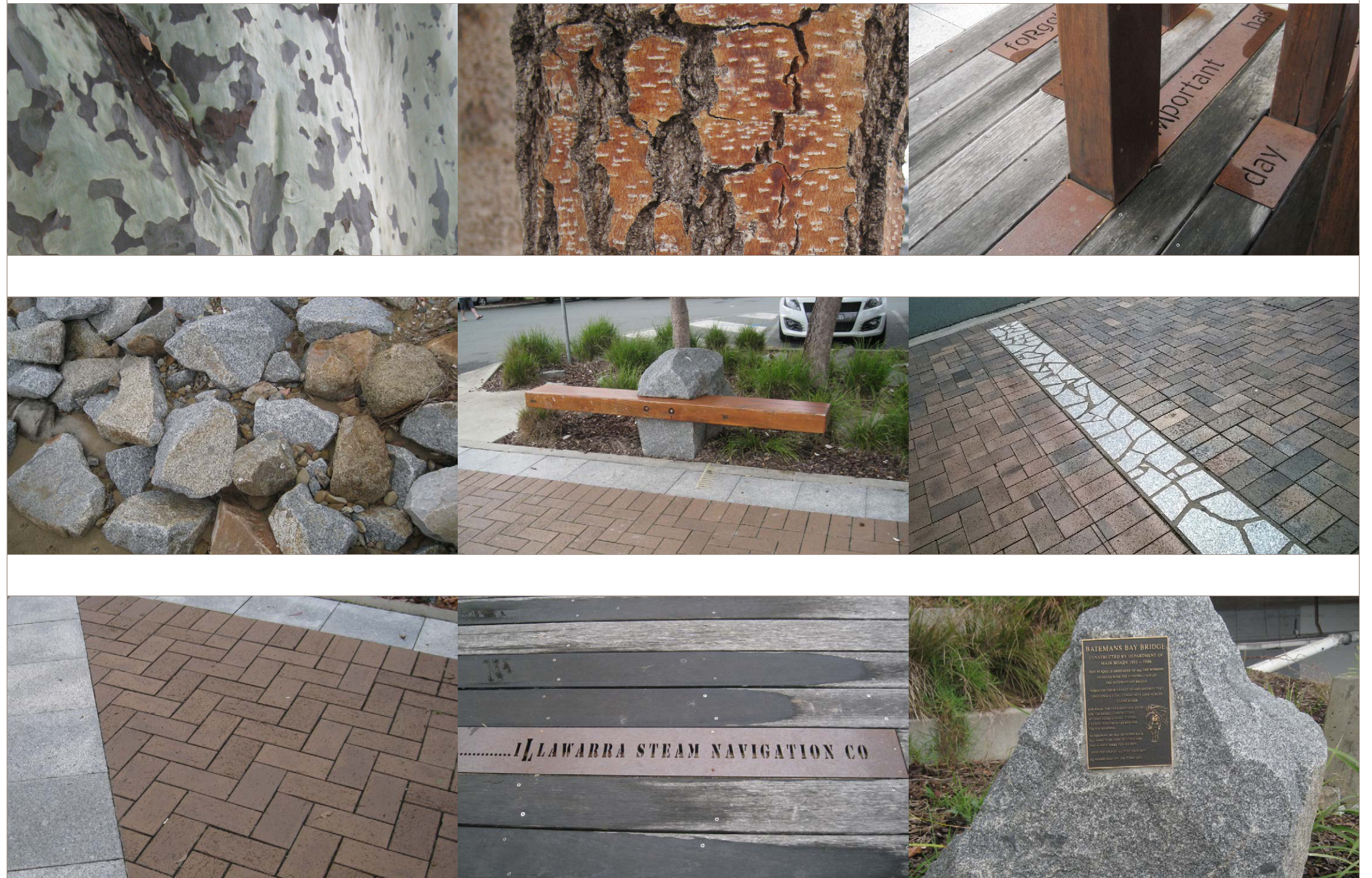












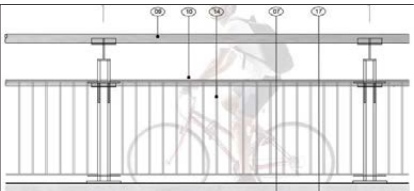
Figure 8-27: Material palette inspiration

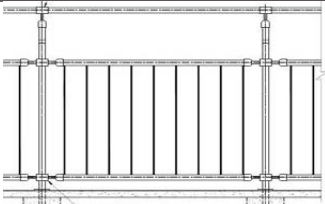
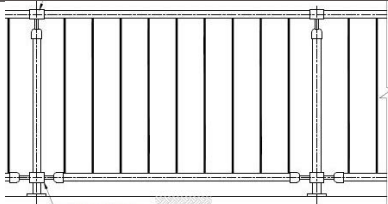


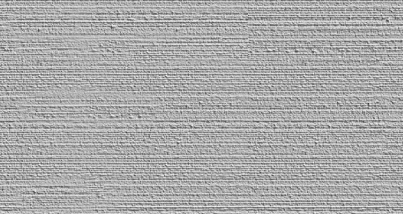


8.5 Public domain schedule

Item Code	Element	Material	Colour/finish	Quantity	SWTC	Specification	Description	Image	
Public domain furniture									
BN1	Bins	Metal/timber	Silver grey/ natural	5 (north) 4 (south)	App 3 Table 3.1 Lot 4, 4A and 4B (e) App 3 Table 3.1 Lot 5 (g) App 3 Table 3.1 Lot 30 (h)	As per Council's specification	Metal frame with timber infill with provision for solar panels to be incorporated		
BR1	Bike racks	Stainless steel round tube	316 Marine Grade	3 (north) 3 (south)	App 3 Table 3.1 Lot 30 (l)	950x900 or as per Council specification	Surface mount hoop bike rack with 7mm thick surface mount plates with 3 mounting holes		
ST1	Seat (formal)	Timber	Natural	2 (north) 2 (south)	App 3 Table 3.1 Lot 5 (c)	As per Council's specification	Timber seats with metal or granite support.		
ST2	Feature seat	Granite	Natural	2 (south)					
ST3	Seat (informal)	Timber/ granite block	Natural	2 (north) 2 (south)	App 3 Table 3.1 Lot 5 (c)	As per Council's specification	Granite blocks informal seating in special areas such as Aboriginal interpretative area		
SG1	Interpretive signage	Metal engraving on rock	Natrual stone with bronze engraving	1 (north) 1 (south)	App 3 Table 3.1 Lot 30 (j)	To be confirmed in consultation with the relevant stakeholders			

Item Code	Element	Material	Colour/finish	Quantity	SWTC	Specification	Description	Image
SG2	Memorial plaque relocated on southern foreshore			1 (south)		As per existing		
SG3	Korners Park signage	Timber	Natural	1 (north)	App 3 Table 3.1 Lot 5 (h)	As per existing	Relocate Korners Park sign, subject to consultation with Rotary	
SG4	Batemans Marine Park Signage	Timber	Natural	1 (north)		As per existing	Existing signage to be reinstated	
FT1	Fish cleaning table	Metal	Silver grey	1 (north) 1 (south)		As per existing	Steel frame information boards, with flat boards for pin ups.	
PS1	Picnic shelters	Steel	Silver grey	2 (north)	App 3 Table 3.1 Lot 4, 4A and 4B (d) App 3 Table 3.1 Lot 5 (c)	As per Council's specification	Skillion roof shelters with shade screen to match existing. All steel posts in powder-coated finish and fixtures to have anti-vandal fixings and brackets in stainless steel for corrosive environment	 
PS2	Picnic shelters with twin BBQs	Steel	Silver grey	2 (north)	App 3 Table 3.1 Lot 4, 4A and 4B (d) App 3 Table 3.1 Lot 5 (c)	As per Council's specification	Skillion roof shelters with shade screen to match existing. All steel posts in powder-coated finish and fixtures to have anti-vandal fixings and brackets in stainless steel for corrosive environment	

Item Code	Element	Material	Colour/finish	Quantity	SWTC	Specification	Description	Image	
PS3	Picnic tables			2 (north)		As per Council's specification			
Public amenities									
-	Contemplation area			1 (north)	App 3 Table 3.1 Part of Lot 6 (d)	As per Council's specification			
-	Drinking fountain	316 Marine grade stainless steel	Polished	1 (north) 1 (south)		Street Furniture Australia 770x450x1125 or Council's equivalent	A sculptural form with integrated dog bowls		
-	Playground	Timber/metal	Mixed	1 (north)	App 3 Table 3.1 Lot 5 (c)		Provision for a collection of playful elements such as swing set, ladders etc. (Note: playground by others)		
-	Platforms	Timber Split face Moruya granite blocks	Natural	1 (north) 1 (south)	App 3 Table 3.1 Lot 30 (b)		Timber deck with Moruya granite courses		

Item Code	Element	Material	Colour/finish	Quantity	SWTC	Specification	Description	Image	
-	Toilet block	Precast concrete with steel framing	Natural	1 (north) 1 (south)	App 3 Table 3.1 7007/DP1017293 (e)		Concrete structure with steel frame and with lightweight skillion roof, as pavilions in the landscape		
Paving									
PV1	Bridge	Ashphalt	Natural	NA			Shared path to have ashphalt		
PV2	Cultural walk	Stone/ concrete	Natural	NA			Informal path with concrete blocks in the landscape with potential for metal infill		
PV3	Promenade	Brick/granite	Natural	NA	App 3 Table 3.1 Lot 30 (e) (f)	As per Council specification	Formal brick paving along southern promenade with granite edging, and extension of the existing southern promenade paving finish		
PV4	Market area	Concrete/ ashphalt	Natural	NA			Ashphalt with mixture of concrete mosaic infills, as an extension of the souther promenade grid.		
Fencing									
-	Bridge shared path	Marine grade stainless steel	Powder-coated	NA			1400mm high quality finish bespoke fence on bridge shared path and approaches. Stainless handrails and galvanised powder-coated balustrades		

Item Code	Element	Material	Colour/finish	Quantity	SWTC	Specification	Description	Image	
	Pedestrian	Steel	Powder-coated	NA			1400mm high quality powder-coated tubular fencing located in medians and roadway edges		
	Security	Chainlink	Powder-coated				2000mm nominal high security fence with high quality fusion bonded chainwire mesh, used in areas of low visibility		
Retaining wall									
-	South	Class 2 concrete	Natural off-form colour and anti-graffiti treatment	NA		Reckli Ripple J and Thames	Articulated horizontal pattern		
-	North	Class 2 concrete	Natural off-form colour	NA		Reckli Ripple J	Articulated vertical pattern - Natural concrete texture		

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9.0 Conclusion

This report presents an integrated urban and landscape design, developed through an iterative process, working closely with various design disciplines and Roads and Maritime. The urban design responds to the objectives, principles and strategies developed for the project.

This document demonstrates that the following objectives are achieved:

- Provide an elegant design for the bridge that enhances the user experience and is integrated with other project elements, to fit sensitively into its natural setting and makes reference to the identity of the existing bridge to become a new icon and legacy for Batemans Bay
- Provide opportunities to reflect the heritage values of the community including the evolving narrative of the river crossing from a punt, to the lift span bridge, to the new raised span bridge
- Provide opportunities for the development of the foreshores, including the provision of additional parking, increased amenities and recreational zones
- Reinforce connectivity between communities on either side of the bridge
- Highlight opportunities for foreshore improvements, in close consultation with key stakeholders and the community, to be undertaken as future works.

The project provides a new layer to the narrative of crossing the Clyde River by making references to the old while allowing motorists, pedestrians and the public to participate in the creation of new memories at the centre of their community. The elegant sculptural form of the bridge will provide a positive experience for both drivers and the community by opening up new visual experiences while respecting heritage values of the community and the local landscape character. The project reinforces the identity of Batemans Bay in the creation of this new icon as a legacy for the community.

The project will reinforce the identity of Batemans Bay in the creation of this new icon as a legacy for the community.



Figure 9-1: View of new Batemans Bay Bridge from Holmes Lookout, Clyde River National Park

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