JOSH BYRNE & ASSOCIATES

SHIRE OF IRWIN
DONGARA PORT DENISON
A BRILLIANT BLEND

IRWIN RIVER WALKING TRAIL AMENITY UPGRADES

MASTERPLAN

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This document may only be used for the purpose for which it was commissioned in accordance with the Terms of Engagement.

01 INTRODUCTION

The Irwin River Walking Trail Amenity Upgrades will enhance community wellbeing and highlight the unique qualities of Dongara/Port Denison. The Irwin River is an important natural asset for the twin towns.

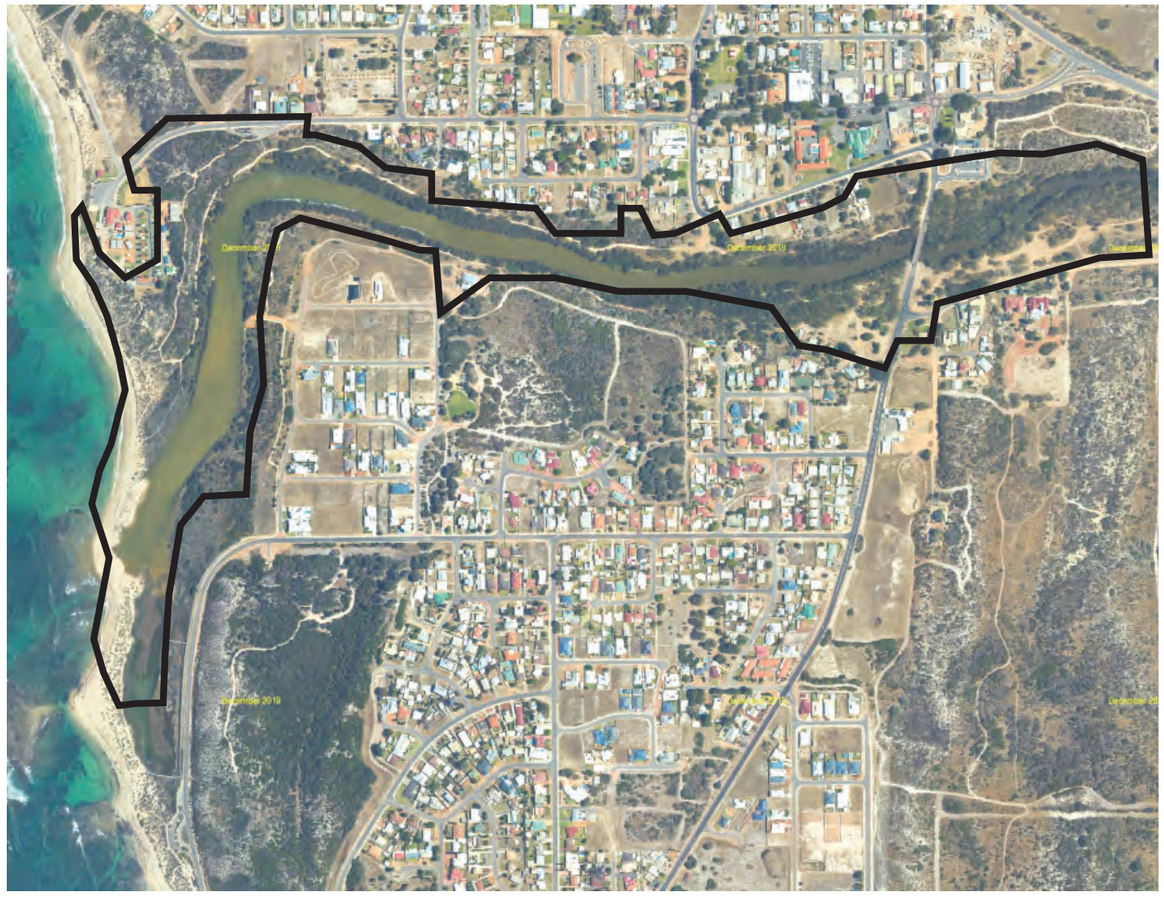
This document summarises JBA's masterplan design for the Irwin River Walking Trail Amenity Upgrades project. The masterplan is a strategic document that sets out principles for development and a vision for the amenity upgrades. Focus areas can then be selected for development by the Shire based on priority and funding. The masterplan covers the existing Irwin River Walking Trails from the traffic bridge to the lagoon and includes proposed new trails to the east of the traffic bridge. The Irwin River flows from east to its termination at the west coast. It divides the twin towns of Dongara and Port Denison.

The masterplan is informed by an opportunities and constraints analysis, site visits, community consultation, and key stakeholder engagement. These methods were used collectively to develop a strategy that responds to the unique character of Dongara/Port Denison and the needs of it's community. The key aim of the Dongara/Port Denison River Trails project is to enhance the existing Irwin River Walking Trails to better meet the needs of the community and attract visitors. Key objectives drawn from the brief include:

- To contribute to Dongara's 'sense of place'
- Improve access to trails and links to key points of interest
- Increase connection between river and town
- Improve recreation opportunities and connection to nature for all user groups
- Become regionally significant
- Engage with community during development
- Enhance the natural environment (including native revegetation and weed management)
- Incorporate bushfire management into the vegetation strategy
- Improve the condition of existing cultural heritage and its interpretation
- Opportunities for gathering and events
- Activation to increase safety and interest
- Preserve the 'natural', low-key character

The masterplan document provides a summary of key background documents and community feedback. Site analysis covers landscape, environment, culture/heritage, movement/ activation, and community. A series of masterplan principles have been developed from the background review, community feedback and site analysis. These principles create a framework for the masterplan.

The masterplan has been divided into a number of precincts of different characters, Central, East, Old Port Road, Lagoon and Lookout and Dunes. The trails move through level foreshore areas close to town, wetland boardwalks, and steep dune paths. The design strategies aim to reflect and enhance existing characteristics and connections of the different precincts. The report outlines an overall approach to planting, weed management, materials, drainage and trail surface, and fire management.



Aerial and Project Area NTS

02 BACKGROUND

Relevant background information included here are summaries of key policy documents relating to the study area, previous studies of the project site, and the public consultation undertaken for the schematic masterplan.

DESKTOP REVIEW OF KEY DOCUMENTS

The desktop review included the review of a number of key documents. These include:

- Shire of Irwin Strategic Community Plan 2017-2027
- Mid West Tourism Development Strategy 2014
- Shire of Irwin Tourism Development Plan 2013-2018
- Irwin Estuary Weed Management Plan (NACC, 2013)
- Irwin River Estuary Management Plan (Land Insights 2014)
- Green Infrastructure Strategy 2015-2020
- Access and Inclusion Plan 2012-2017

Key objectives from these reports have been incorporated into the masterplan. Relevant points have been summarised below:

- Need to support the aging population including accessibility
- Improving the natural environment including weed management, coastal protection and erosion, habitat preservation
- Recognise places of cultural heritage value
- Become RV friendly town (growing market), which has potential to increase visitation
- Marketing of distinctive, 'iconic' activities
- Increase Aboriginal/cultural tourism experiences
- Improve wayfinding, signage, smart devices, google maps, visitor amenities
- Increase nature-based activities/adventure, mountain biking, kayaking, riding, walking trails, fishing.
- More activities for children
- Develop river tourism kayak hire, tours etc)
- Need to reduce targeted weed species and revegetate
- Improve habitat by controlling access, minimising disturbance
- Control stormwater run-off
- The River is vulnerable to flooding, minimise infrastructure investment in low lying areas
- Develop sensitively designed carparks, facilities
- Upgrade recreational nodes including Church St lookout, Waldeck St carpark, Bridge picnic area, Denison House
- Highlight heritage and promote community involvement
- Improve image, sense of place
- Engage community and provide volunteering opportunities

PUBLIC CONSULTATION

Community consultation was undertaken by JBA at the Shire's consultation event on 4 March 2021 to gather responses to JBA's Schematic Plan for the River Trails. Feedback has been incorporated into the masterplan. Key points include:

- Don't want big changes to the trails themselves and maintain the natural character
- The existing kayak launch is used and there is support for locations indicated (Waldeck Street and Denison House and site of existing)
- Pedestrian bridge proposal supported but concern over location. Preference for Waldeck Street location.
- Trails are well used used for walking/cycling
- Weed reduction and path maintenance are priorities. Some respondents voiced an interest in volunteering to remove weeds
- Need more seating and bins
- Support for universal access at lookout, cemetery, pedestrian bridge, Waldeck street, south of bridge, Denison House, Ocean Drive, boardwalk
- Support for picnic lawns and BBQ's at area to south of bridge, Waldeck Street, Denison House
- Support for conservation area/limited access to area around Bee nests on south side of River (historic quarry), Dune areas, and to the east of the caravan park
- Nature play in picnic area south of bridge and Waldeck Street



03 ANALYSIS



River in 1985 from Church Street Image: IDHS



River Trail 2020 Img: JBA



Dunes 2020 Img: JBA

LANDSCAPE

Vegetation

The estuary was used as grazing area by the townspeople after European settlement. Native revegetation was undertaken in the estuary in the early 1970s and in the mid 2010's. NACC has mapped the vegetation and weed coverage extensively. The southern part of the site is in excellent condition, but central areas are degraded and weed species proliferate.

Geology and Soils

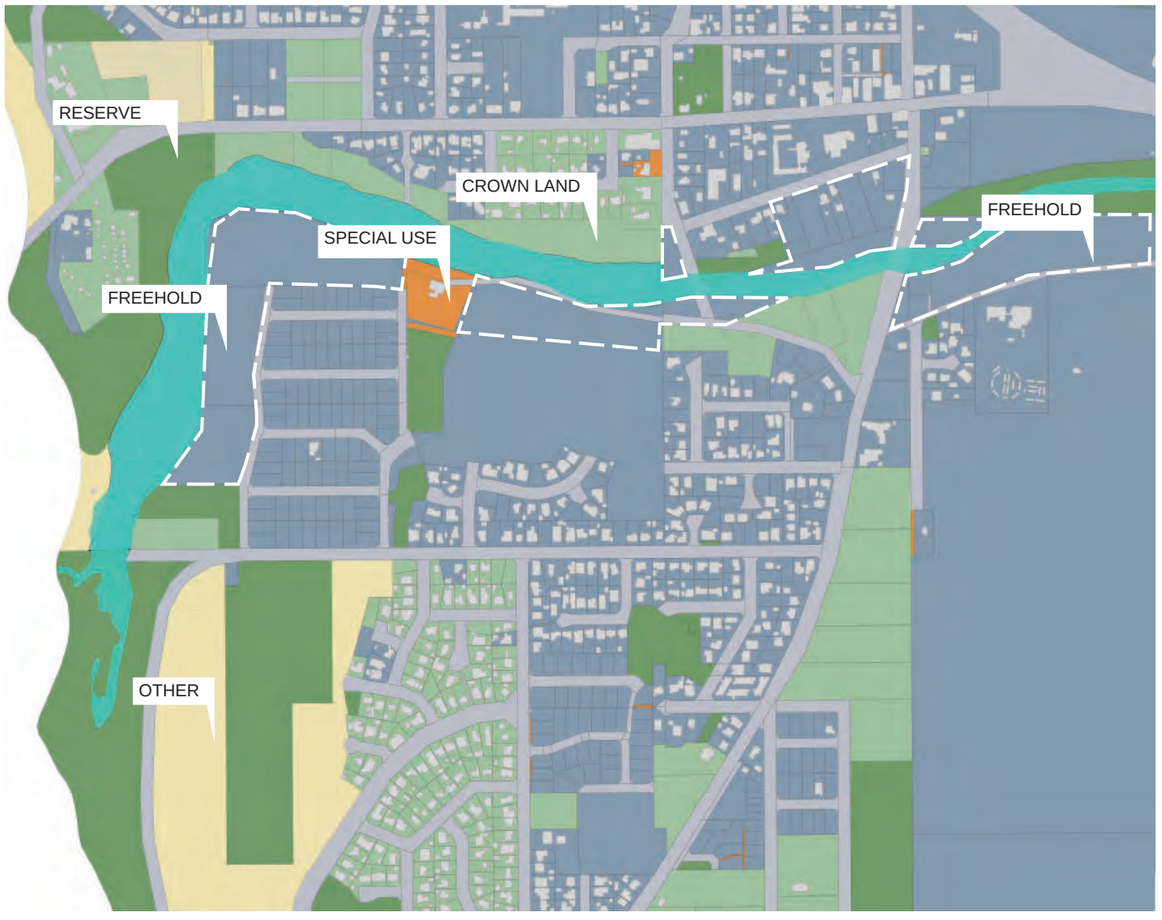
The site is at a junction of different soil systems including Quindalup Central (to south and north west coastal) is a coastal dune system; Tamala South System (to north) is low hills and limestone outcrops; Greenough Alluvium System (round River and to north) is alluvial plains on flood plains of red sandy, loamy earth, and clay. Sandy soils create fertility and water retention issues and the alluvial are prone to waterlogging. There are Acid Sulfate Soil risk areas in the low lying river valley.

Topography and Landscape Features

The landscape qualities come from the river character - riparian vegetation, river valley topography and adjacent limestone cliffs. The highest ground is at the Church Street lookout, and the land falls away to the east and the river valley. The levels climb out of the river valley to the south, and one of the highest points on the southern trail is at Denison House. The undulating topography creates opportunities for long distance vistas, and wide view scapes. The River runs east-west until the Church Street lookout where it turns sharply south to a wetland area at the rivermouth with a sandbar that separates the River from the ocean in summer. There is limited connection to the River from Dongara town centre.

Land Use

Areas within the study area are largely designated Reserve or Crown Land. The lot containing Denison House is zoned special use (permitted uses include Local Authority and Community Use). Problematic areas are indicated on the diagram right (white dashed boundaries) where the river trails are within Freehold land that extends to the waterline. This will limit potential to expand trails to the east and retain control over trails to the southern shore. This study supports recommendations in the 2014 Irwin River Estuary Management Plan to retain management of reserves in the project area. The central areas are mixed use urban, areas to the south and north are residential, and the eastern areas are reserve or caravan park.



Tenure Mapping Scale 1:10000

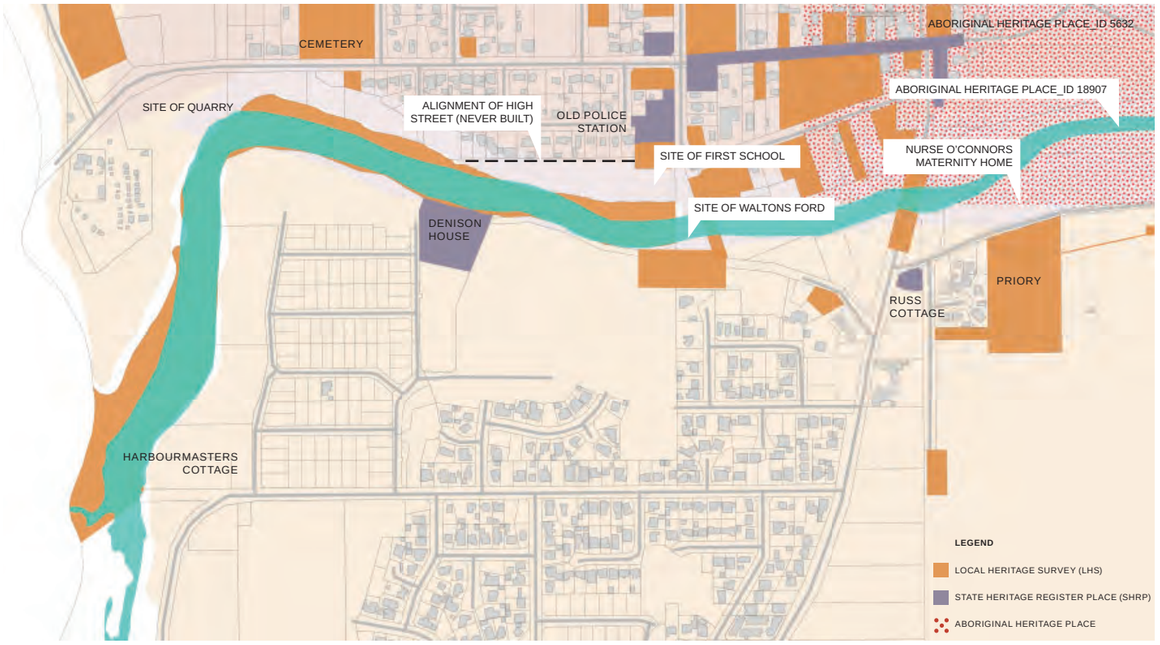
ANALYSIS



Road adjacent to River at ridge Img; JBA



River below Denison House (1986) Image: IDHS



Heritage Mapping Scale 1:1000

ENVIRONMENT

Water

The river trails are within a flood risk area. There have been a number of major floods that destroyed heritage properties along the estuary. The areas adjacent to the bridge are particularly vulnerable to inundation. Development should anticipate flood events and minimise infrastructure within these areas. The river has changed considerably. The 1986 photo shows a narrower River column and the lagoon was often dry in the summer. The widening of the River is eroding and undermining tree roots in especially south of the bridge. The water catchment includes private gardens and road run-off that flows unfiltered to the river, which can impact water quality (cyanobacterial bloom observed). The path is eroded due to overland drainage flow including (lookout and east of Waldeck St).

Climate

Dongara/Port Denison's climate is characterised by hot, dry summers, cool winters, low rainfall, and strong southerly wind. There is vegetative cover to the northern shore at the trail level, and to the southern shore between the bridge and Denison House. The south western trails, dune areas, and lagoon are more exposed and hot in summer. There are gaps in the street trees in roads that connect to trail heads. Heat and discomfort would discourage trail use in summer.

Bushfire

The entire project area is within a bushfire risk area. Proliferation of weed species increases fire risk as does unbroken dense vegetation.

Infrastructure

Water Corporation and Western power assets are not located along the river trails, but on Retreat Blvd and Clarkson St/Port Leander Drive and the termination of Waldeck Street, and Church Street. Connection to water for drinking fountains/WC's and connection for electricity for lighting is easiest in these locations. There are no public toilets in close proximity to trails. The condition of the existing boardwalks is poor, and some areas of existing trails are badly worn, creating an uneven surface and making access difficult for those less able bodied.

HERITAGE/CULTURE

Identity/Character

The Irwin River Trails showcase Dongara's natural, historical, and cultural features, but interpretive signage is currently lacking.

Indigenous Heritage

The Irwin River is of mythological significance to the Wattandee tribe. The freshwater and saltwater snake travelled through the estuary of Irwin Eerinoo/Wandha River. The Wattandee tribe are Ow'Wa Thardoo (Salt water) and Ow'Wa Go'aloo (Fresh water) people. There is limited signage and interpretation of indigenous history and culture. The Shire's recent engagement with the Wattandee community will enable the incorporation of Wattandee history.

Heritage Properties

The site history include connection to Lieutenant George Grey's naming of the "Irwin River", Convict labour, pastoral land development, and an active port. Heritage buildings on the Local Heritage Survey (LHS) or the State Heritage Register Place (SHRP) front the river trails or are in close proximity. These include Irwin District Museum (SHRP) built in 1870 and formerly the police station, the site of the first school c.1870-1902, the site of Walton's Ford. On the southern shore is Denison House c.1890s (SHRP) and the Old Mill (1862). The mill was sold to Dr Bartlett in 1897 who used the stone from the mill to build a residence. His wife built the terraced gardens. The property was purchased by the Benedictine Community in 1944. The quarry east of Denison House was used in the 1860s to provide stone to buildings in the town.

The Waldeck Street riverside is the site of the first school and Waltons Ford (stone river crossing) and are likely to have archeological potential. The southern trail follows the Old Port Road to the Mill, Quarry, Harbourmasters and old port. To the east are Russ Cottage c.1869 (SHRP) and the Priory (1881). The Priory was built as the Dongara Hotel in 1881, but purchased by Dominican Sisters in 1902. These sites offer cultural experiences for trail users, however, there is limited signage and interpretation of historic buildings from the trails. The Irwin District Museum has an existing historic trail, and a wealth of information that could be disseminated.

ANALYSIS



Arrival to trail head south of bridge



Waldeck Street Parking Area



Access north of bridge



Trail below Church St lookout - Trails are well used



Southern shore boardwalk through She-oaks

MOVEMENT/ACTIVATION

Connections

There is limited opportunity for visual connection to the trails given the topography. There is a lack of signage to direct to River Trails, despite the proximity to existing attractions on Dongara main street. There is a lack of visibility of trail heads, and limited ‘sense of arrival’ (see above).

Access

Access for bikes, kayaks, pushchairs and elderly was identified as a key concern by the community. Achieving universal access to all trail areas will be challenging given the undulating topography. River access to non-motorised craft is currently limited/informal.

Activation

The existing trails are regularly used during the day by locals. Lack of amenities was a key concern of the community. It limits potential for events, picnics, community use and reduces trail user comfort. There is currently no lighting and very few properties front onto the trails. Denison House is the only public community use building on the trails but is underutilised.

Parking/Transport

Informal parking at the end of Waldeck Street and south of Bridge are well used. There is no formal parking or road signage indicating trail heads or parking areas. RV and caravan parking is lacking which creates parking issues in residential streets or visitors to bypass Dongara.

COMMUNITY

Recreation

The trails are currently used for walking, fishing and bird watching. They are well used by locals, but access has been raised as an issue and lack of amenities. Recreation for visitors is limited by lack of knowledge of trails and lack of signage.

Nature Connection

The trails move through a number of different habitat types and the area is known for its wildflowers and birdlife. Nature connection needs to be balanced with controlling access to some areas to reduce disturbance to flora and fauna. It is a popular dog-walking trail, and dogs can harm native fauna. The community appreciate the natural state of the river trails, so this natural feel needs to be predominantly retained but with improved amenities and access (2014 Irwin River Estuary Management Plan Survey).

Safety

There is little passive surveillance of the trails as very few properties front onto the river trails. This has an impact on safety and activation.

Collaboration

The community consultation session suggested the community are interested in the improvements to the trail, and a number suggested they would be happy to volunteer for the ongoing maintenance, weed management, etc of the Trails.

04 DESIGN PRINCIPLES



ENHANCE LANDSCAPE QUALITIES

- Clear weeds, revegetate with local native species to enhance ecology, views and bushfire management
- Ethnobotanic interpretative signage
- Celebrate landscape values by enhancing key long distance vistas to the river, and views to the river from the trail
- Create continuous River Reserve
- Restrict access to some areas to enhance habitat
- New paths in disturbed areas only
- Create a co-ordinated and consistent signage strategy for directional, interpretive, information signs and locate sensitively
- Collaboration to maximise impact (NACC, MEEDAC)
- Consider value of weed species in relation to cultural heritage



RESPONSIVE DESIGN

- Enhance trail user comfort with amenities and shade where needed to mitigate heat
- Mitigate flood risk to low lying areas especially to south of bridge
- Filter road run-off using stormwater capture and treatment prior to entering the River
- Adopt stabilisation and embankment control where necessary
- Manage surface water drainage
- Mitigate bushfire risk through weed clearance, fire breaks
- Create sustainable, robust infrastructure



CELEBRATE HERITAGE/CULTURE

- Reinforce Dongara/Port Denison's distinctive sense of place by enhancing physical and visual connections to existing natural, cultural and built features
- Enhance signage, interpretation and public art opportunities
- Engage with Indigenous knowledge holders and strengthen Indigenous cultural interpretation
- Enhance heritage properties
- Focus amenities and interpretation in areas with strong links to existing heritage features
- Reconsider uses for underutilised historic buildings
- Explore and uncover archaeology of lost heritage features ('old school', harbourmasters cottage) to create additional historic destinations



CONNECTED AND ACTIVATED

- Enhance connections from existing features through new pedestrian crossings, signage/interpretation, shade, seating, nature play, wayfinding app, trail head visibility
- Create universal access at key access points
- Create continuous active streetscapes, lighting, and change of building use between existing visitor attractions and the river trails
- Provide well signed car and bike parking at trail heads
- Continue to consider potential for Pedestrian bridge to link towns across River
- Enhance the destinations along the River
- Create more adventure-based recreation activities to broaden user groups
- Activate public use buildings at night with events and co-location



DESIGNED WITH THE COMMUNITY

- Trails that cater for multiple user types - walking, cycling, prams
- Appropriate entry points
- Keep 'natural feel' to most of the trails
- Incorporate amenities requested by the community (kayak launch, water fountains, parking, BBQ's, playground, toilets)
- Enhance connection to river and trails through pedestrian links, vistas, thematic connections
- Collaborate with community groups/ create a taskforce to improve trails
- Collaborate with the community to develop a site-wide strategy for naming trails, amenity areas and reserves in a coordinated manner
- Consider lighting, sightlines, night-time activation to enhance community safety. (Lighting for amenity must be balanced with impact on ecology and light pollution)

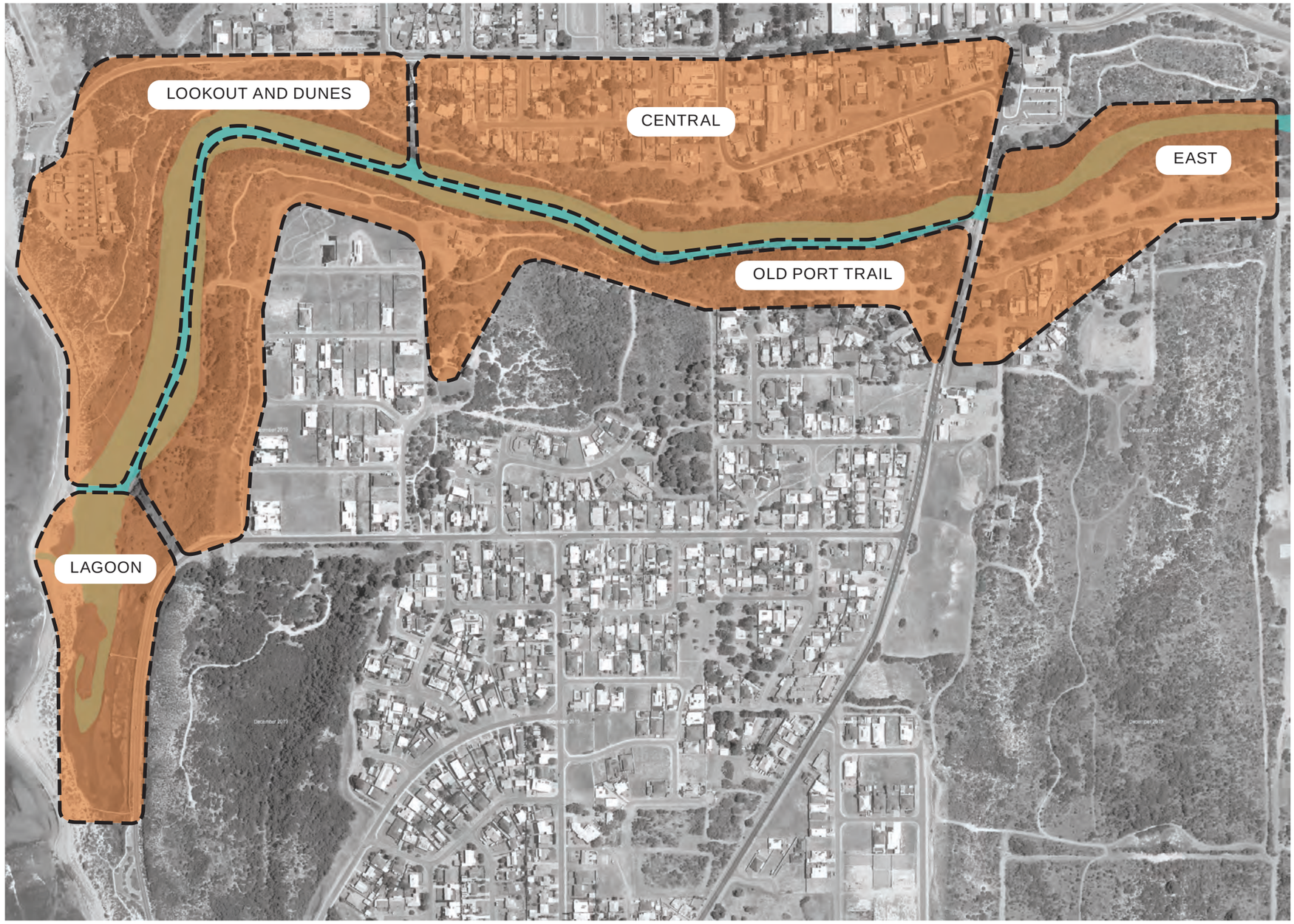
05 MASTERPLAN

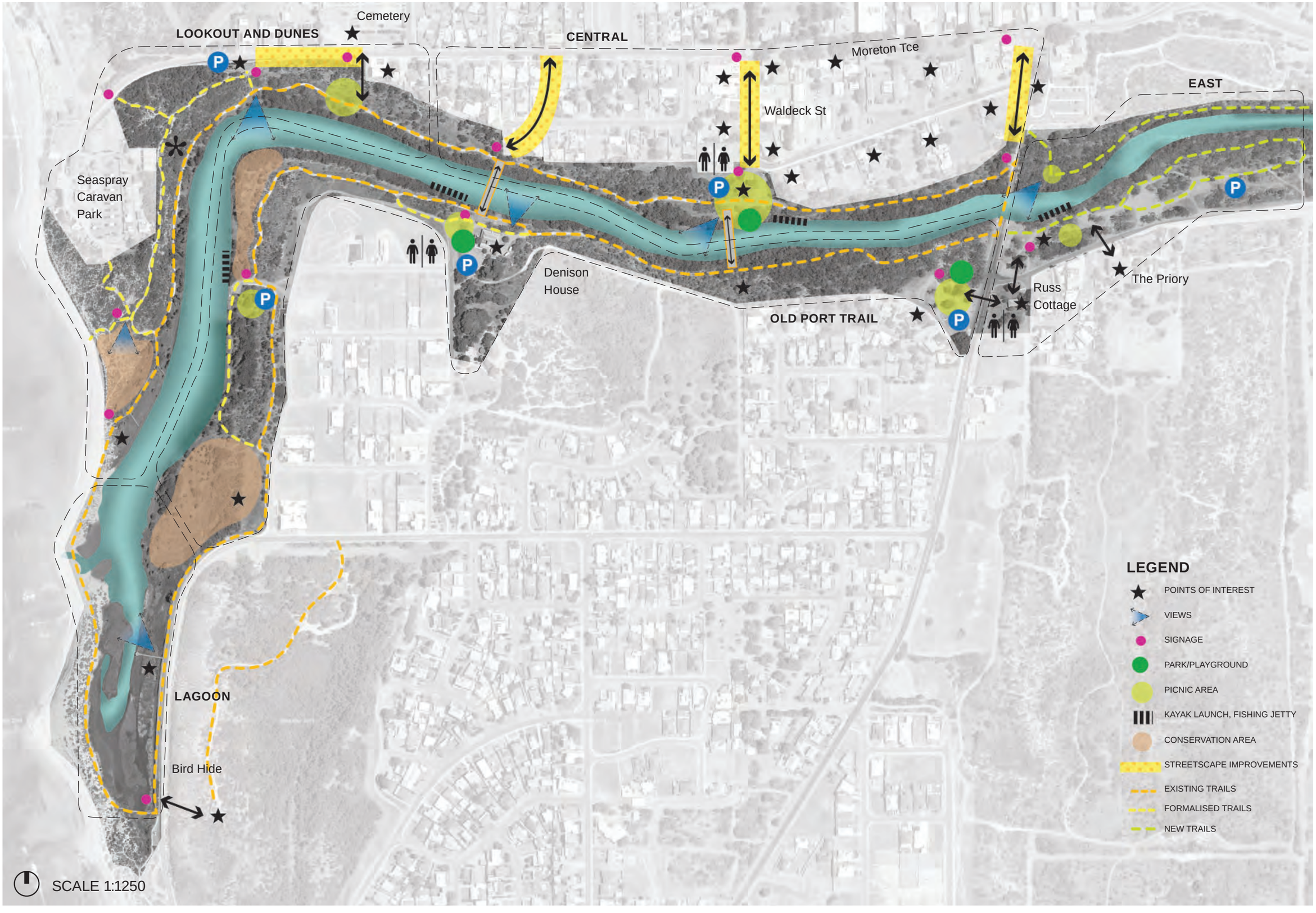
The masterplan has been developed in response to desktop review, site analysis, public and stakeholder consultation. The masterplan has been divided into a number of precincts of different characters:

- Central: Town Centre location with civic and historic elements. Key trail head entrance at Waldeck Street
- East: Disturbed areas of lower conservation value that could be developed into adventure zone with ample areas for parking and high visibility
- Old Port Trail: The route of the ‘old port’ road includes key historic elements in a natural setting. Key trail head entrances with high visibility at the bridge.
- Lagoon: Natural wetland area of high conservation value
- Lookout and Dunes: Natural coastal walk with sweeping views and destination lookout

Design strategies have then been identified for each of the precincts. The design strategies aim to reflect and enhance the different characteristics of the precincts and respond to the opportunities and constraints identified in the analysis.

The naming of the precincts themselves and spaces within the precincts could become a community engagement exercise and potential to incoporate Wattandee cultural references.




LOOKOUT AND DUNES
Cemetery
CENTRAL
Moreton Tce
Waldeck St
EAST
Seaspray
Caravan
Park
Denison
House
OLD PORT TRAIL
Russ
Cottage
The Priory
LAGOON
Bird Hide
SCALE 1:1250
LEGEND
POINTS OF INTEREST
VIEWS
SIGNAGE
PARK/PLAYGROUND
PICNIC AREA
KAYAK LAUNCH, FISHING JETTY
CONSERVATION AREA
STREETSCAPE IMPROVEMENTS
EXISTING TRAILS
FORMALISED TRAILS
NEW TRAILS

06 CENTRAL (CIVIC)



Site Photo looking up to Hunt Rd



Site Photo looking from Hunt Road to River

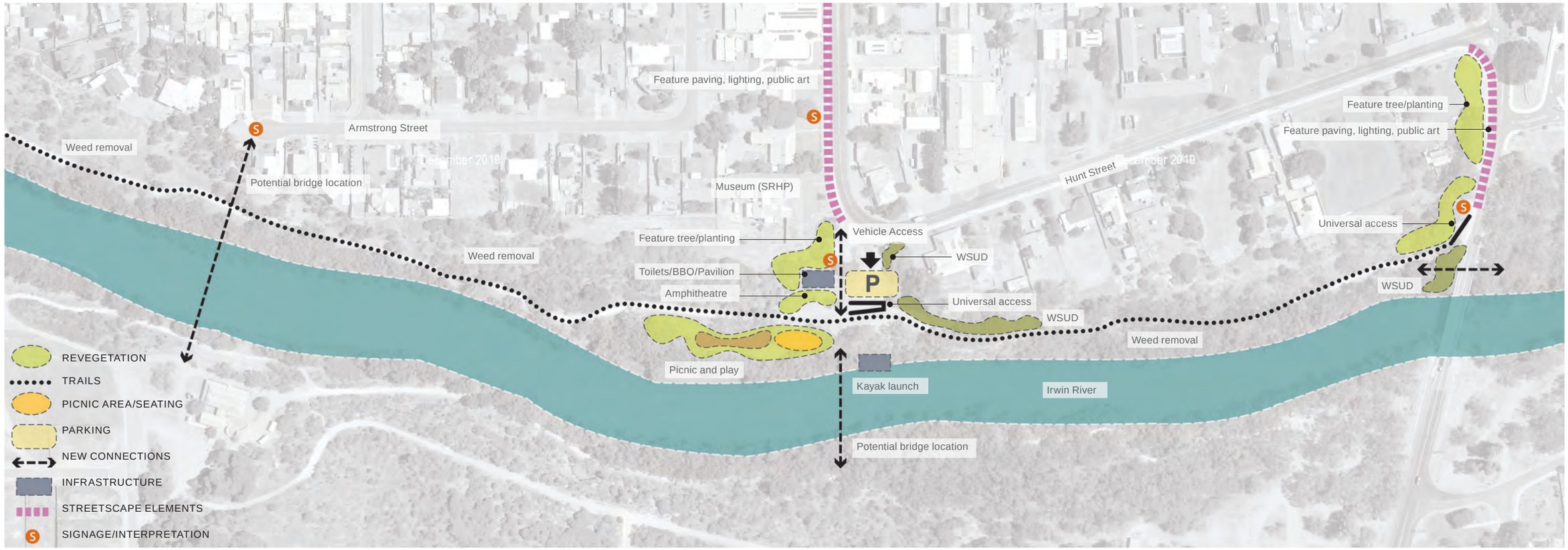
The Central Zone is one of the key access points to the River and is the main interface between Town and River. It has strong connections with heritage buildings on Waldeck Street and potential archeology of the Old School. It is near the Museum and Visitors Centre and the civic character of the area anticipates a higher degree of intervention/amenity. Key considerations include:

- Limited visual cues to River from Town Centre
- Limited sense of arrival at Waldeck Street trail head
- Little or no trail amenities
- Access does not meet universal access requirements
- Proximity to town is undermined by weak connectivity of footpaths, signage, activation

The design aims to develop the potential of the River as a civic space with gathering areas and amenities. Design strategies include:

- Use signage, interpretation, planting, new pedestrian crossings, and wayfinding apps to draw people down Waldeck Street to the River Trails.
- Use planting, signage, and amenities to create a visible trail head and public open space linked to civic functions on Waldeck Street. An architecturally significant shade structure and jetty would become visual cues to the river and civic space
- Place new amenities and infrastructure (toilets, BBQ's, shade structure) on higher ground to reduce flood risk. There are also services in close proximity.
- Topography could be used to create a terraced amphitheatre for events
- Provide well-signed car and bike parking at Waldeck Street trail head
- Create a low-key nature play area
- Consider how Wattandee names or significant animals could be used in the nature play area. These could include the water snake, willy wagtail, the mopoke/curlew
- Explore potential for a jetty structure for fishing and kayak launch with shade and seating
- Consider a pedestrian crossing to allow safe movement across Point Leander Drive or enable access under the bridge.
- Further explore potential for pedestrian bridge at suggested locations to increase pedestrian/cyclist connection between the twin towns and create new landmark. Further feasibility studies are required and more detailed public consultation following negative feedback about Armstrong St site.
- Use signage, planting, public art to increase visibility of Point Leander Drive access point. Riparian vegetation can be visual cues to the River
- Maintain Waldeck street trail head as Bushfire clearing
- Manage surface water drainage in areas where the trail is being eroded, and filter road run-off before it enters the River using WSUD.
- Explore potential for new landscape features that interprets the Old School site (see precedents opposite). Recommend archaeological assessment of Old School
- Incorporate interpretive signage of the Old School, Waltons Ford (the first river crossing), and Denison House (on opposite bank)
- Provide universal access and continuous sealed footpath at Waldeck Street trail head
- Create continuous active streetscapes, lighting, planting, feature paving between Moreton Terrace and the River Trails
- Consider change of use/tenure of buildings adjacent to river trails to promote activation
- Enhance views by weed removal and selective vegetation removal (non significant planting including of *Acacia*) to open up view corridor from Waldeck Street
- Consider lighting to public open space to improve activation and safety in an area that would have the least ecological impact of light pollution. Consider feature lighting of mature trees and shade structures

CENTRAL MASTERPLAN



PRECEDENTS



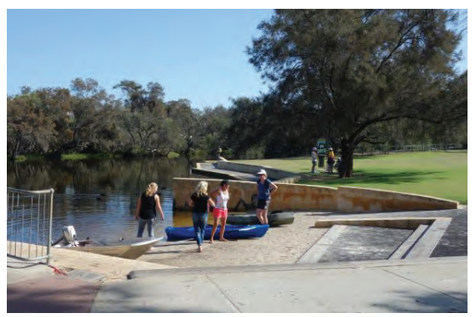
Old church foundations - AER - Image: Ivan Avdeenko



Ballast Point - Historical Interpretation Img: Christian Borchert



Dunbar Battery Rankin Fraser Image and Project



Kayak launch Kent Street Weir - Image: DPaW

07 EASTERN ZONE (ADVENTURE)



Russ Cottage



The Priory Image: Wikimedia

This eastern most extent of the River Trails is generally disturbed with weed inundation to the northern bank and heavily cleared and previously developed to the southern bank. The eastern zone is not currently included in the Irwin River Trails, and much of the area is currently freehold and would need to be transferred to reserve. Key considerations include:

- Weed infestation to north bank and limited visibility of River
- Southbank overrun by vehicle tracks
- Vegetation degraded
- Prone to flooding especially south bank
- High visibility of potential new trail at southern shore
- Increasing mountain biking market

It consists of two distinct ares:

NORTH SHORE

The aim is to enhance connection between town and river through a river trail and riverside platform. Key strategies include:

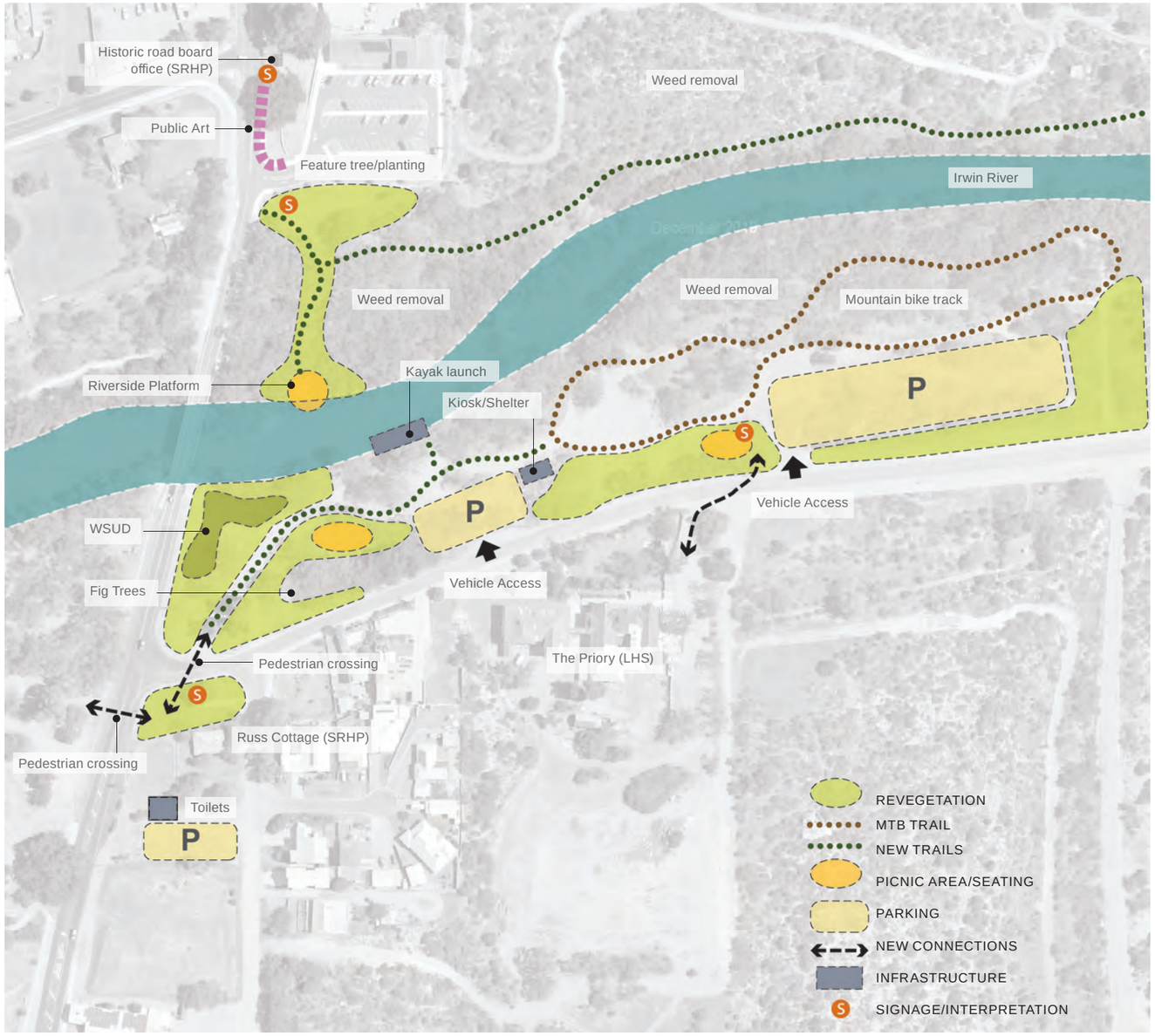
- Clear weeds and create a trail from Point Leander Drive to River.
- If tenure can be secured, create a new trail east to the BP
- Use signage, interpretation, and public art elements to draw pedestrians in the Town Centre to the River.
- The steep banks make a riverside trail challenging, but a high level riverside viewing platform may be feasible. At this higher level, it would also be less prone to flood damage
- Potential for new trail needs further investigation but would require selective clearing. The implication of this is reduced habitat and green infrastructure but improvements in bushfire risk and sightlines to the river.

SOUTHERN SHORE

The aim is to develop an adventure theme to differentiate this area and take advantage of the disturbed nature of the site to introduce an increased level of intervention. The extent of the eastern trail requires further investigation. Key strategies include:

- Explore potential for short technical mountain bike tracks catering to different levels of ability
- Provide co-located relevant activities/ amenities including bike hire, food kiosk/food trucks, kayak launch and hire
- Connect to the Priory (1881), and collaborate with the Priory to activate or provide services (bike hire, food and beverage). This would help to minimise infrastructure in the flood zone.
- Connect to Russ cottage and from Russ cottage to the west. Consider a pedestrian crossing or road marking in some manner
- Conservation of Russ Cottage and setting to retain its cultural significance, may involve preservation, restoration, reconstruction, and adaptation of the house and gardens.
- Consider co-locating a cafe and toilets at Russ cottage
- Interpretive signage for historic buildings in the vicinity and flooding history including the destruction of the Maternity Hospital and the destruction of the bridges, and the Priory
- Retain Fig trees and consider selective planting of additional fig trees to enhance the ‘place-based’ planting
- Provide well signed car and bike parking
- Revegetate with native species areas heavily disturbed by vehicles
- Incorporate WSUD landscape adjacent to road
- Selective clearing around kayak launch to improve physical and visual connection to River
- There is currently no sign of conflict between cyclists and pedestrians on the trails, but a dedicated mountain bike trail would help mitigate issues given a predicted increase in visitor numbers and provide more challenging mountain biking trails
- Low key infrastructure as this area is prone to flooding. Any infrastructure (kayak hire, shade structures, toilets) need to be robust to withstand inundation
- Adopt a low-key, ‘natural’ aesthetic with unsealed carpark and trails

EASTERN MASTERPLAN



PRECEDENTS



Wylde Mountain Bike Trail - GroupGSA Image: Simon Wood



Boodjar Bidi Youth Art Group 2021 Img: LouiseCoghill



Aston Hills - Trailscapes Images: Trailscapes



Technical elements - Trailscapes (designer and images)



Riverside Platform Img: Clariana

08 OLD PORT TRAIL (HISTORY)



Site photo near bridge looking south



Site photo near bridge looking north



Denison House

This trail follows the route of the Old Port Road, an 1850s track that connected the Mill Quarry (1850s-70s), the Mill (1859 - now Denison House), Harbourmasters Cottage (1857), and the Old Port at the Estuary. Key considerations include:

- Erosion of riverbank and undermining of mature existing trees near bridge
- Underutilisation of Denison House
- Limited signage and interpretation for (wayfinding, historic and cultural)
- Good opportunity for highly visibly trail head but currently underexploited
- Some areas in freehold would need to be transferred to reserve
- Lack of shade to west, can be hot and exposed
- Views to river limited by weeds
- Good sightlines to river at bridge and area popular as low-key play and sitting area

The trail consists of two distinct areas:

BRIDGE TO DENISON HOUSE

This area starts at the parkland near the bridge which is the most visible ‘gateway’ to trails, moves through a boardwalk Sheoak forest, past the old Quarry and rises up to Denison House. Key strategies include:

- Create community hub at Denison House as a place for volunteering/nature conservation and create a riverside friends group
- Conservation of Denison House/Smith’s Mill and setting to retain its cultural significance, may involve preservation, restoration, reconstruction, adaptation. Any work to be preceded by archaeological investigation.
- Adaptive re-use as community hub, place-based retail, food and beverage, markets, art gallery, picnic area/bbqs, playspace
- Denison House garden is a key part of its history and the conservation of this is an opportunity to include a micro botanic, bush tucker, or ethnobotanic garden of native species
- Investigate historic value of retaining invasive weed species in Denison House garden (Japanese Pepper) and Agave that indicates location of Harbourmasters cottage
- New residential development east of Denison House may activate trails but domestic fencing will need to be mitigated by planting to retain sense of ‘natural’ River Trail
- Define parking bays, create low-key nature play, seating, and signage at the trail head near the bridge. Incorporate public art piece to further increase visibility of trail head.
- Consider renaming Bridge park with a Indigenous name and low-key nature playground and indigenous themed/ collaborative public art
- Wattandee names or significant animals could be used in the nature play area. These could include the water snake, Jirjirri (willy wagtail), the Woorkunda (Mopoke/Curlew), the Kardarra (turtle), Minjinoo (Horny devil lizards), Bannajee’s (Ducks), Yalleebeeree (Emu), Jeereejeeree/Jirjiri (fly catcher willy-wagtail), Wootha (Magpie), Thogginyoo (Parrot), Woorndee (Bandicoot), Oothoo (Dingo’s) • Mimmee (Lizards), Wanderroo Thoogurnoo (Frogs), Wuralin (Small green Parrots)
- Wattandee history should be incorporated near the bridge including the story of how many of the Wattandee tribe were washed away in a flood.
- Consider embankment control especially near bridge where trees are being undermined
- Explore potential for universal access to lower trails and river. Create universal access at upper level
- Remove weed species at riverbank to improve views and replace with native vegetation for bank stabilisation
- Introduce swales and vegetation close to the roadside to filter water before it enters river
- The Irwin District Historical society suggest the community be consulted for a new name - this could be suggested for the parkland area east of the bridge
- Provide well signed parking for visitors at the trail heads, including cycle parking, caravans and RV’s.

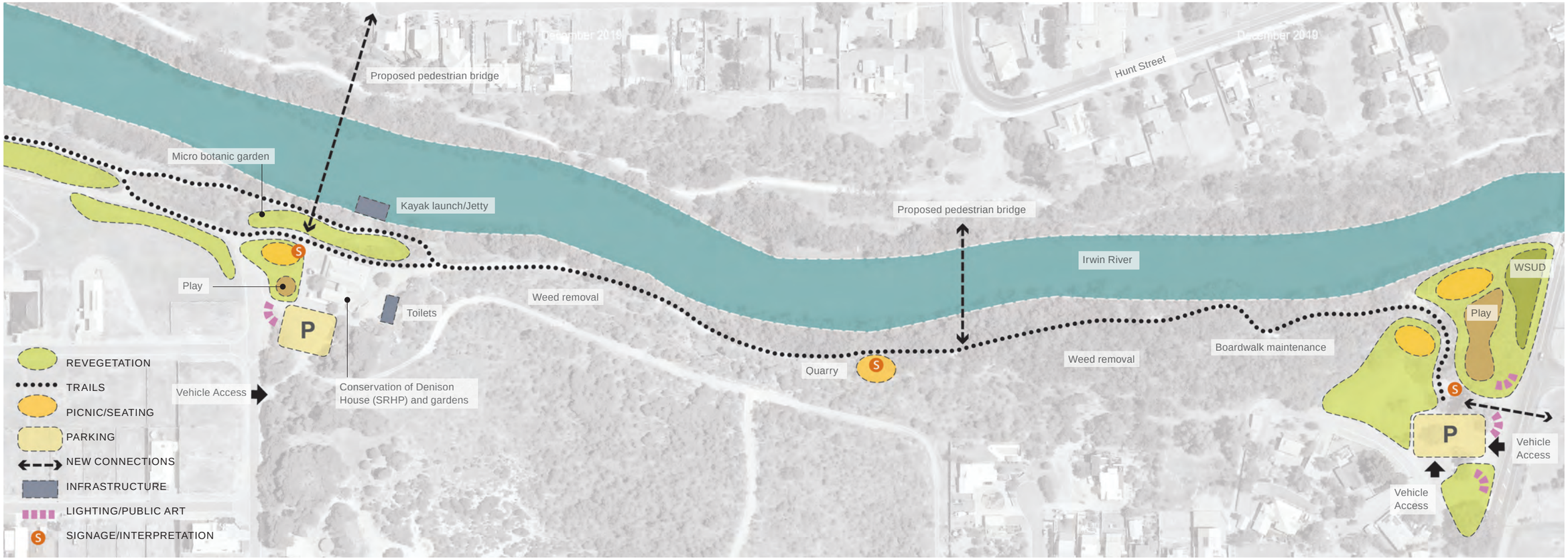


Evergreen Brickworks Image: Claude Cormier



Maramataha Bridge Image: Visit Ruapehu

OLD PORT TRAIL - BRIDGE TO DENISON HOUSE MASTERPLAN



PRECEDENTS



Grounds of Abbey Lorsch - Topotek1 Image: Hanns Joosten



Len Packham Playspace Design/Image: JBA



New Norcia Design/Image: Axiom



Commonground design & image

RIVERBEND

This is the westernmost edge of the southern shore. This trail has limited views and connection to the River but high conservation value. Key design strategies include:

- Introduce native trees at trail level to increase shade for trail user comfort
- Create nature reserves for bird and wildlife habitat. This area has also been identified in the Irwin River Estuary Management Plan Consider limiting access by fencing. Incorporate interpretive signage relating to nature conservation and ecology.
- Clearly mark trail head with directional and historic interpretation signage at existing carpark
- Formalise existing riverside trail and create a new link to a trail along Retreat Boulevard. Create a new trail ‘cutting the corner’ to Ocean Drive to enable a buffer to the residential area and enhance ‘nature’ feel.
- Investigate harbourmaster’s cottage site and provide landscape treatment, interpretive signage.
- Retain existing kayak launch, parking, and picnic area.
- Create a buffer of vegetation to the residential area to the east to enhance ‘natural’ trail feel
- Where possible, replace exotic species with native species on verges to retain ‘natural’ landscape
- Remove weeds with the potential exception of the exotic species marking the setting of the harbourmaster’s house if it is considered significant for historical conservation/historical interpretation.



Site photo walking south around the riverbend



Site photo at existing kayak ramp looking west



Site photo Retreat Boulevard

OLD PORT TRAIL - RIVERBEND MASTERPLAN



09 LAGOON (NATURE)

This trail includes the boardwalk to Ocean Drive and the dune trail at the rivermouth which is broken when winter water levels rise considerably. It is the least developed, most ‘natural’ of the trail zones with the strongest connection to the River and its ecology. It is bordered to the east by reserve and to the west by the ocean.

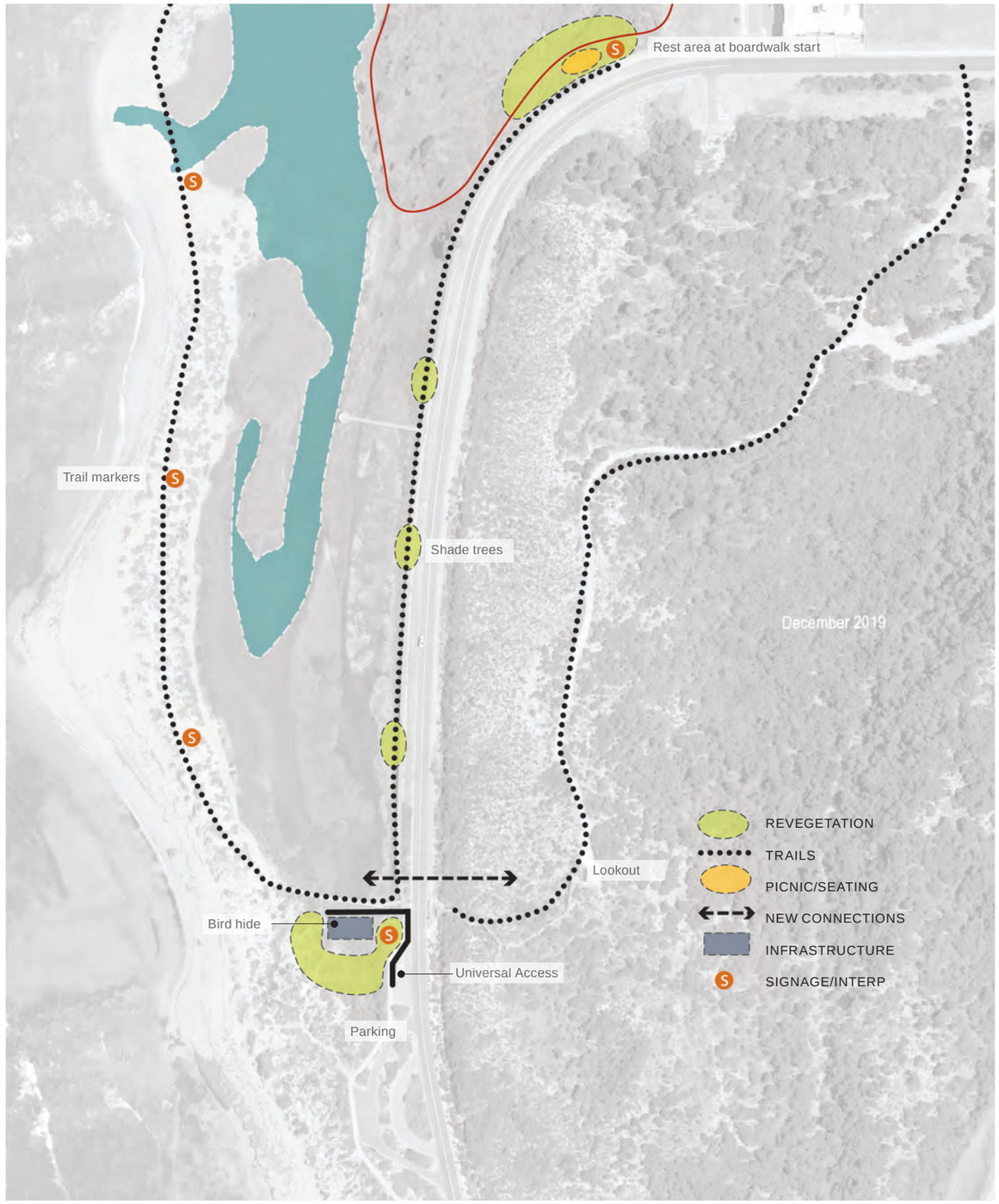
Key considerations include:

- This is a popular bird watching area
- It is a wetland lagoon environment with minimal tree cover
- The dune trail is ill defined and there are multiple routes through the dunes/samphire

Key strategies include:

- Maintain boardwalk or replace
- Create level access from carpark to viewpoint/ bird hide to south.
- Engage with Wattandee and provide interpretation and signage to explain indigenous language and cultural information.
- Wattandee bird names could be incorporated. This area of trail could be renamed or incorporate public art. The Jirjiri (willy wagtail), Walyamberree (Ibis), Wooradhoo (Swans), Ngooyambiddee (Pelicans) are some examples.
- Create bird hide as nature-focussed destination with ecological interpretation, seating and shade. Tuck into dune and buffer with vegetation to minimise impact in sensitive location
- Create single route through dunes with trail markers and signage to discourage alternative routes and protect samphire
- Create areas of shade with discrete grouping of trees or shade structures placed appropriately in this open lagoon landscape

LAGOON MASTERPLAN



PRECEDENTS



Bird Hide Ramboll Studio Dreiseitl (designer & image)



Bird Hide Agence Territories Image: Nicolas Waltefaugle



Shelter Plant Architect Image: Steven Evans

10 DUNES AND LOOKOUT (PROSPECT)



Site photo of existing lookout



Site photo of existing stair down to River Trail



Site photo of boardwalk

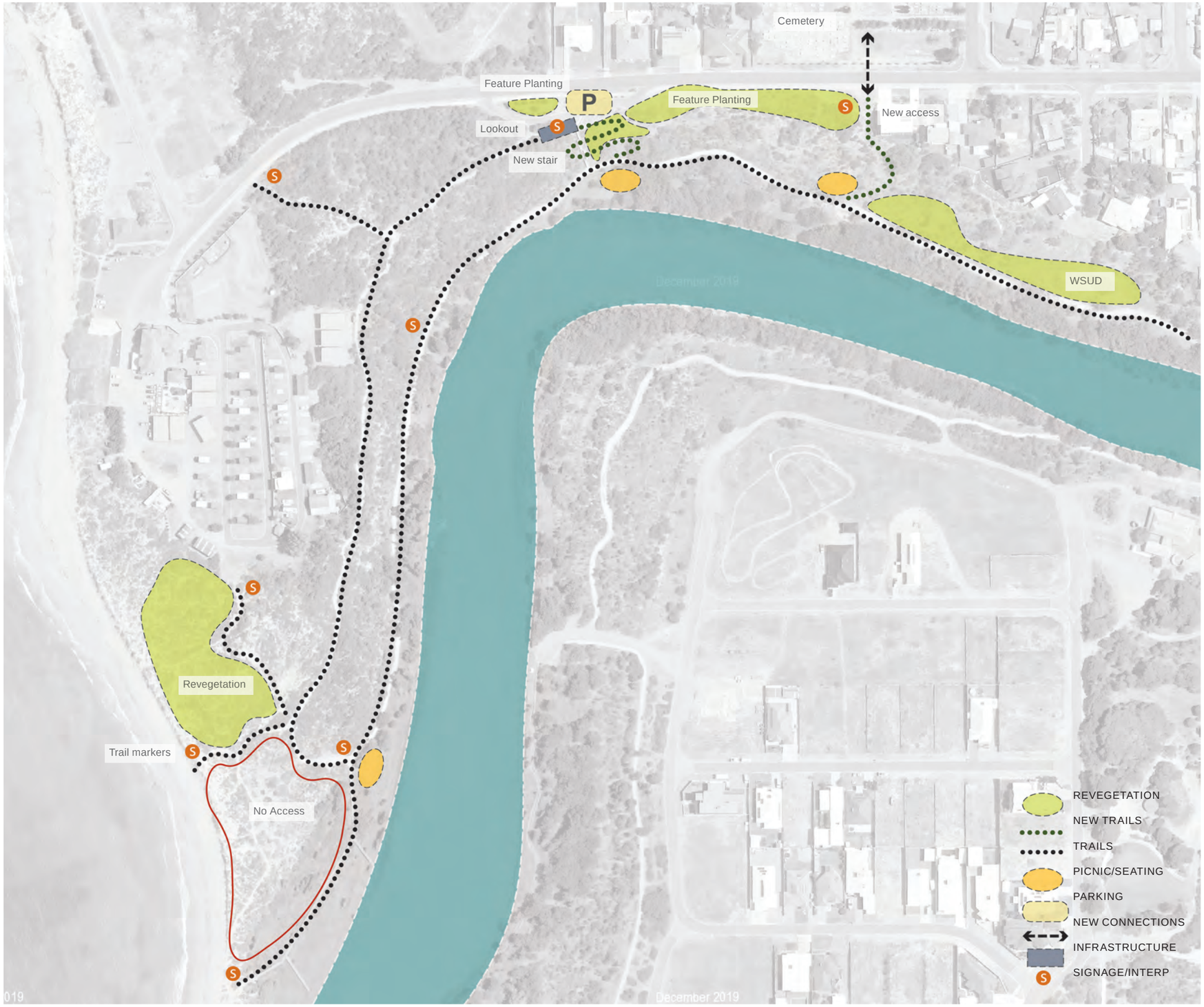
This area moves from the beach past limestone cliffs to the foot of the lookout stairs. The lower level includes boardwalks on the lagoon. At the higher level it climbs through the dunes to the clifftop and lookout. Key considerations include:

- The lookout has great views to River
- Dunes are degraded with multiple paths
- Very steep staircase from lookout to trails
- Limited amenities on trail
- It has a direct relationship with the river at the southern end and very good visual connections from dune trails and lookout
- Drainage issues on steep path from lookout
- ‘Natural’ undeveloped feel at lower trail level with native vegetation in good condition

Key design strategies include:

- Remove dilapidated bird hide, recommend not replacing in this location
- Maintain boardwalks
- Interpretive signage to Quarry, Old Port and harbourmaster’s cottage, and ecology
- Consider replacing lookout with something architecturally significant to create destination
- Replace staircase from from lookout with pathway or more gradual staircase.
- Create link to Cemetery (new trail/staircase)
- Introduce clear signage to lookout from Town Centre.
- Formalise paths through Dunes with trail markers, remove duplicate paths and revegetate.
- Limit access to dune area as shown to re-establish native vegetation and habitat
- Manage surface water drainage in areas where the trail is being eroded.
- Introduce seating areas in shady areas with river views
- Provide universal access to Lookout as a minimum
- Enhance setting of lookout with native feature planting
- Provide some discrete lighting at Lookout
- Incorporate Wattandee history, names or significant animals. Bannajee’s (Ducks), Warradha (Eagle hawks), Jeereejeeree/ Jirjiri (fly catcher willy-wagtail), Kakkainyoo (Osprey), Eerinyittee (Sparrow Hawk), Walyamberree (Ibis), Wootha (Magpie), Woorkunda (our spiritual bird the Mopoke/ Curlew)

DUNES AND LOOKOUT MASTERPLAN



PRECEDENTS



Coastal Walk - Aspect Studios designer and image



Mont Specie Lookout - Messner Achitects design/image



Quilotoa Lake Lookout - Image Lorena Darqueau

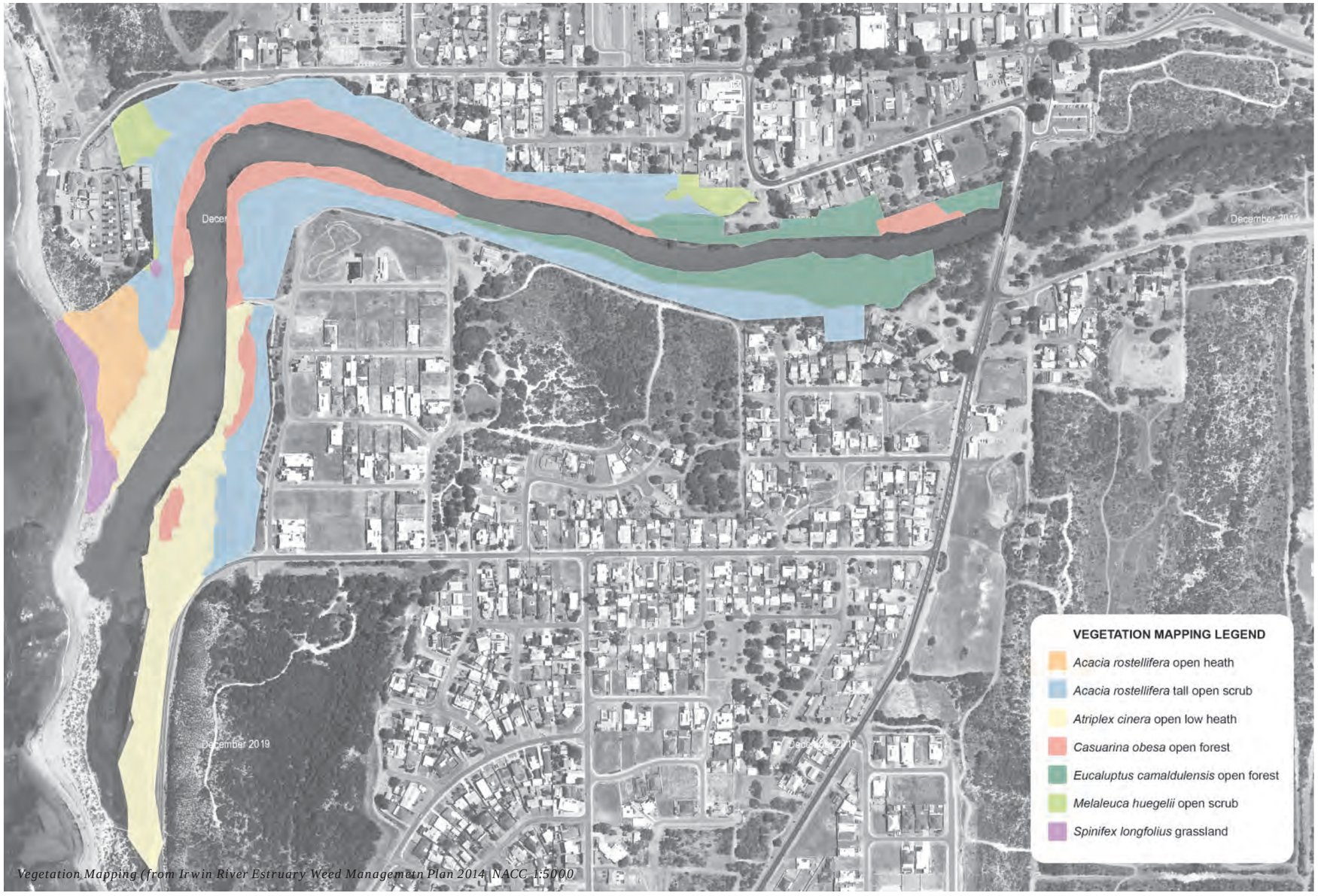
11 PLANTING PALETTE

The plant selection recommends native plants to reflect the natural setting. It is recommended that where exotic species have historical significance, for example Moreton Bay Fig and Port Jackson Fig they be preserved. The ficus species in the eastern zone should be preserved. Further study is required to understand the historical significance of the exotic planting adjacent to Denison House and near the Harbourmaster's cottage site.

The Irwin River Estuary Weed Management Plan (2013) summarised vegetation communities within the site. The areas from the bridge to the river bend were considered degraded or completely degraded. The diagram left shows where the vegetation types occur and these form the basis of the planting palette:

- *Acacia rostellifera* open heath in dunes
- *Acacia rostellifera* tall open scrub
- *Atriplex cinera* open low heath Alluvial flats
- *Casuarina obesa* open forest
- *Eucalyptus camaldulensis* open forest central River banks
- *Melaleuca huegelii* open scrub limestone cliffs
- *Spinifex longfolius* grassland western dunes

The planting strategy is to revegetate according to the appropriate vegetation community in degraded areas and new feature planting/ WSUD selected from the existing plant species. The Eastern Zone is mainly *Eucalyptus camaldulensis* and planting would be according to this vegetation community. Limited clearing of shrubs, dead wood should be considered as fire mitigation and to open up views.



Vegetation Mapping (from Irwin River Estruary Weed Managemetn Plan 2014 |NACC 1:5000

ACACIA ROSTELLIFERA OPEN HEATH

Acacia cyclops



Image Credit: katanninglandcare.org

Acacia rostellifora



Image Credit: John Baas

Acanthocarpus preissii



Image Credit: nativ.com.au

Enchylaena tomentosa



Image Credit: Arthur Chapman

Hardenbergia



Image Credit: waggaflora.com

Myoporum tetrandrum



Image Credit: M. Kealley

Olearia axillaris



Image Credit: Cottesloecoastcare.org

Rhagodia baccata



Image Credit: Cottesloecoastcare.org

Salsola australis-



Image Credit: Anne Hoggett

Spinifex longifolius -



Image Credit: Cottesloecoastcare.org

Tecticornia



Image Credit: Colin Meurk

Threlkeldia diffusa



Image Credit: scnaturesearch.com.au

SPINIFEX LONGIFOLIUS GRASSLAND

Acacia rostellifera



Image Credit: John Baas

Acanthocarpus preissii



Image Credit: nativ.com.au

Atriplex cinerea



Image Credit: plantthis.com.au

Atriplex isatidea



Image Credit: Cottesloecoastcare.org

Carpobrotus virescens



Image Credit: Lullfitz.com.au

Ficinia nodosa



Image Credit: Cottesloecoastcare.org

Nitraria billardierei



Image Credit: William Archer

Olearia axillaris



Image Credit: Cottesloecoastcare.org

Rhagodia baccata



Image Credit: Cottesloecoastcare.org

Salsola australis



Image Credit: Anne Hoggett

Santalum acuminatum



Image Credit: wtlandcare.org

Scaevola crassifolia



Image Credit: R. Clark

Senecio pinnatifolius



Image Credit: Arthur Chapman

Spinifex longifolius



Image Credit: Cottesloecoastcare.org

Threlkeldia diffusa



Image Credit: scnaturesearch.com.au

ACACIA ROSTELLIFERA TALL OPEN SCRUB

Acacia rostellifora



Image Credit: John Baas

Acanthocarpus preissii



Image Credit: nativ.com.au

Alyogyne huegelii



Image Credit: nativ.com.au

Alyxia buxifolia



Image Credit: northqueenslandplants.

Amyema miraculosa



Image Credit: northqueenslandplants.

Anthocercis intricata



Image Credit: Gary Thompson

Austrostipa elegantissima



Image Credit: Cottesloecoastcare.org

Callitris arenaria-



Image Credit: Rick Fencl

Carpobrotus virescens-



Image Credit: Lullfitz.com.au

Cassytha racemosa-



Image Credit: Cottesloecoastcare.org

Clematis linearifolia



Image Credit: northqueenslandplants.

Convolvulus remotus



Image Credit: Melissa Doherty

Dianella revoluta



Image Credit: Simontheplantman.com

Enchylaena tomentosa



Image Credit: Arthur Chapman

Exocarpos sparteus



Image Credit: William Archer

Hibbertia subvaginata-



Image Credit: Ellenbrook bushland

Lepidosperma



Image Credit: Lullfitz.com.au

Maireana brevifolia



Image Credit: Don Wood

Melaleuca cardiophylla-



Image Credit: Geoff Derrin

Melaleuca huegelii



Image Credit: Brian Freeman

Melaleuca lanceolata



Image Credit: nativeshop.com.au

Myoporum montanum



Image Credit: diversitynativeseeds.com

Myoporum tetrandrum



Image Credit: M. Kealley

Pittosporum



Image Credit: Robert Powell

Rhagodia baccata subsp.



Image Credit: Cottesloecoastcare.org

Rhagodia preissii



Image Credit: Westgrow.com.au

Salsola australis-



Image Credit: Anne Hoggett

Santalum acuminatum-



Image Credit: wtlandcare.org

Scaevola crassifolia -



Image Credit: R. Clark

Scaevola thesioides



Image Credit: Porteuspark.org.au

Spyridium globulosum



Image Credit: Cambridgecoastcare.com.

Suaeda australis



Image Credit: friendsofwilliamstown

Templetonia retusa



Image Credit nativ.com.au

Threlkeldia diffusa



Image Credit: scnaturesearch.com.au

Tricoryne elatior



Image Credit: Frasercoastplants

EUCALYPTUS CAMALDULENSIS OPEN FOREST

Acacia rostellifora



Image Credit: John Baas

Acacia saligna subsp.



Image Credit: Katanninglandcare.org.au

Alyogyne huegelii



Image Credit: Brian Freeman

Atriplex cinerea



Image Credit: plantthis.com.au

Austrostipa



Image Credit: Cottesloecoastcare.org

Casaurina obesa



Image Credit: vhd.heritage.vic.gov.au

Cyperus gymnocaulos



Image Credit: urrbraewetlandlc.org

Enchylaena tomentosa



Image Credit: Arthur Chapman

Eucalyptus Camaldulensis



Image Credit: Katanninglandcare.org.au

Maireana brevifolia-



Image Credit: Don Wood

Pimelea microcephala



Image Credit: SA Seed conservation

Tecticornia



Image Credit: Colin Meurk

Typha domingensis



Image Credit: wtlandcare.org

ATRIPLEX CINEREA OPEN LOW HEATH

Atriplex amnicola



Image Credit: State of Western Australia

Atriplex cinerea



Image Credit: plantthis.com.au

Cyperus gymnocaulos



Image Credit: urrbraewetlandlc.org

Samolus repens



Image Credit: Trees for life (SA)

Senecio pinnatifolius



Image Credit: Arthur Chapman

Sporobolus virginicus



Image Credit: Cottesloecoastcare.org

Suaeda australis



Image Credit: friendsofwilliamstown.

Tecticornia



Image Credit: Colin Meurk

MELALEUCA HUEGELII TALL OPEN SCRUB

Acanthocarpus preissii



Image Credit: nativ.com.au

Carpobrotus virescens



Image Credit: Lullfitz.com.au

Cassytha racemosa



Image Credit: Cottesloecoastcare.org

Dianella revoluta



Image Credit: Simontheplantman.com

Enchylaena tomentosa



Image Credit: Arthur Chapman

Eremophila glabra



Image Credit William Archer

Melaleuca huegelii



Image Credit: Brian Freeman

Myoporum montanum-



Image Credit: diversitynativeseeds.com

Olearia axillaris



Image Credit: Cottesloecoastcare.org

Ptilotus divaricatus



Image Credit: Timothy Hammer

Rhagodia baccata



Image Credit: Cottesloecoastcare.org

Salsola australis



Image Credit: Anne Hoggett

Santalum acuminatum



Image Credit: Anne Hoggett

Scaevola crassifolia



Image Credit: R. Clark

Tecticornia



Image Credit: Colin Meurk

Templetonia retusa



Image Credit nativ.com.au

Threlkeldia diffusa



Image Credit: scnaturesearch.com.au

CASUARINA OBESA OPEN FOREST

Alyogyne huegelii



Image Credit: Brian Freeman

Atriplex cinerea



Image Credit: plantthis.com.au

Casaurina obesa



Image Credit: vhd.heritage.vic.gov.au

Cyperus gymnocaulos



Image Credit: urrbraewetlandlc.org

Juncus kraussii



Image Credit: katanninglandcare.org.

Melaleuca rhaphiophylla



Image Credit: Lyn Alcock

Myoporum montanum-



Image Credit: diversitynativeseeds.com

Tecticornia



Image Credit: Colin Meurk

12 MATERIAL PALETTE

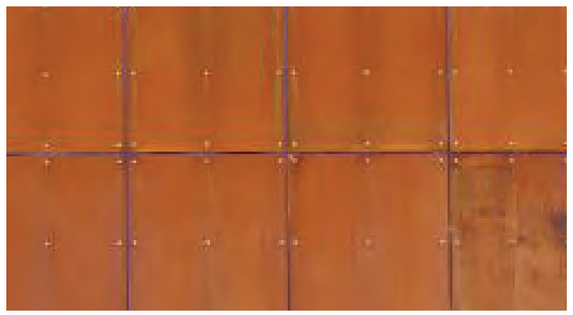
An important consideration to emerge from the public consultation, site analysis, and observation is the aspiration to retain the perceived ‘natural’ feel of the trails. The material strategy reflects and supports this:

- Minimise changes to the trails itself preserving the informal crushed rock trail surface and informal edge
- Develop bespoke shade structures, furniture or select furniture products that have colours and textures that are appropriate to the natural setting. These including timber, weathering steel, darker coloured painted steel, tinted concrete
- Create appropriate walls and footpaths using local limestone or coloured/textured concrete that reflects the local limestone geology
- Use natural curves and shapes found in nature
- Allow materials to form a natural patina rather than using stains and varnishes. Use reclaimed materials such as recycled jarrah that already have a patina and blend with the natural environment
- Avoid formal edges and large areas of hardstanding in contrasting colours. Carparks to be crushed gravel with timber or steel edging











13 WEED MANAGEMENT

This section adopts the recommendations set out in the 2013 Irwin Estuary Weed Management Plan. This report covers the Irwin River Trails site area except to the east of the bridge. Key issues include:

- The site area has been extensively cleared for agriculture and housing and is impacted by fire and weed infestation
- 38% of the site at the time of the survey was degraded or completely degraded
- 40 types of weed were recorded including very high priority for control
- There is a clear role for community volunteers including monitoring and hand removal of selected weed species, photo monitoring, and establishment of regional herbarium.

The table opposite summarises weeds identified, order of priority, and management. Full weed management details and location are included in the appendices of the 2013 Irwin Estuary Weed Management Plan.

It is recommended that the Shire collaborate with NACC, MEEDAC, and community groups for ongoing weed managment and revegetation.

Removal of weeds is also part of the bushfire mitigation strategy

SPECIES	PRIORITY	LOCATION	MANAGMENT
African Boxthorn	Very High	Throughout both banks	Remove (hand, cut and paint, spray) and monitor
Geraldton Carnation Weed	Very High	Throughout both banks	Community monitor and hand remove twice a year
Japanese Pepper	Very High	Throughout/eastern bank	Hand remove seedlings, stem inject/cut and paint trees
African Lovegrass	Very High	Northern End of Retreat Boulevard	Herbicide , Community monitor and hand remove
Couch and Kikuyu Grass	Very High	Alluvial flats	Experienced contractor to remove
Crownbeard	Very High	Around Perimeter and central	Community hand remove or spray
Fountain grass	Very High	Throughout both banks	Herbicide, Community monitor and hand remove
Ice Plant	Very High	Near Seaspray Caravan Park	Remove germinants and monitor
Lantana	Very High	South Bank	Remove all plants and do not spread fruit
Pypegrass	Very High	Seaspray Caravan Park	Eradicate
Tambookie Grass	Very High		Community monitor and hand remove
Whiteflower Fumitory	Very High	scattered throughout	Hand remove and spray with glyphosate larger areas
Wild Oats	Very High	Adjacent to Retreat Boulevard	Grass selective herbicide
Wild Turnip	Very High		Community monitor and hand remove
Canary island date palms	Medium	South Bank	Hand remove, cut and paint trees
Castor Oil	Medium	Throughout both banks	Community monitor and hand remove seedlings, cut and paint trees
False Bamboo	Medium	South Bank	Cut and paint, spray herbicide
Olive	Medium		Hand remove seedlings, cut and paint trees
Onion weed	Medium	Retreat Boulevard	Hand remove near Bridge
Pepper tree	Medium	East - both banks	Hand remove seedlings, stem inject/cut and paint trees
Soursob	Medium	Throughout both banks	Remove
Tamarisk	Medium	Ocean Drive and Point Leander Drive	Stem inject glyphosate, remove specimen near boardwalk and adjacent to Point Leander Drive
Agave Americana	Low	North bank Ocean Road and Retreat Boulevard	Hand remove small plants, chemical control large plants
Norfolk Island Hibiscus, Tree Tobacco	Low		Hand remove seedlings and stem inject mature

14 TRAIL SURFACE AND DRAINAGE

DOWNSLOPE EROSION

Water running down the trail creates deep ruts and uneven surface. This is particularly noticeable adjacent to the Lookout on Church Street, where the surface water flows down the steep slope. Further consideration needs to be given to this area as trails should not exceed 1 in 10 gradient. A switchback is advisable and/or water bars (see diagram right).

CROSS SLOPE EROSION

Water running across the trail washes away the trail surface and leaves it water logged. This has been observed to the east of Waldeck Street where there is a steep embankment uphill of the trail and the surface water flows down on to the trail. Strategies in this area include creating a vegetated swale downslope of the hill and rock armouring to the trail.

SURFACE WATER DRAINAGE

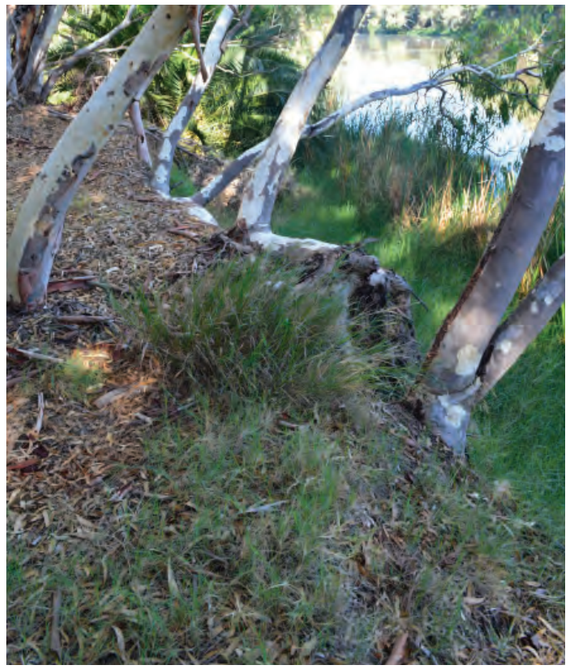
WSUD swales and infiltration basins are to be considered where run-off can filter road pollutants or domestic garden fertilizers and seeds.

EMBANKMENT CONTROL

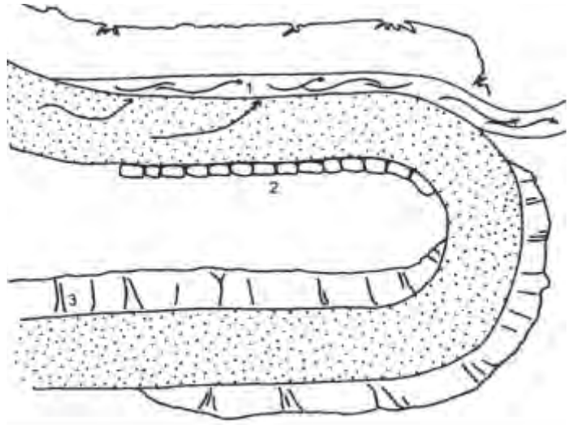
The photo right shows the embankment erosion near the bridge that is undermining existing trees. This could be controlled using natural looking approaches such as Bioengineering or Revetments. Bioengineering uses vegetation, wood and biodegradable products to reduce surface erosion and provide toe protection. Revetments create a protective cover (i.e limestone) on an embankment of earth to reduce erosion.



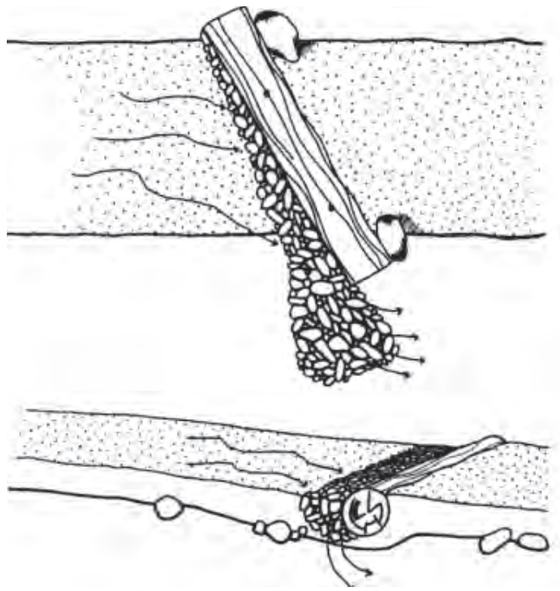
Path erosion downslope of lookout



Undermining southern bank



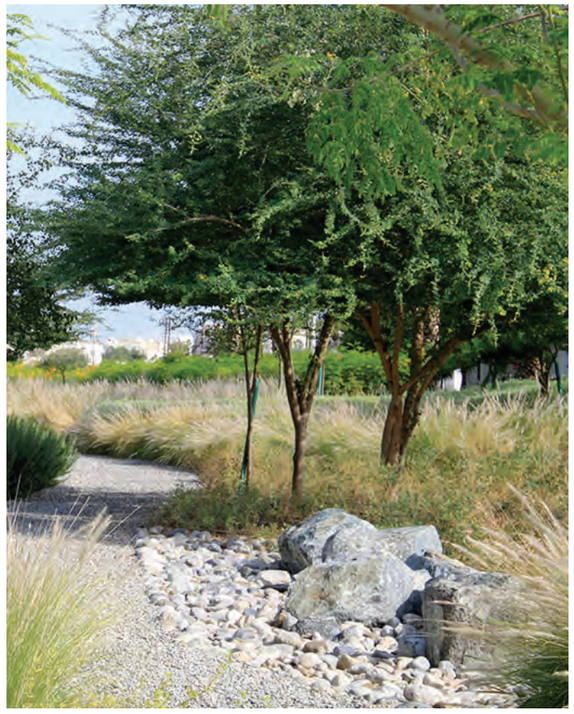
Switchback (British Columbia Ministry of Forestry for.gov.bc.ca)



Log Waterbar (British Columbia Ministry of Forestry for.gov.bc.ca)



Rock Revetments/Fillets (ECOS CSIRO Photo Becki Morris)



Vegetated Swales Wadi Al Alzeiba (Image Atelier Jaqueline Otsy)

15 BUSHFIRE MANAGEMENT

FUEL REDUCTION/MANAGEMENT

Fuel load risk should be mitigated by clearing weeds. Areas in close proximity to infrastructure should maintain combustible dead vegetation levels as set out in SPP 3.7.

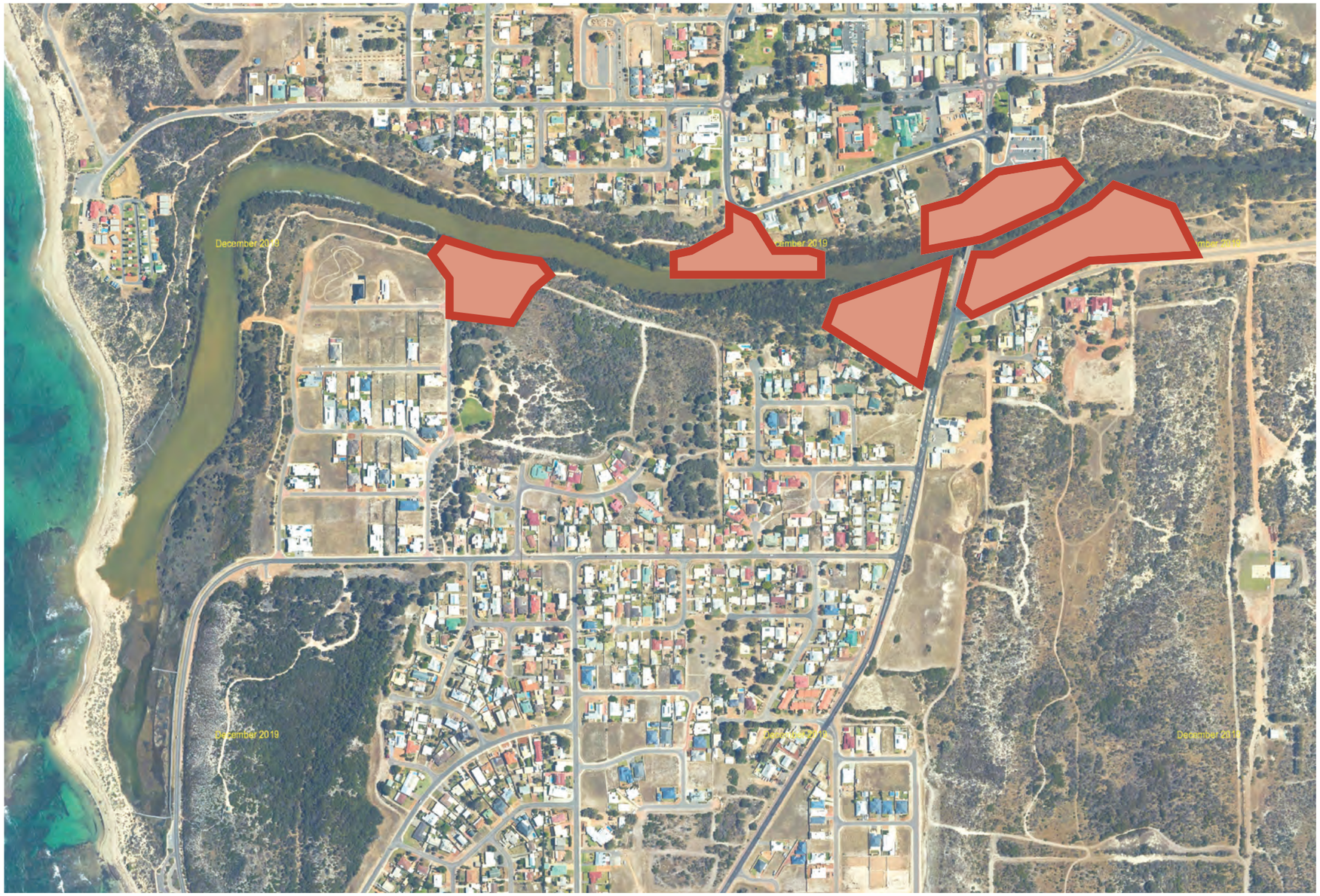
The Figure right illustrates potential areas of selective clearing. These areas already have some cleared area and are at high risk being in close proximity to existing homes. Weed removal could be focussed in these areas and there could be selective clearing of existing native shrubs and trees in poor condition. In these areas shrubs and trees should not form a continuous canopy and existing tree canopies could be raised (branches removed below 2m).

INFRASTRUCTURE SITING

Infrastructure is located in lower risk areas that are already substantially cleared or less dense. Maintain buffers to vegetation, create an Asset Protection Zone around new and existing infrastructure as set out in SPP 3.7.

PLANTING DESIGN

In this ‘natural’ context it is more appropriate to maintain the native planting palette rather than specify exotics that might be lower fire risk. However, reducing planting density for new planting (to reduce fuel load) and non-flammable rock mulches should be considered. Non-flammable stone walls can be incorporated as ‘shield’ walls (from wind, radiant heat, embers) in areas such as Denison House and Waldeck Street. Areas of low combustible planting/non-flammable mulches should be interspersed between trees, and shrubs clumped and separated from trees to break up fuel continuity.



Selective Clearing zones NTS

16 OPINION OF PROBABLE COST

CENTRAL

ITEM	DESCRIPTION	QTY	UNIT	RATE	TOTAL
1.00	**PRELIMINARY, SITE WORKS & DEMOLITIONS**				
1.01	Site mobilisation	1	item	$10,000.00	**$10,000.00**
1.02	Fine grading	1	item	$10,000.00	**$10,000.00**
1.03	Arborist Tree Pruning & TPZ Protection	1	item	$15,000.00	**$15,000.00**
1.04	Weed Eradication	20,000	m2	$0.80	**$16,000.00**
1.05	Minor Earthworks and fine grading	10,000	m2	$1.00	**$10,000.00**
1.06	Rock Excavation	10	m3	$350.00	**$3,500.00**
	PRELIMINARY, SITE WORKS & DEMOLITIONS TOTAL				**$64,500.00**
2.00	**HARDWORKS - SURFACE TREATMENTS**				
2.01	Trails remediation - crushed limestone to match existing	1	allowance	$20,000.00	**$20,000.00**
2.02	Paving Type 1- 100mm thick coloured concrete	250	m2	$80.00	**$20,000.00**
2.03	Paving Type 2 - Exposed aggregate paving to feeder streets	250	m2	$160.00	**$40,000.00**
2.04	Driveway access and parking bitumen	350	m2	$32.00	**$11,200.00**
2.05	Concrete pads to seating and bin areas	50	m2	$80.00	**$4,000.00**
	HARDWORKS - SURFACE TREATMENTS TOTAL				**$95,200.00**
3.00	**HARDWORKS - INFRASTRUCTURE**				
3.01	Ramps and stairs	80	m2	$2,000.00	**$160,000.00**
3.02	Edging Type 1 - Steel Edging to garden beds	100	m2	$45.00	**$4,500.00**
3.03	Edging Type 2 - flush kerb to carpark	60	l/m	$70.00	**$4,200.00**
3.04	Kayak Launch	1	allowance	$20,000.00	**$20,000.00**
3.05	Benches	12	item	$1,500.00	**$18,000.00**
3.06	Large Shelter/Pavilion/toilets	100	m2	$2,000.00	**$200,000.00**
3.07	Picnic tables	2	each	$5,000.00	**$10,000.00**
3.08	Bin enclosures	6	each	$7,000.00	**$42,000.00**
3.09	Bike rack	4	each	$750.00	**$3,000.00**
3.10	Bolders	10	each	$150.00	**$1,500.00**
3.11	Retaining walls	100	l/m	$1,200.00	**$120,000.00**
3.12	Drinking fountain with bottle refill	1	each	$6,910.00	**$6,910.00**
3.13	Signage	1	allowance	$5,000.00	**$5,000.00**
3.14	Double BBQ	2	each	$12,000.00	**$24,000.00**
3.15	Nature playspace	1	allowance	$100,000.00	**$100,000.00**
	HARDWORKS - INFRASTRUCTURE TOTAL				**$719,110.00**
4.00	**SOFTWORKS**				
4.01	Reveg Planting - Tube stock including soil wetting agent and slow release fertiliser as per manufacturers standards (4 tubes /m2)	6,000	m2	$12.00	**$72,000.00**
4.02	Planting - 140mm pot including soil wetting agent and slow release fertiliser as per manufacturers standards (3 /m2)	2,000	m2	$24.00	**$48,000.00**
4.03	Trees - 45L - incl. Tree Stakes & Soil conditioner	10	item	$160.00	**$1,600.00**
4.04	Trees - 200L - incl. Tree Stakes & Soil conditioner	10	item	$430.00	**$4,300.00**
4.05	Soil conditioner for garden bed areas - 25mm thick	9,000	m2	$12.00	**$108,000.00**
4.06	Mulch Type 1 - Native Organic mulch to garden beds- 75mm thick	5,000	m2	$12.00	**$60,000.00**
4.08	Mulch Type 2 - Rock mulch - 75mm thick	4,000	m2	$30.00	**$120,000.00**
4.09	Roll on turf - with 20mm soil conditioner	350	m2	$10.27	**$3,594.50**
	SOFTWORKS TOTAL				**$417,494.50**
5.00	**SERVICES AND PUBLIC ART**				
5.01	Light posts and associated electrical work (allowance for 1 post per 25m)	1	item	$24,000.00	**$24,000.00**
5.02	Lighting to built structures	1	item	$2,000.00	**$2,000.00**
5.03	Conduits, trenching, cabling, cabinets and switchboards, etc	1	item	$50,000.00	**$50,000.00**
5.04	Irrigation	1	allowance	$20,000.00	**$20,000.00**
5.05	Public Art	1	allowance	$30,000.00	**$30,000.00**
	SERVICES AND PUBLIC ART TOTAL				**$126,000.00**
6.00	**PEDESTRIAN BRIDGE**				**$1,000,000.00**

	Sub Total Construction		**$2,422,304.50**
	Contingency	30%	**$726,691.35**
	Sub total Exc GST		**$3,148,995.85**
	GST	10%	**$314,899.59**
	TOTAL inc GST		**$3,463,895.44**

EASTERN

ITEM	DESCRIPTION	QTY	UNIT	RATE	TOTAL
1.00	**PRELIMINARY, SITE WORKS & DEMOLITIONS**				
1.01	Site mobilisation	1	item	$10,000.00	**$10,000.00**
1.02	Fine grading	1	item	$10,000.00	**$10,000.00**
1.03	Arborist Tree Pruning & TPZ Protection	1	item	$15,000.00	**$15,000.00**
1.04	Weed Eradication	30,000	m2	$0.80	**$24,000.00**
1.06	Minor Earthworks and fine grading	10,000	m2	$1.00	**$10,000.00**
1.07	Rock Excavation	10	m3	$350.00	**$3,500.00**
	PRELIMINARY, SITE WORKS & DEMOLITIONS TOTAL				**$72,500.00**
2.00	**HARDWORKS - SURFACE TREATMENTS**				
2.01	Trails remediation - crushed limestone to match existing	1	allowance	$20,000.00	**$20,000.00**
2.02	Paving Type 2 - Exposed aggregate paving to feeder streets	250	m2	$160.00	**$40,000.00**
2.03	Paving Type 3 - New crushed limestone trails	1,400	m2	$65.00	**$91,000.00**
2.04	Driveway access and parking (gravel)	4,500	m2	$65.00	**$292,500.00**
2.05	Concrete pads to seating and bin areas	40	m2	$80.00	**$3,200.00**
	HARDWORKS - SURFACE TREATMENTS TOTAL				**$446,700.00**
3.00	**HARDWORKS - INFRASTRUCTURE**				
3.01	Edging Type 1 - Steel Edging to garden beds	100	m2	$45.00	**$4,500.00**
3.02	Riverside Platform	1	allowance	$20,000.00	**$20,000.00**
3.03	Kayak Launch	1	allowance	$20,000.00	**$20,000.00**
3.04	Benches	12	item	$1,500.00	**$18,000.00**
3.05	Toilets	60	m2	$2,000.00	**$120,000.00**
3.06	Picnic tables	2	each	$5,000.00	**$10,000.00**
3.07	Bin enclosures	6	each	$7,000.00	**$42,000.00**
3.08	Bike rack	10	each	$750.00	**$7,500.00**
3.09	Shelter	2	each	$20,000.00	**$40,000.00**
3.10	Mountain bike track and technical elements	1	allowance	$150,000.00	**$150,000.00**
3.11	Drinking fountain with bottle refill	2	each	$6,910.00	**$13,820.00**
3.12	Signage	1	allowance	$5,000.00	**$5,000.00**
3.13	Pedestrian Crossings	2	allowance	$4,000.00	**$8,000.00**
	HARDWORKS - INFRASTRUCTURE TOTAL				**$458,820.00**
4.00	**SOFTWORKS**				
4.01	Reveg Planting - Tube stock including soil wetting agent and slow release fertiliser as per manufacturers standards (4 tubes /m2)	8,000	m2	$12.00	**$96,000.00**
4.02	Planting (Feature and Swale) - 140mm pot including soil wetting agent and slow release fertiliser as per manufacturers standards (3 /m2)	3,000	m2	$24.00	**$72,000.00**
4.03	Trees - 45L - incl. Tree Stakes & Soil conditioner	20	item	$160.00	**$3,200.00**
4.04	Trees - 200L - incl. Tree Stakes & Soil conditioner	10	item	$430.00	**$4,300.00**
4.05	Soil conditioner for garden bed areas - 25mm thick	3,000	m2	$12.00	**$36,000.00**
4.06	Mulch Type 2 - Rock mulch - 75mm thick	3,000	m2	$30.00	**$90,000.00**
	SOFTWORKS TOTAL				**$301,500.00**
5.00	**LIGHTING AND PUBLIC ART**				
5.01	Light posts and associated electrical work (allowance for 1 post per 25m)	1	item	$24,000.00	**$24,000.00**
5.02	Lighting to built structures	1	item	$2,000.00	**$2,000.00**
5.03	Conduits, trenching, cabling, cabinets and switchboards, etc	1	item	$20,000.00	**$20,000.00**
5.04	Public Art	1	allowance	$10,000.00	**$10,000.00**
	LIGHTING AND PUBLIC ART TOTAL				**$56,000.00**

	Sub Total Construction		**$1,335,520.00**
	Contingency	30%	**$400,656.00**
	Sub total Exc GST		**$1,736,176.00**
	GST	10%	**$173,617.60**
	TOTAL inc GST		**$1,909,793.60**

OLD PORT TRAIL

ITEM	DESCRIPTION	QTY	UNIT	RATE	TOTAL
1.00	**PRELIMINARY, SITE WORKS & DEMOLITIONS**				
1.01	Site mobilisation	1	item	$10,000.00	**$10,000.00**
1.02	Fine grading	1	item	$10,000.00	**$10,000.00**
1.03	Arborist Tree Pruning & TPZ Protection	1	item	$15,000.00	**$15,000.00**
1.04	Weed Eradication	30,000	m2	$0.80	**$24,000.00**
1.05	Minor Earthworks and fine grading	10,000	m2	$1.00	**$10,000.00**
1.06	Rock Excavation	10	m3	$350.00	**$3,500.00**
	PRELIMINARY, SITE WORKS & DEMOLITIONS TOTAL				**$72,500.00**
2.00	**HARDWORKS - SURFACE TREATMENTS**				
2.01	Trails remediation - crushed limestone to match existing	1	allowance	$20,000.00	**$20,000.00**
2.02	Paving Type 1- 100mm thick coloured concrete	340	m2	$80.00	**$27,200.00**
2.03	Driveway access and parking (gravel)	1,200	m2	$65.00	**$78,000.00**
2.04	Concrete pads to seating and bin areas	20	m2	$80.00	**$1,600.00**
2.05	Boardwalk remediation	1	allowance	$20,000.00	**$20,000.00**
	HARDWORKS - SURFACE TREATMENTS TOTAL				**$146,800.00**
3.00	**HARDWORKS - INFRASTRUCTURE**				
3.01	Ramps and stairs (Denison House)	20	m2	$2,000.00	**$40,000.00**
3.02	Edging Type 1 - Steel Edging to garden beds	100	m2	$45.00	**$4,500.00**
3.03	Kayak Launch	1	allowance	$20,000.00	**$20,000.00**
3.04	Benches	6	item	$1,500.00	**$9,000.00**
3.05	Toilets (Denison House)	40	m2	$2,000.00	**$80,000.00**
3.06	Picnic tables	4	each	$5,000.00	**$20,000.00**
3.07	Bin enclosures	6	each	$7,000.00	**$42,000.00**
3.08	Bike rack	4	each	$750.00	**$3,000.00**
3.09	Bolders	10	each	$150.00	**$1,500.00**
3.10	Retaining walls	100	l/m	$1,200.00	**$120,000.00**
3.11	Drinking fountain with bottle refill	1	each	$6,910.00	**$6,910.00**
3.12	Signage	1	allowance	$8,000.00	**$8,000.00**
3.13	Double BBQ	2	each	$12,000.00	**$24,000.00**
3.14	Nature playspace	2	allowance	$100,000.00	**$200,000.00**
3.15	Conservation Area fencing	400	l/m	$50.00	**$20,000.00**
	HARDWORKS - INFRASTRUCTURE TOTAL				**$598,910.00**
4.00	**SOFTWORKS**				
4.01	Reveg Planting - Tube stock including soil wetting agent and slow release fertiliser as per manufacturers standards (4 tubes /m2)	8,000	m2	$12.00	**$96,000.00**
4.02	Planting - 140mm pot including soil wetting agent and slow release fertiliser as per manufacturers standards (3 /m2)	1,500	m2	$24.00	**$36,000.00**
4.03	Trees - 45L - incl. Tree Stakes & Soil conditioner	10	item	$160.00	**$1,600.00**
4.04	Trees - 200L - incl. Tree Stakes & Soil conditioner	18	item	$430.00	**$7,740.00**
4.05	Soil conditioner for garden bed areas - 25mm thick	1,500	m2	$12.00	**$18,000.00**
4.06	Mulch Type 2 - Rock mulch - 75mm thick	1,500	m2	$30.00	**$45,000.00**
4.07	Roll on turf - with 20mm soil conditioner	300	m2	$10.27	**$3,081.00**
	SOFTWORKS TOTAL				**$207,421.00**
5.00	**LIGHTING AND PUBLIC ART**				
5.01	Light posts and associated electrical work	1	item	$10,000.00	**$10,000.00**
5.02	Lighting to built structures	1	item	$20,000.00	**$20,000.00**
5.03	Conduits, trenching, cabling, cabinets and switchboards, etc	1	item	$50,000.00	**$50,000.00**
5.04	Public Art	2	allowance	$15,000.00	**$30,000.00**
	LIGHTING AND PUBLIC ART TOTAL				**$110,000.00**
			Sub Total Construction		**$1,135,631.00**
			Contingency	30%	**$340,689.30**
			Sub total Exc GST		**$1,476,320.30**
			GST	10%	**$147,632.03**
			TOTAL inc GST		**$1,623,952.33**

LAGOON

ITEM	DESCRIPTION	QTY	UNIT	RATE	TOTAL
1.00	**PRELIMINARY, SITE WORKS & DEMOLITIONS**				
1.01	Site mobilisation	1	item	$10,000.00	**$10,000.00**
1.02	Fine grading	1	item	$10,000.00	**$10,000.00**
1.03	Arborist Tree Pruning & TPZ Protection	1	item	$15,000.00	**$15,000.00**
1.04	Weed Eradication	15,000	m2	$0.80	**$12,000.00**
1.05	Minor Earthworks and fine grading	2,000	m2	$1.00	**$2,000.00**
	PRELIMINARY, SITE WORKS & DEMOLITIONS TOTAL				**$49,000.00**
2.00	**HARDWORKS - SURFACE TREATMENTS**				
2.01	Boardwalk across water (timber or grated walkway including support structure and handrail)	200	m2	$800.00	**$160,000.00**
2.02	Paving Type 1- 100mm thick coloured concrete to replace boardwalk	1,000	m2	$80.00	**$80,000.00**
2.03	Concrete pads to seating and bin areas	20	m2	$80.00	**$1,600.00**
	HARDWORKS - SURFACE TREATMENTS TOTAL				**$241,600.00**
3.00	**HARDWORKS - INFRASTRUCTURE**				
3.01	Ramps and stairs	20	m2	$2,000.00	**$40,000.00**
3.02	Benches	6	item	$1,500.00	**$9,000.00**
3.03	Bird Hide (feature)	40	m2	$2,000.00	**$80,000.00**
3.04	Bin enclosures	2	each	$7,000.00	**$14,000.00**
3.05	Bike rack	2	each	$750.00	**$1,500.00**
3.06	Signage including through Dunes (Directional & Interpretive)	1	allowance	$7,000.00	**$7,000.00**
	HARDWORKS - INFRASTRUCTURE TOTAL				**$151,500.00**
4.00	**SOFTWORKS**				
4.01	Reveg Planting - Tube stock including soil wetting agent and slow release fertiliser as per manufacturers standards (4 tubes /m2)	500	m2	$12.00	**$6,000.00**
4.02	Trees - 200L - incl. Tree Stakes & Soil conditioner	10	item	$430.00	**$4,300.00**
	SOFTWORKS TOTAL				**$10,300.00**
5.00	**LIGHTING AND PUBLIC ART**				
5.01	Lighting to carpark	1	item	$2,000.00	**$2,000.00**
5.02	Conduits, trenching, cabling, cabinets and switchboards, etc	1	item	$5,000.00	**$5,000.00**
5.03	Public Art	1	allowance	$10,000.00	**$10,000.00**
	LIGHTING AND PUBLIC ART TOTAL				**$17,000.00**
			Sub Total Construction		**$469,400.00**
			Contingency	30%	**$140,820.00**
			Sub total Exc GST		**$610,220.00**
			GST	10%	**$61,022.00**
			TOTAL inc GST		**$671,242.00**

DUNES AND LOOKOUT

ITEM	DESCRIPTION	QTY	UNIT	RATE	TOTAL
1.00	**PRELIMINARY, SITE WORKS & DEMOLITIONS**				
1.01	Site mobilisation	1	item	$10,000.00	**$10,000.00**
1.02	Fine grading	1	item	$10,000.00	**$10,000.00**
1.03	Arborist Tree Pruning & TPZ Protection	1	item	$15,000.00	**$15,000.00**
1.04	Weed Eradication	30,000	m2	$0.80	**$24,000.00**
1.05	Minor Earthworks and fine grading	10,000	m2	$1.00	**$10,000.00**
1.06	Rock Excavation	20	m3	$350.00	**$7,000.00**
	PRELIMINARY, SITE WORKS & DEMOLITIONS TOTAL				**$76,000.00**
2.00	**HARDWORKS - SURFACE TREATMENTS**				
2.01	Trails remediation - crushed limestone to match existing	1	allowance	$20,000.00	**$20,000.00**
2.02	Paving Type 1- 100mm thick coloured concrete	50	m2	$80.00	**$4,000.00**
2.03	Paving Type 3 - New crushed limestone trails	250	m2	$65.00	**$16,250.00**
2.04	Parking (Bitumen)	50	m2	$32.00	**$1,600.00**
2.05	Concrete pads to seating and bin areas	50	m2	$80.00	**$4,000.00**
2.06	Conservation Area fencing	600	l/m	$50.00	**$30,000.00**
	HARDWORKS - SURFACE TREATMENTS TOTAL				**$75,850.00**
3.00	**HARDWORKS - INFRASTRUCTURE**				
3.01	Ramps and stairs	120	m2	$2,000.00	**$240,000.00**
3.02	Edging Type 2 - flush kerb to carpark	60	l/m	$70.00	**$4,200.00**
3.03	Benches	8	item	$1,500.00	**$12,000.00**
3.04	Lookout (Architectural feature)	50	m2	$2,000.00	**$100,000.00**
3.05	Picnic tables	2	each	$5,000.00	**$10,000.00**
3.06	Bin enclosures	2	each	$7,000.00	**$14,000.00**
3.07	Bike rack	2	each	$750.00	**$1,500.00**
3.08	Retaining walls	20	l/m	$1,200.00	**$24,000.00**
3.09	Drinking fountain with bottle refill	1	each	$6,910.00	**$6,910.00**
3.10	Signage	1	allowance	$5,000.00	**$5,000.00**
	HARDWORKS - INFRASTRUCTURE TOTAL				**$417,610.00**
4.00	**SOFTWORKS**				
4.01	Reveg Planting - Tube stock including soil wetting agent and slow release fertiliser as per manufacturers standards (4 tubes /m2)	6,000	m2	$12.00	**$72,000.00**
4.02	Planting - 140mm pot including soil wetting agent and slow release fertiliser as per manufacturers standards (3 /m2)	1,100	m2	$24.00	**$26,400.00**
4.03	Trees - 200L - incl. Tree Stakes & Soil conditioner	12	item	$430.00	**$5,160.00**
4.04	Soil conditioner for garden bed areas - 25mm thick	1,100	m2	$12.00	**$13,200.00**
4.05	Mulch Type 2 - Rock mulch - 75mm thick	1,100	m2	$30.00	**$33,000.00**
	SOFTWORKS TOTAL				**$149,760.00**
5.00	**LIGHTING AND PUBLIC ART**				
5.01	Lighting to built structures	1	item	$2,000.00	**$2,000.00**
5.02	Conduits, trenching, cabling, cabinets and switchboards, etc	1	item	$10,000.00	**$10,000.00**
5.03	Public Art	1	allowance	$30,000.00	**$30,000.00**
	LIGHTING AND PUBLIC ART TOTAL				**$42,000.00**

	Sub Total Construction		**$761,220.00**
	Contingency	30%	**$228,366.00**
	Sub total Exc GST		**$989,586.00**
	GST	10%	**$98,958.60**
	TOTAL inc GST		**$1,088,544.60**

SUMMARY

ITEM	DESCRIPTION	TOTAL
1.00	**Central**	
1.01	PRELIMINARY, SITE WORKS & DEMOLITIONS	$64,500.00
1.02	HARDWORKS - SURFACE TREATMENTS	$95,200.00
1.03	HARDWORKS - INFRASTRUCTURE	$719,110.00
1.04	SOFTWORKS	$417,494.50
1.05	LIGHTING AND PUBLIC ART	$126,000.00
1.06	PEDESTRIAN BRIDGE	$1,000,000.00
	Central	**$2,422,304.50**
2.00	**Eastern**	
2.01	PRELIMINARY, SITE WORKS & DEMOLITIONS	$72,500.00
2.02	HARDWORKS - SURFACE TREATMENTS	$446,700.00
2.03	HARDWORKS - INFRASTRUCTURE	$458,820.00
2.04	SOFTWORKS	$301,500.00
2.05	LIGHTING AND PUBLIC ART	$56,000.00
	Eastern	**$1,335,520.00**
3.00	**Old Port Trail**	
3.01	PRELIMINARY, SITE WORKS & DEMOLITIONS	$72,500.00
3.02	HARDWORKS - SURFACE TREATMENTS	$146,800.00
3.03	HARDWORKS - INFRASTRUCTURE	$598,910.00
3.04	SOFTWORKS	$207,421.00
3.05	LIGHTING AND PUBLIC ART	$110,000.00
	Old Port Trail	**$1,135,631.00**
2.00	**Lagoon**	
2.01	PRELIMINARY, SITE WORKS & DEMOLITIONS	$49,000.00
2.02	HARDWORKS - SURFACE TREATMENTS	$241,600.00
2.03	HARDWORKS - INFRASTRUCTURE	$151,500.00
2.04	SOFTWORKS	$10,300.00
2.05	LIGHTING AND PUBLIC ART	$17,000.00
	Lagoon	**$469,400.00**
2.00	**Dunes and Lookout**	
2.01	PRELIMINARY, SITE WORKS & DEMOLITIONS	$76,000.00
2.02	HARDWORKS - SURFACE TREATMENTS	$75,850.00
2.03	HARDWORKS - INFRASTRUCTURE	$417,610.00
2.04	SOFTWORKS	$149,760.00
2.05	LIGHTING AND PUBLIC ART	$42,000.00
	Dunes and Lookout	**$761,220.00**

Sub Total Construction	$6,124,075.50
Contingency 30%	$1,837,222.65
Sub total Exc GST	$7,961,298.15
GST 10%	$796,129.82
TOTAL inc GST	$8,757,427.97



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