Cape Byron State Conservation Area

Cape Byron Master Plan

Jingi wahla widtha jugun ... (Welcome to Country)

This master plan talks about a special part of the Country of the Bundjalung of Byron Bay (Arakwal) people known as Cape Byron State Conservation Area, which is located on the NSW far north coast, adjacent to the town of Byron Bay.

The park is an important part of Country to the Arakwal and to other Bundjalung people as a place of spiritual and cultural significance. We know Cape Byron as Walgun, which means 'shoulder'.

The park was created in 1997, under a Deed of Agreement between the Arakwal people, the Tweed Byron Local Aboriginal Land Council and the NSW Government as part of resolving a native title claim. The Deed and the National Parks and Wildlife Act 1974 provides for the care, control and management of the park to be vested with the Cape Byron Trust. The Deed was acknowledged in the Indigenous Land Use Agreement (ILUA), signed on 28 December 2000, between the Arakwal people and the NSW Government. The ILUA recognises the rights and interests of our people as the traditional owners of Country that includes Cape Byron State Conservation Area and has been acknowledged as a model for reconciliation across Australia and the world.

The Arakwal people jointly manage the park with the National Parks and Wildlife Service as members of the Cape Byron Trust, together with other community members. This master plan is to provide our joint-management with a clear vision to plan for the future challenges and opportunities that tourism presents our Byron Bay community. The Arakwal people are committed to protecting our cultural, spiritual, historical and natural assets of Walgun.

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OEH acknowledges that Cape Byron State Conservation Area is the traditional Country of the Arakwal people.

Cover photo by Context (2016).

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Cape Byron Lighthouse (Context 2016)

Figure 1 The Lighthouse mid twentieth century (State Library NSW)

1.0 Executive summary

1.1 What is proposed?

The National Parks and Wildlife Service (NPWS) commissioned the preparation of this master plan to explore preferred options that allow for a broad range of visitors to access and enjoy the Cape Byron State Conservation Area (referred to as the Cape in this plan). Included in the master plan are proposals for high quality facilities to meet visitor demand, address access and transport, and protect the natural and cultural values of the Cape into the future. It integrates the Cape Byron Trust's current concepts for the popular walking track network and Most Easterly Point and the recently released Byron Shire Council's Byron Bay Town Centre Masterplan into the broader master planning for the Cape.

The Cape walking experience is a key component of the master plan vision. The proposals include the development of a unique and memorable walk with quality materials and a consistent design that is identifiable with the Cape, improves ease of navigation for locals and visitors and leaves a lasting impression.

Limited opportunities exist for additional facilities that cater to increasing visitor numbers. Due to the small size and steep terrain of the Cape and restricted vehicle access, a key objective is the upgrade of the existing walking tracks, lookouts and rest areas, and evaluation of alternative transit options to reduce congestion and conflicts between walkers and cars.

A fleet of solar powered electric shuttle buses is proposed. This is the transit option that is the most compatible with walkers, the most efficient and will result in the least impact. It also provides the best integration with the proposed Arakwal Cultural Centre and the Byron Bay Town Centre Masterplan .

The master plan provides a framework for further development of the proposals.

1.2 Why is the project needed?

The Cape is one of the most highly visited tourism destinations in non-metropolitan NSW with many key attractions found in a small area.

Currently up to 1600 vehicles a day are driving up to the lighthouse precinct and seeking parking in one of 24 parking spaces. It is estimated that at times, 83% may not find a parking space and are turned away. The Cape Byron Trust provides manned traffic controllers to supervise the congestion and safety issues, which impacts on the visitor experience.

More than 2800 people walk to the lighthouse daily. Many walkers use the roads, creating conflicts between cars and walkers [Figure 2]. Increased visitation resulting from Byron Bay's growing popularity as a visitor destination will generate high levels of foot and vehicle traffic growth in the future creating further conflicts.

The existing infrastructure for walkers is poor. The excellent boardwalk along Lighthouse Road above Clarkes Beach is very well patronised but stops abruptly at Brooke Drive after which walkers must negotiate a dangerous and narrow section of Lighthouse Road to reconnect with the Cape walking tracks. A continuous path is needed to address safety issues.

The master plan will guide improvements to visitor facilities, to meet growing visitor numbers and expectations, while protecting the Cape's significant natural and cultural assets.

Any new infrastructure proposed for the Cape will have some level of environmental impact. Mitigation of environmental impacts is a key consideration in assessing transit and infrastructure options. All significant proposals contained in the master plan will be subject to environmental assessment prior to final approval.

Figure 2 Vehicles taking over the majority of usable space (Context, 2016)

1.3 How does the project satisfy the need?

The master plan identifies and assesses options for improving the visitor experience at the Cape and for transporting people to and from the Lighthouse Precinct. The master plan outcomes will:

- make every visit to the Cape enjoyable for locals and visitors, whether they arrive by foot or other means
- make every visit to the Lighthouse Precinct safe by removing the conflict and interactions between walkers and cars
- make the Cape pedestrian friendly
- bring economic and community benefits to the local community and the Cape's stakeholders
- integrate with the proposals developed in the council's Byron Bay Town Centre Masterplan which emphasises pedestrian priority and an integrated transport hub
- ensure consistency with and incorporate the recommendations of the Cape Byron Lightstation Precinct Conservation Management Plan (CMP).

In detail the master plan includes the following elements:

- a pedestrian priority Cape
- improved walking tracks, lookouts and rest spots with a consistent Cape design
- upgraded signage and interpretive elements
- improved visitor experiences and interpretation for the Head Lighthouse Keeper's Cottage
- conversion of the council's Lighthouse Road up-road to a limited access road with a lifting arm barrier
- a dedicated walkway added to the Lighthouse Road down-road to meet the proposed boardwalk extension [Figure 3]
- traffic calming measures on council's Lighthouse Road with a raised threshold (flattop) with marked crossing to facilitate pedestrians/walkers safe crossing and passage to the down-road [Figure 4]
- extension of the Cape Byron walking track boardwalk from Brooke Drive to the proposed traffic calming measures on Lighthouse Road with an on-grade path joining the Lighthouse Road down-road path
- new link from proposed Arakwal Cultural Centre to Tallow Ridge, with potential link to council's proposed Sand Hills track and into Byron Bay town centre
- a lower shuttle bus station/terminus at the proposed Arakwal Cultural Centre site
- an upper shuttle bus pick up/drop off point at the Lighthouse Precinct
- a flexible turf outdoor space in place of former car parks
- adjusted parking arrangements at Palm Valley/The Pass car park to improve vehicle circulation and parking and pedestrian access and safety
- integration with other transit proposals. Such as the Byron Bay shuttle
- link five major lookouts with the Byron Bay town centre
- enhanced walking tracks to assist with the protection and conservation of endangered ecological communities
- maintenance of access for emergency/service/staff/ pre-approved disabled and guests vehicles at the Lighthouse Precinct.

Figure 3 Artistic impression of Lighthouse Road down-road (Context, 2016)

Figure 4 Artistic impression of raised boardwalk extension on Lighthouse Road (Context, 2016)

1.4 What transit alternatives were considered?

Alternatives considered included:

- do nothing
- increased parking capacity at the Cape
- walking only access to the Cape
- light rail
- funicular
- gondola or cable car
- tourist bus
- shuttle bus
- electric buses
- car parking booking system.

1.5 Community involvement in the project

During the development of the master plan, a number of channels and communication tools were used to inform and engage stakeholders, visitors and the community including:

- Presentations to the Arakwal Corporation, Cape Byron Trust and Byron Shire Council.
- Visitor surveys conducted over several weekends: 130 surveys from locals and 78 from visitors were collected and analysed.
- Community updates and interviews with local media.
- The draft master plan was placed on public exhibition for a period of six weeks. During this time, two public information sessions were held. A total of 43 submissions were received on the plan.

All issues and comments raised during consultation were recorded on a stakeholder database and informed key investigations and project design.

Improvement of the walking access to the Lighthouse Precinct and traffic impacts were the issues most frequently raised during consultation, followed by comments regarding transit options. Other issues raised related to flora and fauna, visual quality, heritage impacts and air quality. Following consultation, submissions were analysed and recorded in a submissions report. Criteria were applied in determining whether or not the final plan would be changed in response to a comment raised in a submission. A change to the master plan was supported where:

- an alternative policy, strategy or action that would better support delivery of park management objectives
- new, updated or additional information of direct and critical relevance to future park management
- basic factual or editorial error or omission that should be corrected.

1.6 What are the main beneficial outcomes expected?

The master plan will provide the following benefits.

- A direct walking link between the Cape and the Byron Bay town centre.
- An electric-powered solar shuttle bus service to replace the 370,000 cars currently heading to the Lighthouse circulating on the Cape roads annually.
- Improved safety on access roads and walking tracks.
- Reduced traffic and traffic congestion on Lighthouse Road.
- Improved visitor amenity and satisfaction for locals and visitors.
- Improved walking tracks that do not expose walkers to traffic.
- Improved environmental conditions adjacent to walking tracks.
- Improved environmental conditions due to the removal of cars.
- Opportunities to use open space currently required for vehicle circulation and parking for other purposes such as education programs.
- Opportunities to create employment for Arakwal people.
- The ability to cater to an anticipated increase in visitor numbers.

1.7 How would likely impacts be managed?

The master plan is been designed to minimise environmental impacts. Some minor impacts will occur during construction, including disruptions to walking track and lookout access for short periods.

The shuttle buses will use existing road infrastructure, with fewer environmental impacts than transit options that require construction. The shuttle bus fleet will be charged by a solar charging station located at the NPWS depot.

The master plan proposes an additional walking track to link the existing Tallow Ridge track to Tallow Beach Road near the proposed Arakwal Cultural Centre. This traverses vegetation that has had moderate to severe disturbance in the past, but it is understood that much of the disturbed areas are now regenerating. Detailed design and alignment selection will reduce environmental impacts and include elevated sections where necessary.

A review of environmental factors will include environmental safeguards to mitigate potential impacts on the cultural and natural heritage values during construction and operation.

Proposals at the Lighthouse Precinct will be consistent with the Conservation Management Plan (CMP).

Figure 5 Revegetation at The Pass (Context, 2015)

Figure 6 Cape Byron Walking Track (Context, 2015)

2.0 Introduction

2.1 Background

In 2002, Cape Byron was designated a state conservation area of 99 hectares. It is jointly managed by the traditional owners, the Arakwal people, and NPWS on behalf of the Cape Byron Trust. Under the *National Parks and Wildlife Act 1974*, the Trust is responsible for the care, control and management of the Cape. The Trust provides a model for joint management.

The Trust is a largely self-funded management body. Income made from the Cape is placed directly back into its management and improvement. The Trust commissioned several planning documents to guide day-to-day and longer term decision-making. In addition to the Trust's documents, the recently completed Byron Bay Town Centre Masterplan was also noted as a key planning document that had implications for the Cape master plan. Each of these documents identified access to the Cape as a key issue.

The Cape Byron Headland Reserve Plan of Management (2002) states:

> 'Car parks are frequently pushed beyond capacity during holiday periods, particularly in the Lighthouse Precinct. Congestion during these periods is in conflict with the cultural and natural settings of the Reserve and significantly compromises visitor enjoyment. There is no opportunity to increase car parking space within the Reserve without compromising other values. Parking space cannot be increased in any of the Reserve's car parks due to physical limitations and strict management requirements to maintain historical and natural settings. While the Trust is committed to providing a diversity of access, the Trust will seek to encourage alternative means of access such as bus shuttle and improved walking tracks." and "Scenic drives, walking, jogging and cycling are popular activities along Reserve roads. Conflicts between road users frequently occur, particularly on Lighthouse Road and may compromise visitor safety. The roads are narrow and the steep slopes of the Reserve make widening of the roads impractical." The desired outcome is "To reduce the number of private vehicles within the Lighthouse Precinct with access predominately by walking, cycling or by public transport." An action is "A walking track to Cosy Corner from Lighthouse Road will be provided with a link to the Tallow Ridge Track at Lee Lane to be investigated and implemented if appropriate.'

The Trust and NPWS provided the project brief for preparation of the master plan, which builds on previous planning documents and identifies landscape solutions to address key issues such as access and transport and improved visitor experience.

The CMP (Freeman Ellsmore 2008), prepared for the Cape Byron Lightstation Precinct, recommended a range of conservation policies, some of which have been put into effect or are ongoing. A key strategy identified:

> 'further investigation of options to minimise the extent of vehicles in the precinct, or even to remove them altogether, apart from service vehicles and those associated with people with special needs at the site to retain its significance as a lightstation and major tourist destination. Various options could be considered such as low environmental impact electric shuttles; a lift device from Tallow Beach; improved paths on the access road; a bus service from the (once developed) Arakwal Cultural Centre, if deemed appropriate; or pick up from car parks in the Reserve. In addition, this plan recommends actively promoting and encouraging pedestrian access over vehicle access'.

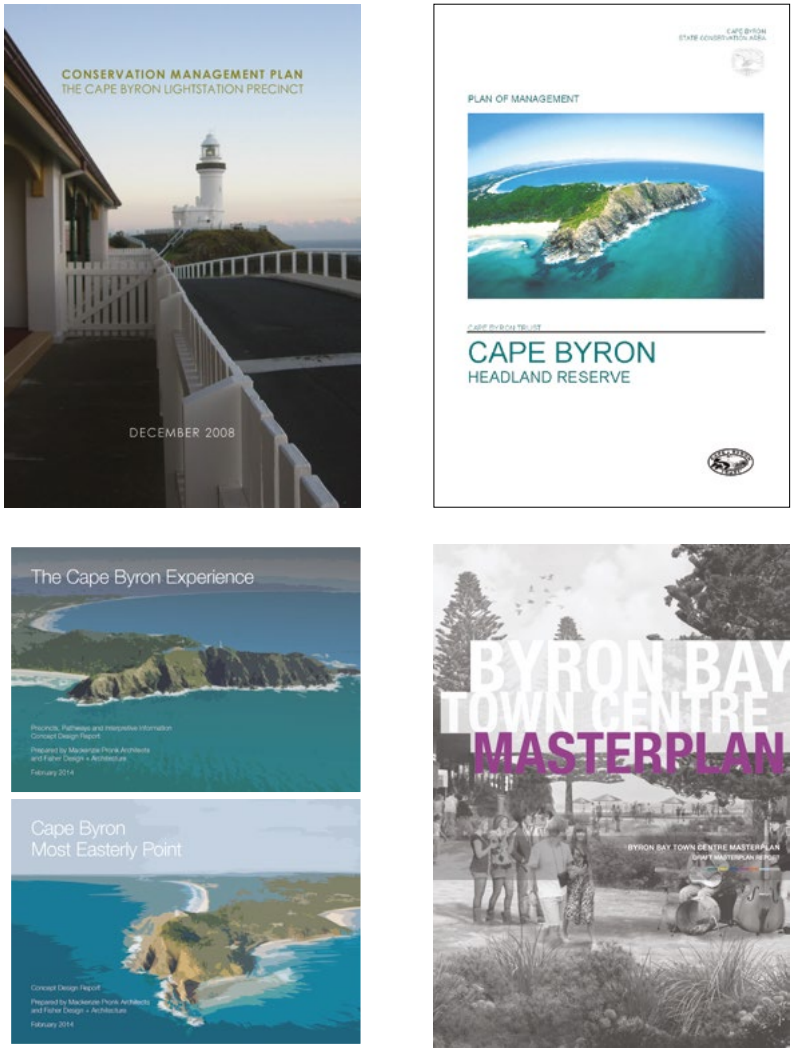


Figure 7 Referenced planning documents

2.2 The study area

The study area encompasses all of Cape Byron State Conservation Area, including the main visitor hubs located at the Lighthouse Precinct and at day use areas and beaches at Wategos Beach, Tallow Beach, The Pass/Palm Valley.

The park includes approximately four kilometres of coastline and the intertidal zone down to the mean low water mark. The Cape Byron Marine Park adjoins and overlaps the Cape between mean low and mean high water mark.

Lighthouse Road and the Lighthouse Road up-road are managed by Byron Shire Council while the Lighthouse Road down-road, Brooke Drive and part of Tallow Beach Road are managed by NPWS.

The Cape is located within the administration areas of the Arakwal people, the Tweed - Byron Local Aboriginal Land Council, North Coast Local Land Services and Byron Shire Council.

2.3 Aboriginal culture

The Arakwal people are part of the Bundjalung Nation and their history predates the arrival of Europeans. Their ancestors, Bobby and Alice Bumberbin, Harry and Clara Bray, and Linda and Jimmy Kay lived and raised families in and around Byron Bay. The Elders have shared stories of accompanying their father on fishing trips to Cape Byron as younger people and attending family gatherings at The Pass.

Highly significant Aboriginal sites include a foredune midden at The Pass which has been dated at approximately 1000 years old (Collins 1994) and a ceremonial site on Cape Byron destroyed during construction of the Lighthouse in the late 19th and early 20th century (Collins 1994; Freeman Ellsmore 2008). The Pass midden is the last remaining large foredune midden between Ballina and the Queensland border (Collins 1994).

2.4 European heritage

The Lighthouse Precinct is the Cape's most significant European heritage. Areas of potential historic significance occur at The Pass/Palm Valley and Wategos Beach where early European settlement occurred.

A CMP guides the management and long term conservation of the historic and archaeological heritage of the Lighthouse Precinct.

Figure 8 Cape Byron State Conservation Area Regional Context (Context, 2016)

Figure 9 View over Clarke's Beach (Context, 2016)

3.0 Project methodology

3.1 Project methodology

The Cape Byron Master plan was prepared in the following stages:

Stage 1: Project understanding

Site visits and background information gathering

Stage 2: Visitor data analysis and projections

Compilation and analysis of visitor data and projections

Stage 3: Transit options study and recommendations

Identify objectives of the transit system proposal and provide a framework for assessing options

Stage 4: Identify and recommend revenue generation or business opportunities

Provide a long term investment strategy for visitor infrastructure and services

Stage 5: Site analysis

Undertake an analysis of the site to assist in the development of key design principles and inform future planning proposals.

Stage 6: Preliminary master plan report

Prepare a preliminary master plan report for endorsement and public exhibition

Stage 7: Submissions report

Prepare a submissions report summarising the results of public comments

Stage 8: Final master plan report

Prepare a final report with plans, financial analysis, implementation plans and cost estimates

Figure 10 Entrance to the Cape (Context, 2016)

4.0 Vision and principles

4.1 NPWS vision and principles

The overall vision for NPWS is:

‘Inspiring everyone to love their national parks’

NPWS developed principles, outlined below, that will guide, shape and inform NPWS into the future. They capture the qualities that the master plan should have and inform the development of project-specific objectives and principles. They also form the basis for thinking about, evaluating and deriving the criteria to judge the quality of the master plan.

Conservation

Conservation is at our core.

Culture and heritage

We respect and celebrate rich culture and heritage.

Communities

We work with and for our communities.

Experiences

We provide outstanding natural spaces and engaging experiences.

4.2 Project specific vision

The project specific vision for the Cape is:

‘Cape Byron State Conservation Area will provide exceptional, year round visitor experiences, which showcase its natural and cultural values. Every visit to the Cape will be a safe and enjoyable one’

Conservation

Cultural, historic and environmental conservation is at the forefront of the master plan. From the historically significant Lighthouse Precinct, to the endangered ecological communities of the Cape, this master plan will ensure this iconic location is conserved and protected into the future.

Facility enhancements will assist in the protection and conservation of the natural and cultural destinations at the Cape.

Culture and heritage

Promotion of the unique culture and heritage of the Cape will be enhanced by the master plan. European and Aboriginal culture and heritage will be promoted through education at the Cape and in the proposed Arakwal Cultural Centre. The master plan provides a platform for Aboriginal programs, activities and interpretation.

Communities

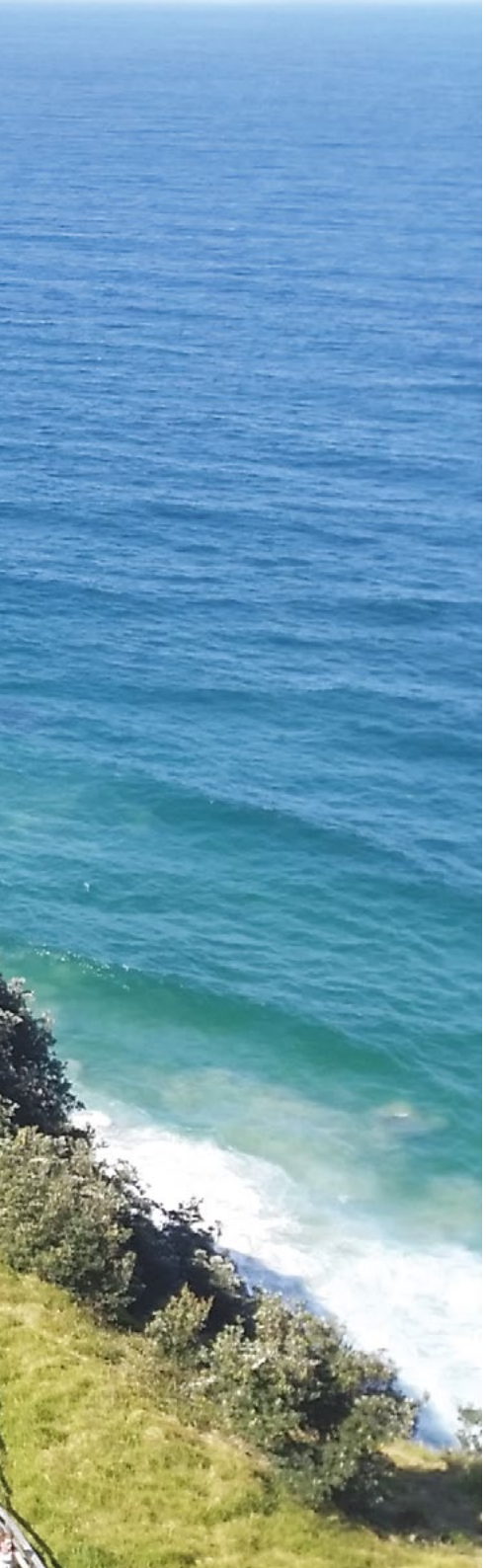
The Cape has a close connection with the community of Byron Bay, both culturally and geographically. Continuing community engagement is essential, as the master plan will have flow on effects to the local community. The Cape and its facilities will continue to be one of Byron Bay’s most cherished locations, with the ongoing support and involvement of the local community.

Experiences

The overall Cape experience will be a world class walking experience, with new and upgraded lookouts, rest areas, interpretation, consistent track treatments and features and alternative transit options.

Figure 11 Cape Byron Lighthouse (John Spencer/OEH 2013)

Figure 12 EnView from the Lighthouse towards the Most Easterly Point (Context, 2016)



5.0 Existing landscape

5.1 The site

The Cape is known as Walgun which means ‘shoulder’ in the Bundjalung language. The Arakwal people of the Bundjalung Nation have occupied the landscape of Byron Bay for at least 22,000 years. Extensive large middens at The Pass are testament to this occupation. To this day the Cape continues to be an important gathering and ceremonial place for the Arakwal people.

The Cape’s unique topography and geographic location as the Australian mainland’s Most Easterly Point, as well as its cultural heritage values, ocean and hinterland views and popular nature-based activities, such as whale watching, give the Cape iconic status today.

Figure 13 Aerial view of Cape Byron NPWS land in the Byron town context (Google Maps)

Figure 14 *Themeda* grasslands (Context, 2016)

Figure 15 Littoral rainforest on the Cape (Context, 2016)

Vegetation

The metamorphic soils of the Cape support a range of rainforest and wet sclerophyll forest while the sandy hind-dune soils behind Tallow Beach are vegetated with drier, open sclerophyll forest and stands of littoral rainforest. Littoral rainforest accounts for about 50 per cent of the forest cover of the Cape. On the steep slopes behind Little Wategos are *Themeda* grasslands [Figure 14].

An ethnobotanical study undertaken with the Arakwal people documented culturally valuable plants. Management of the Cape incorporates these culturally valuable plantings.

The vegetation survey by Baker (2013) mapped the eight distinct vegetation communities, 28 subformations and various intermediate communities. The Cape's native vegetation is highly diverse and includes threatened and rare plants and three endangered ecological communities listed under the *Biodiversity Conservation Act, 2016*. These include:

- Littoral rainforest in the NSW North Coast [Figure 15]
- *Themeda* grassland on seacliffs and coastal headlands in the NSW North Coast.
- Broadleaved paperbark swamp sclerophyll forest

Littoral rainforest is also listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* as the critically endangered ecological community.

Figure 16 Cape Byron State Conservation Area (John Spencer/OEH 2013)

1. LITTORAL RAINFOREST

1a. Riberry-Bangalow Palm-Cudgerie-Strangler Fig Littoral Rainforest

1b. Bennett's Ash-Hard Quandong-Beach Acronychia-Tuckeroo Littoral Rainforest

1c. Tuckeroo-Three veined Laurel Littoral Rainforest

1d. Hard Quandong-White Bean-Guioa-Brown Kurrajong Littoral Rainforest

1e. Cabbage Palm Littoral Rainforest

1f. Brush Box-Cabbage Palm Littoral Rainforest

1g. Brush Box Littoral Rainforest

1h. Beach Acronychia-Brown Bolly Gum-Persoonia adenantha-Red Cluster Heath Littoral Rainforest/ Sclerophyll Shrubland

1i. Coast Banksia-Beach ACronychia-Tuckeroo Littoral Rainforest

1j. Umbrella Cheese Tree-Pink-Flowered Doughwood-Blackwood Littoral Rainforest

1k. Cottonwood Littoral Rainforest

2. WET SCLEROPHYLL FOREST

2a. Brush Box Wet Sclerophyll Forest

2b. Grey Ironbark Wet Sclerophyll Frest

2c. Swamp Box Wet Sclerophyll Forest

2d. Willow Bottlebrush Wet Sclerophyll Forest

3. DRY SCLEROPHYLL FOREST & WOODLAND

3a. Blackbutt Dry Sclerophyll Forest

3b. Scribbly Gum Dry Sclerophyll Forest

3c. Brush Box-Pink Bloodwood Dry Sclerophyll Forest

3d. Pink Bloodwood/Brush Box-Wallum Banksia Dry Sclerophyll Forest/Woodland

3e. Pink Bloodwood-Dwarf Heath Casuarina-Swamp Box-Curracabah Dry Sclerophyll Forest/Woodland Above Graminoid Clay Heath

3f. Swamp Box Dry Sclerophyll Forest Above Graminoid Clay Heath

3g. Swamp Oak Dry Sclerophyll Forest on Headlands

3h. Black She-Oak Dry Sclerophyll Forest

3i. Coast Banksia Dry Sclerophyll Forest/Woodland on Holocene Frontal Dunes

3j. Coast Banksia Dry Sclerophyll Woodland Above Wallum Banksia Dry Heath

3k. Coast Cypress Pine-Coast Banksia-Coast Teatree Dry Sclerophyll Woodland

3l. Horsetail Sheoak Dry Sclerophyll Forest/Woodland on Holocene Frontal Dunes

4. SWAMP SCLEROPHYLL FOREST & WOODLAND

4a. Broadleaved Paperbark Swamp Sclerophyll Forest

4b. Broadleaved Paperbark Swamp Sclerophyll Forest Above Graminoid Clay Heath

5. RAIN SHRUBLAND (shrubland forms of rainforest)

5a. Native Guava-Grey Ebony-Saffron Heart Rain-shrublands on headlands

6. DRY SCLEROPHYLL SHRUBLAND

6a. Wallum Banksia-Black Sheoak-Tree Broom Heath Dry Sclerophyll Shrubland

6b. Bitou Bush-Coast Wattle Shrubland on Frontal Dunes and Headlands

6c. Bitou Bush Sparse Shrubland on Seacliffs

6d. Lantana Shrubland

7. DRY HEATHLAND

7a. Wallum Banksia Dry Heath

7b. Tree Broom Heath-Honey Myrtle Sparse Dry Heath

8. GRAMINOID CLAY HEATHLAND

8a. Byron Graminoid Clay Heath

9. WET HEATHLAND

9a. Swamp Lemon-Scented Teatree-Empodisma-Grass Tree Wet Heath

10. TUSSOCK GRASSLAND

10a. Spinifex Grassland Frontal Dunes

11. SOD GRASSLAND

11a. Kangaroo Grass Headland Grassland

11b. Queensland Blue Couch Headland Grassland

11c. Buffalo Grass Headland Grassland

12. SEDGELAND

12a. Red-Fruit Saw Sedge Sedgeland

12b. Twigrush Sedgeland

13. RUSHLAND

13a. Common Reed Rushland

14. FERNLAND

14a. Coral Fern Fernland

14b. Bat's Wing Fern-Harsh Ground Fern-Bracken-Swamp Water Fern Fernland/Wet Heath Complex

VEGETATION COMPLEX

HC. Headland Complex

DI. Disturbance Complex

MISCELLANEOUS MAP UNITS (Unvegetated)

BE. Beach sand, mobile sand

DE. Developed Areas/Park Infrastructure

DI. Cleared/Severe Disturbance

PI. Picnic Areas

RO. Rock or Scree

WA. Open Water

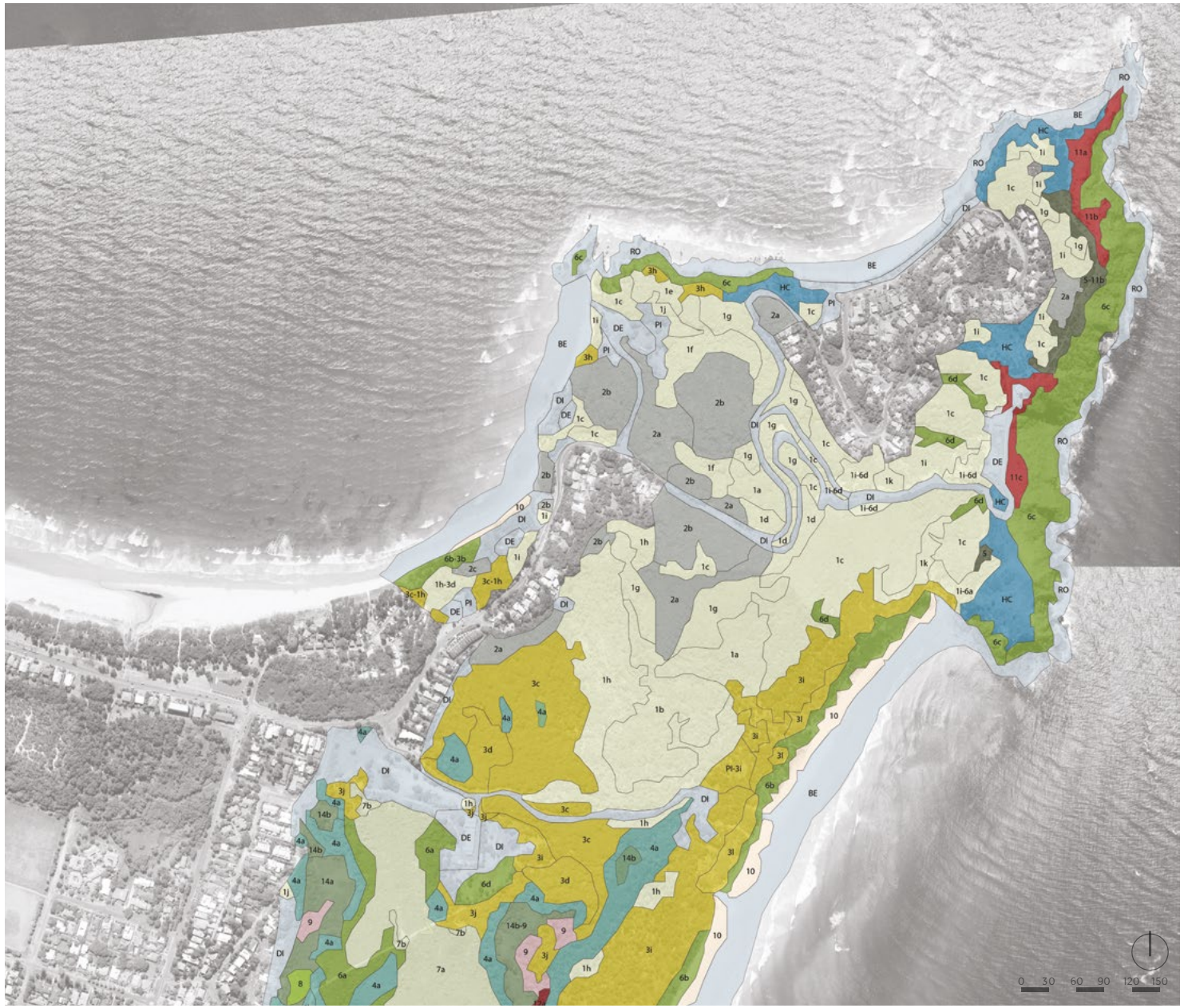


Figure 17 Vegetation and flora of Cape Byron SCA and Arakwal NP. Wildsite Ecological Services (Baker, 2013)

Disturbance analysis

The area in and around the Lighthouse Precinct reflects a recent history of extensive disturbance, with the precinct containing little vegetation of natural or cultural significance.

Since the site was levelled in 1899, it has been maintained in a largely cleared condition, and is now dominated by mown lawns and a few scattered plantings.

Feral goats removed much of the native vegetation on the cliffs facing the ocean until a successful control program removed the goats in 2006.

Bitou Bush (*Chrysanthemoides monilifera*) had overtaken much of the Cape until an extensive control program over the past 10 years eliminated most of the infestation.

Other clearing has resulted from sand mining behind Tallow Beach, the water pipeline that connects to the water tank on the Cape and associated construction access tracks [Figure 18].

Visitors to the Cape create severe erosion when they detour from planned tracks. This is very apparent just beyond the Little Wategos Lookout [Figure 19]. New tracks are needed to prevent this erosion and to protect the endangered *Themeda* Grassland community.

Much of the original vegetation is now regenerating in areas that were previously cleared and active regeneration work has successfully regenerated the watercourse at The Pass and other locations.

Figure 18 Sand Mining at Cape Byron circa 1970's (www.commongroundaustralia.com)

Figure 19 Erosion past the lookout at Little Wategos (Context, 2016)

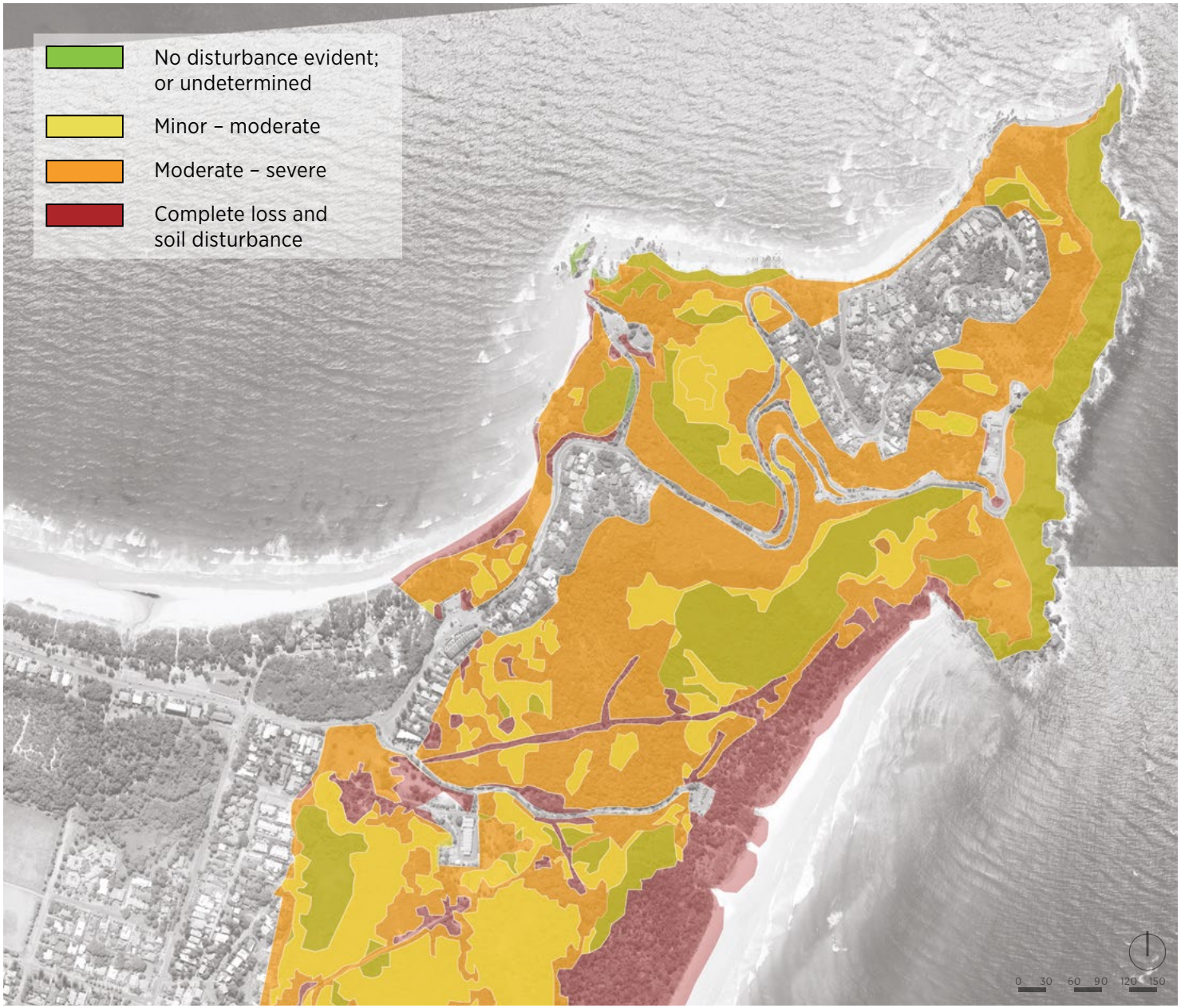


Figure 20 Disturbance levels of Cape Byron SCA and Arakwal NP. Wildsite Ecological Services (Baker, 2013)

Access and circulation

A network of sealed roads, managed by NPWS and Byron Shire Council provide vehicular access to the Cape's beaches and day use areas. Cape Byron Trust manages these day use areas and the Lighthouse Precinct with these spaces linked by the Cape walking track.

Walking

The predominant method of accessing the Lighthouse Precinct is by walking via the existing Cape tracks and roads. About 70 per cent of current visitors are walkers. Walkers include locals, who either walk the route regularly for exercise or a few times throughout the year, and visitors, who generally visit the Lighthouse Precinct at least once during their stay in Byron Bay.

Walkers also include people who have driven to the Lighthouse Precinct and failed to find a park. Some of the walkers follow Lighthouse Road beyond Brooke Drive and the end of the Cape boardwalk. This section of road is dangerous and unpleasant for walkers as it is very narrow with no footpath or shoulder and little safe sight distance on bends.

At times there is congestion on the tracks. Some tracks are inadequate and in disrepair and some of the tracks are discontinuous and difficult to navigate despite adequate signage. The track system requires an upgrade of materials and signage and legibility upgrades to assist with the separation of walkers and joggers.

The western end of the Tallow Ridge walking track finishes in an ambiguous suburban setting with no clear destination. An extension of this track that directs walkers to the proposed Arakwal Cultural Centre will provide a longer loop and a more appropriate finish location.

Figure 21 Existing boardwalk Cape Byron (Context, 2016)

Figure 22 Existing paths in need of enhancement (Context, 2016)

Figure 23 Mini bus accessing the Cape (Context, 2016)

Figure 24 Current Byron Bay bus operator (blanchs.com.au)

Vehicles

A network of roads service the Cape, however they are narrow and winding with little opportunity for turning, passing, stopping and parking. At times drivers perform dangerous manoeuvres. All cars using the Lighthouse Road exceed the speed limit of 10 kilometres per hour.

The roads can become congested during peak times and the congestion can build up towards town. Many drivers on Lighthouse Road contributing to the congestion have failed to find a parking space at the Lighthouse Precinct.

The Lighthouse Precinct accepts tourist coaches [Figure 24]. Entry fees apply to coaches that drop and pick up passengers. Coaches visiting with pre-booked education programs or approved weddings/events are exempt from entry fees.

Large buses have difficulty on the narrow roads and tall buses conflict with overhanging vegetation.

Other

Small numbers of visitors arrive at the Lighthouse Precinct by

- cycling
- running
- dropped off by car
- hop-on/hop-off sightseeing bus.

Figure 25 Circulation at the Lighthouse has largely stayed the same (Frank Hurley c 1935.)

Existing access and circulation map

Due to the steep topography of the Cape, it is challenging to provide universal accessibility. Areas suitable for universal access are indicated on Figure 26. These areas should be assessed for compliance with current access standards.

Figure 26 Access and circulation map

Existing elements

Lighthouse Precinct

The structures at the Lighthouse Precinct have a strong identity due to their visual prominence – 100 metres above sea level, location in a popular area and the homogeneity and form of the original buildings [Figure 27]. The structures and the surrounding area have a strong utilitarian character. This character has been maintained in recent upgrades, such as the replacement of the white-painted arised post and rail fences and the removal of the concrete crib-lock retaining wall and replacement with a stone wall. The landscape surrounds are partly grassed and partly paved. When viewed from the Lighthouse, the paving dominates. Sporadic plantings are found in the rear yards of the former Assistant Lighthouse Keeper's quarters, and on the margins of the site.

> 'The two fully-paved car parking areas are somewhat intrusive and have little significance; these impart an urban quality that overwhelms and suppresses the more authentic quality of ruggedness and remoteness that was an essential characteristic of lightstations.' (CMP – The Cape Byron Lightstation Precinct, 2008.)

The Assistant Lighthouse Keeper's Cottages have been successfully converted to accommodation by the Cape Byron Trust. The Head Lighthouse Keeper's Cottage is currently under utilised and requires improvement.

The Pass

The Pass is a popular local and visitor destination, due to the attractiveness of the setting, proximity to the town centre and renowned surfing beach. The steep narrow and winding access road, Brooke Drive, and the car park can become severely congested in peak periods.

Design proposals have been developed to improve vehicle and pedestrian circulation and legibility, parking arrangements and pedestrian safety ('Palm Valley/The Pass, Cape Byron Headland Reserve Draft Concept Design prepared for the Cape Byron Trust by Geolink 2009').

Arakwal Lands

The Arakwal people are planning to develop a cultural centre. The centre will be located on Arakwal Corporation land adjoining the north-west corner of Arakwal National Park, near the intersection of Lighthouse and Tallow Beach Roads [Figure 28] and adjacent to the NPWS depot and office. It is anticipated that the cultural centre will be a primary visitor destination in Byron Bay and will have an integral role in the delivery of visitor information about Country, including the Cape.

The Arakwal people have expressed interest in integrating the proposed centre with the master plan proposals being developed for the Cape. Such integration may include, but is not limited to:

- incorporation of the NPWS visitor centre
- sharing of parking and bus resources
- museum incorporating interpretive material that covers the Cape
- group visitor packages that cover visitation to the centre and tickets for car parking/shuttle bus or tours to the Lighthouse Precinct
- coffee shop/kiosk
- souvenir sales
- school education tours and activities
- guided tourist tours and programs.

Food outlets

Two cafes are leased by their operators and provide income to the Cape Byron Trust. There are no proposals to provide additional food outlets other than temporary arrangements associated with special events. The food outlets are located at the Lighthouse and The Pass precincts.

Figure 27 Cape Byron Lighthouse (Context, 2016)

Figure 28 Existing Arakwal lands (Context, 2016)

Figure 29 Cape Cafe (Context, 2016)

Figure 30 Fisherman's Lookout is structurally unsafe and in need of immediate repair (Context, 2016)

Car parks

The Cape Byron Trust provides user pays car parking at the following locations:

- Tallow Beach: 79 car spaces, plus two accessible spaces and two bus spaces.
- Captain Cook: 42 car spaces, plus one accessible space and one bus space.
- The Pass/Palm Valley: 85 car spaces, plus three accessible spaces.
- Lighthouse: 24 car spaces, plus one bus space.
- Lighthouse Road: 10 car spaces (upper car park) and 12 car spaces (lower car park).

There is no provision for any trailer or caravan parking (with the exception of boat trailer parking at the Pass). Council signage clearly states that no trailers or caravans are permitted past the Captain Cook car park along Lighthouse Road.

The capacity of car parks is frequently exceeded, particularly in the Lighthouse Precinct. Congestion during these periods conflicts with the cultural and natural settings of the Cape and significantly compromises visitor enjoyment. Parking space cannot be increased in any of the Cape's car parks, due to physical limitations and requirements to maintain historic and natural settings.

Hang gliding launch ramp

A hang gliding launch ramp is discreetly located on Tallow Ridge [Figure 54] and is operated and supervised by the Northern Rivers Hang Gliding and Paragliding Club under a licence with the Cape Byron Trust. The licence agreement limits the number of commercial operators to four.

Hang gliders use part of the lower car park at the Lighthouse Precinct for unloading. Part of this car park will be retained to allow hang gliders to continue to launch from this location. It is not essential that the car park is hard-surfaced as hang gliders use the launching platform sporadically when weather conditions are appropriate. The remainder of the car park can be regenerated with native plantings.

Accommodation

Cape Byron Trust manages six cottages for holiday accommodation [Figure 31]. These are highly successful ventures and contribute a significant proportion of the Cape Byron Trust's income, while providing a unique opportunity for visitors to enjoy the natural and cultural heritage values of the Cape in a way that is not possible during a day visit.

There are no underutilised hard roof properties suitable for further cottage accommodation and there are no plans to provide camping.

Figure 31 Assistant Lighthouse Keeper's cottages (NPWS, 2015)

Figure 33 View to the Cape from the hang glider launch ramp (Context, 2016)

Figure 32 There are current safety issues at Palm Valley/The Pass car park with clashes of pedestrians, cars and boat trailers (Context, 2016)

Figure 34 Reinforced turf or native plantings will replace the lower Lighthouse car park and the current hang glider launch ramp car park will be maintained (Context, 2016)

5.2 Incorporating the Cape with Byron Town Centre Masterplan

Byron Shire Council's Town Centre Masterplan (adopted June 2016) identified several projects that will convert the town centre and environs to pedestrian and cyclist priority over cars. These projects directly influence considerations for the planning of the Cape and include:

- The proposed Butler Street Car Park, which provides a flexible long term car parking facility that alleviates parking issues within the town centre.
- Railway Square Bus Interchange on the western edge of the railway line provides space for alternative modes of transport, such as local and tourist bus travel. Toilets, cycling facilities and a new visitor centre will be incorporated in the facility. Local buses should connect with Jonson Street through a southern road connection allowing public transport access to Jonson Street South.
- A proposed 'Railway Walk' (pedestrian and cycle link) and a rail shuttle and rail bus station located along the North Coast Railway (with station close to Lawson Street) allowing alternate access in and out of the centre.
- A pedestrian and cycle link extension of Byron Street connecting the Cape through to Belongil Creek and forming the major east to west movement corridor in the town centre. Includes a prioritised crossing point at Butler Street.
- The Sandhills Scrubland Walk, which can readily integrate with connecting walks in the Cape and with the proposed Arakwal Cultural Centre. Although the walk does not have high priority for the town centre master plan, once the proposed Cultural Centre is operational, the walk becomes a relevant direct connection and alternative recreational route to the town centre.
- Aboriginal and European heritage at the Cape to be incorporated into the town centre's proposed east-west heritage link.

The pedestrianisation of the town centre and provision of parking at the edge of the town centre is compatible with proposals identified for the Cape. To be successful, the master plan must integrate with these proposals.

Figure 35 Byron Bay Town Centre Masterplan proposed access

Figure 36 Cape Byron State Conservation Area (John Spencer/OEH 2013)

6.0 Master plan

A key objective of this master plan is to transform existing walking tracks, lookouts and rest areas into a unique, world class walking experience. Consistent material and design will help create an easily navigable track for locals and visitors. Alternative transit options will relieve congestion at the Cape by removing the majority of cars and reduce or remove conflicts between walkers and cars.

A fleet of solar powered electric shuttle buses is proposed to transport visitors to the Lighthouse Precinct. This is the preferred transit option as it is the most compatible with walkers, most efficient transport and will result in the least impact. It also provides the best integration with the proposed Arakwal Cultural Centre and the Byron Bay Town Centre Masterplan.

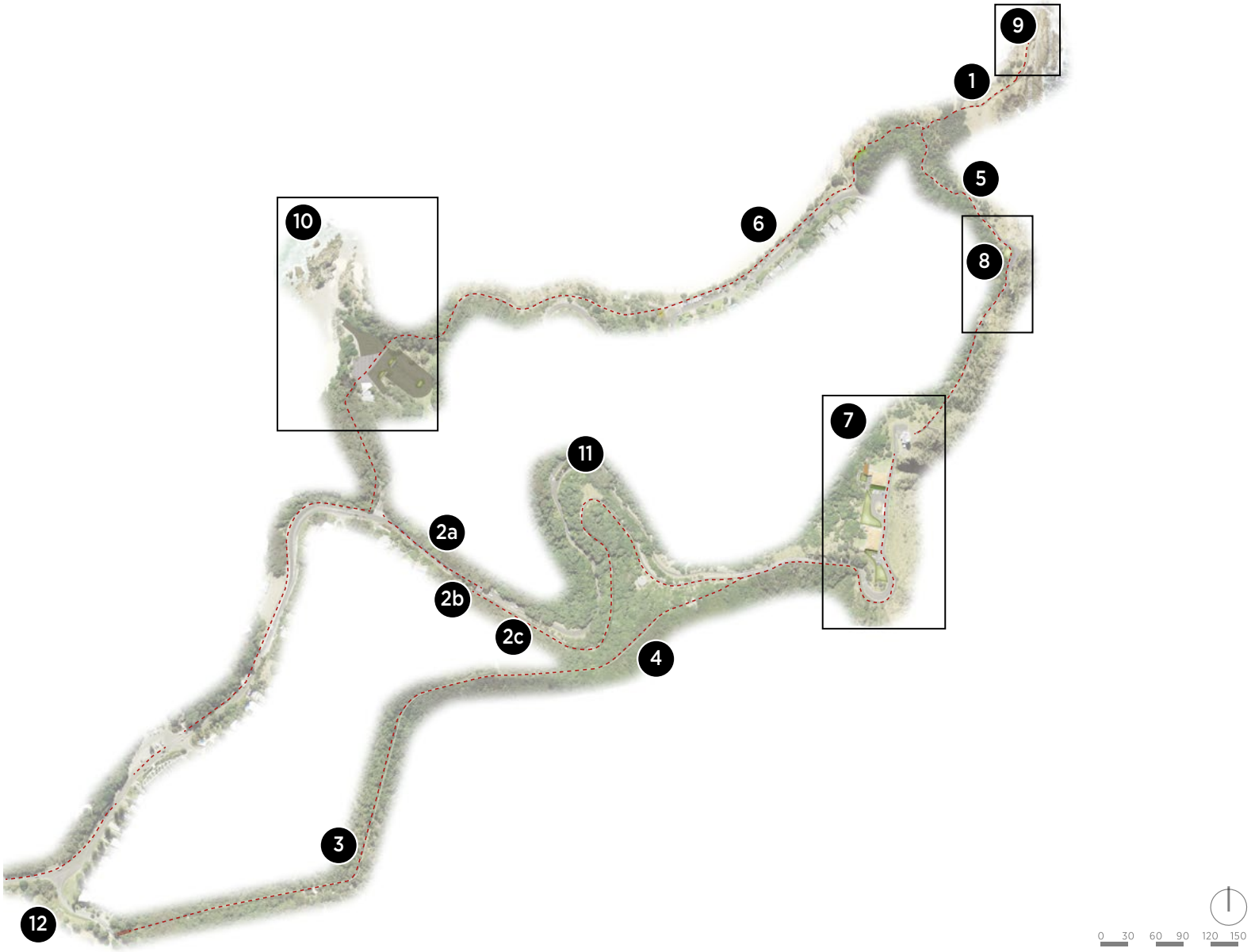


Figure 37 Cape Byron walking access

1. Wategos Beach to proposed Little Wategos Lookout

Fibreglass Reinforced Plastic (FRP) staircase and boardwalk to new lookout. Raised boardwalk will help protect *Themeda* grassland beneath. One existing rest spot is to be enhanced and a lookout is to be moved seaward to a more desirable location.

2. Lighthouse Road on-grade path extension, traffic calming and Lighthouse down-road path

a – Separating pedestrians from vehicles in this highly used location with an on-grade concrete path.

b – Crossing with raised traffic calming.

c – On-road asphalt path with painted delineation.

3. Extension of Tallow Ridge Track to meet proposed Arakwal Cultural Centre

Extend existing Tallow Ridge Track to Tallow Beach Road, with a track through adjoining bushland.

4. Tallow Ridge Track enhancement

Enhance existing track, improve signage and promote the route.

5. Little Wategos to Lighthouse Precinct

Enhance tracks and associated rest spots, widen path in select locations.

6. The Pass to Wategos Beach

Material enhancement of tracks, paths, boardwalks and rest spots.

7. Lighthouse Precinct

Enhancement of former car parks to create new public space for educational and special event opportunities.

8. Most Easterly Point Precinct

Enhance existing lookout incorporating existing concept plans.

9. Little Wategos Precinct

Incorporate new materials in proposed new lookout and enhance existing lookout.

10. Palm Valley Precinct

Repair or replace Fisherman's lookout and Palm Valley/ The Pass car park incorporating existing proposals.

11. Lighthouse Road lifting arm barrier

To prevent cars from entering the Lighthouse Precinct and limit access to buses and service vehicles.

12. Proposed Arakwal Cultural Centre

Proposed Arakwal Cultural Centre to be incorporated in all Cape Byron Trust/NPWS plans.

6.1 Walking tracks

The master plan aims to create a unique, high quality walking experience for locals and visitors, linking various sightseeing locations and showcasing what the Cape has to offer.

Improvements in walking surfaces and balustrades will improve visitor safety and experience, while new interpretive elements, such as in ground and traditional signage, will assist wayfinding throughout the Cape.

Track enhancements at various 'pinch points' will help to separate daily joggers from walkers, reducing conflicts.

1. Wategos beach to proposed Little Wategos Lookout

Little Wategos Lookout is a very popular destination at the Cape. Currently, users tend to bypass the existing lookout to walk further out on the headland, creating safety and management issues. The existing lookout is in poor condition. A new lookout at the most north-easterly point of the headland is proposed.

This will reduce safety issues and disturbance to the surrounding *Themeda* grassland community.

Proposed recommendations:

- Replace all of the Little Wategos Track, lookout platform and stairs with a raised boardwalk to protect the *Themeda* grassland.
- Extend the Little Wategos track from the lookout platform to the end of the point with a raised path/steps to prevent further erosion and to increase the area of the *Themeda* grassland.
- Rest Spot 1: to be moved to a more desirable location with views. Incorporate interpretive handrail signage.
- Rest Spot 2 : upgrade materials including stack stone bench.
- Investigate a potential new at-grade path between two rest spots.
- Incorporate ground level signage on track to Little Wategos Lookout.

Figure 38 Existing condition (Context, 2016)

Figure 39 Existing condition (Context, 2016)

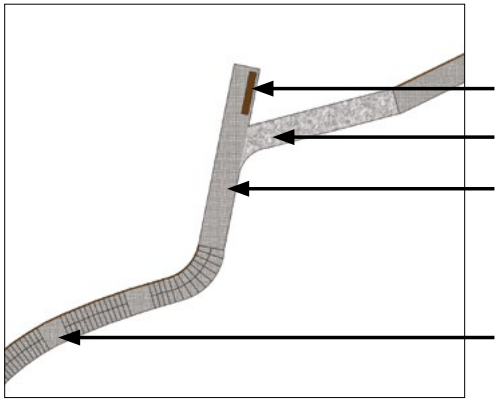


Figure 40 Proposed plan – Rest Spot 1

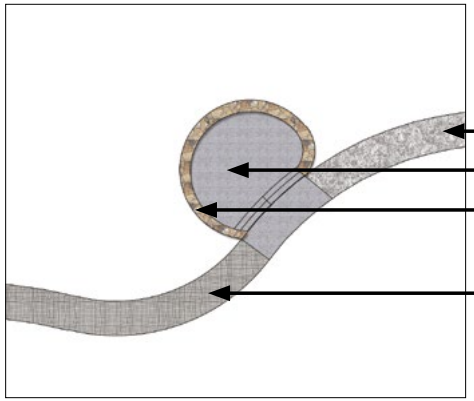


Figure 41 Proposed plan – Rest Spot 2

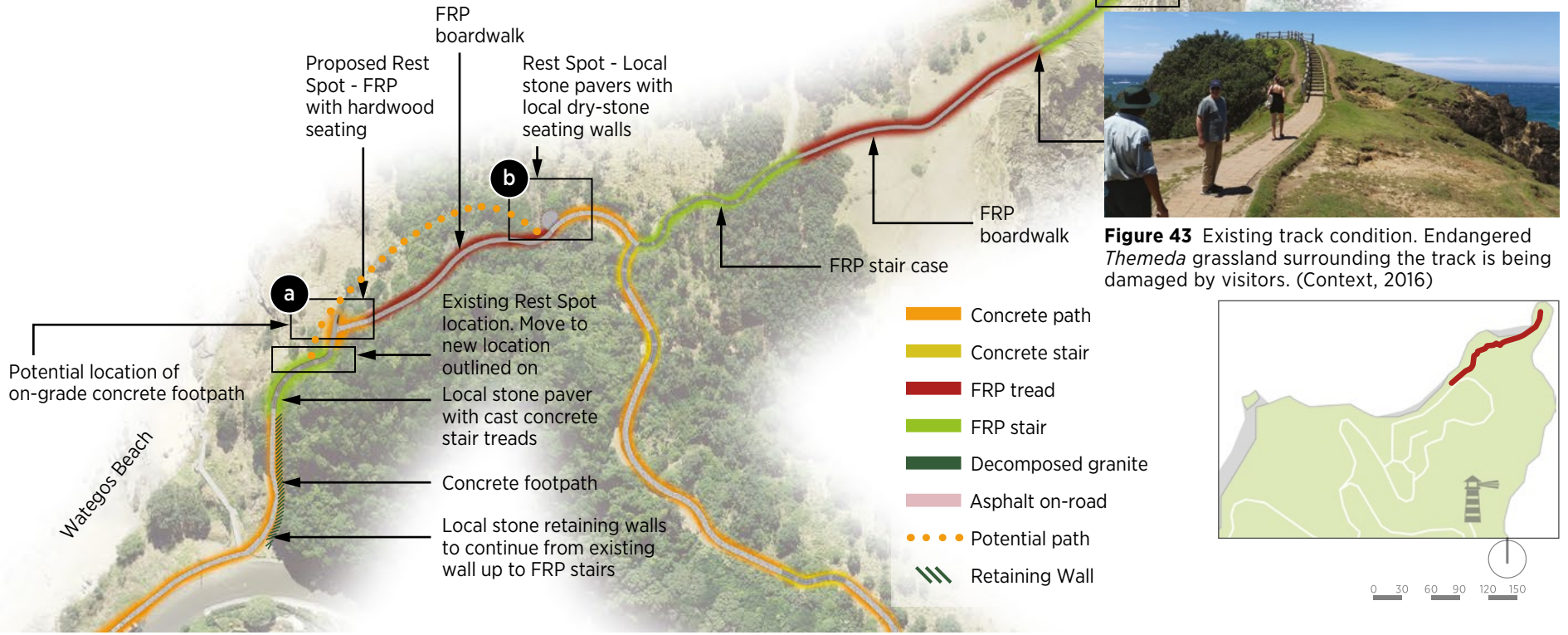


Figure 42 Wategos beach to Little Wategos Lookout proposed access

Figure 43 Existing track condition. Endangered *Themeda* grassland surrounding the track is being damaged by visitors. (Context, 2016)

2. Lighthouse Road on-grade footpath extension, traffic calming and Lighthouse road down-road path

- Encourage Byron Shire Council to extend the raised boardwalk on Lighthouse Road from Brooke Drive to the pedestrian raised threshold with marked crossing using an at-grade solution where feasible.
- Traffic calming crossing consisting of a ramped, flat-topped raised surface (75-100 millimetres high), striped pedestrian crossing on a flat-topped surface providing level connection with pedestrian paths.
- Traffic calming crossing will ensure pedestrians can safely cross Lighthouse Road, with a new track joining a newpath on the Lighthouse Road down-road. It will provide dual-function traffic calming and pedestrian priority. This type of crossing is not preferred by buses, but the specifications can be tailored to accommodate buses.
- Painted pedestrian delineation plus vehicle separation on down-road in consultation and agreement from council
- Upgrade materials and incorporate interpretive handrail signage at Existing Tallow Beach lookout.
- Lighthouse up-roads (east of Palm Valley Drive intersection) and down-roads to be closed to general traffic with specifications tailored to accommodate buses. Agreement from Byron Shire Council will be required.
- Install up-road lifting arm barrier with traffic signal with the following specifications:
    - similar to those used in car park management systems
    - synchronised operation to ensure one-way (e.g. default setting could be up-traffic ‘stop’ and down-traffic ‘go’)
    - may require some road widening and fencing/barriers to support solution
    - opportunity for additional measures to control vehicles driving up to Lighthouse (e.g. PIN or swipe-card access only)
    - system can facilitate a parking booking system for visitors if needed
    - if it is set-up suitably, it should not require additional management (passive solution)
    - authorised users will include: service vehicles; staff and lessee vehicles; visitors staying overnight in the cottage accommodation; solar bus shuttle service; emergency vehicles; and hang gliders.

Figure 44 Proposed path along Lighthouse Road to raised crossing. Path then continues to meet Lighthouse downroad path for an uninterrupted walk to the lighthouse. (Context, 2016)

Figure 45 Proposed dedicated downroad walking path and bus lane to meet new Lighthouse Road path. (Context, 2016)

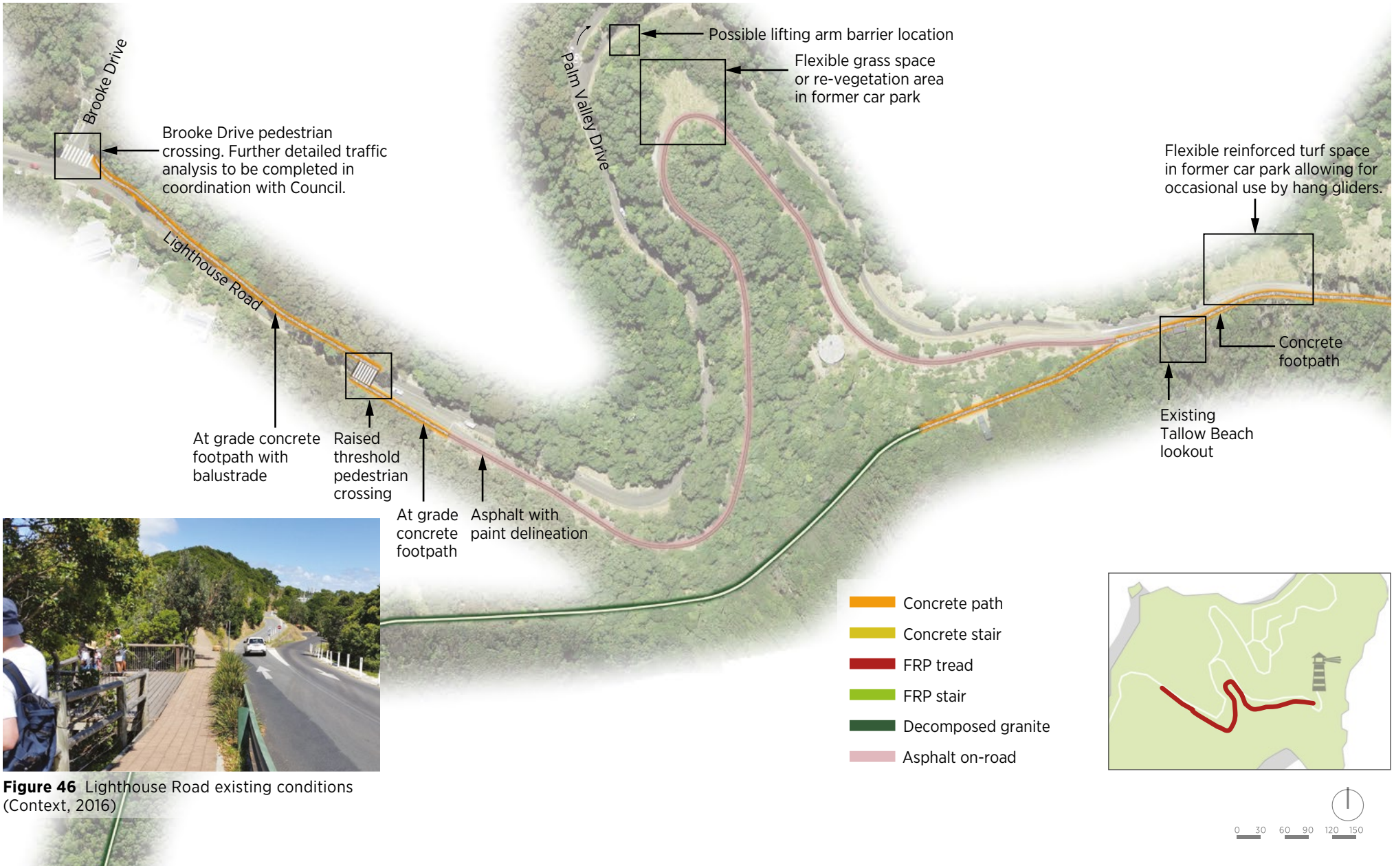


Figure 46 Lighthouse Road existing conditions (Context, 2016)

Figure 47 Lighthouse Road existing conditions

3. Extension of Tallow Ridge Track to meet proposed Arakwal Cultural Centre

The proposed extension of Tallow Ridge Track will pass through several distinct ecological communities providing a unique user experience.

Recommendations include:

- extend the Tallow Ridge Track to Tallow Beach Road and the proposed Arakwal Cultural Centre, with future provision for connection with council's Sandhills Scrubland Walk
- install additional signage along the track to encourage use of the under utilised track
- install raised FRP boardwalks that will allow the track to navigate through any low lying areas that may flood periodically
- extend the track to follow the path of previous high disturbance (see Figure 20)
- install major composite metal signage on local stone base at Tallow Beach Road for improved navigation.

Once approved, the exact route of the Tallow Ridge track will be determined during detail design to ensure that it has the least environmental impact on existing vegetation.

Figure 51 Existing track condition is mostly informal sand path (Context, 2016)

Figure 48 Cement stabilised decomposed granite path (Context, 2016)

Figure 49 Raised FRP Boardwalk (Context, 2016)

Figure 50 FRP stairs (Context, 2016)

Figure 52 Brushbox littoral rainforest at Tallow Ridge (Context, 2016)

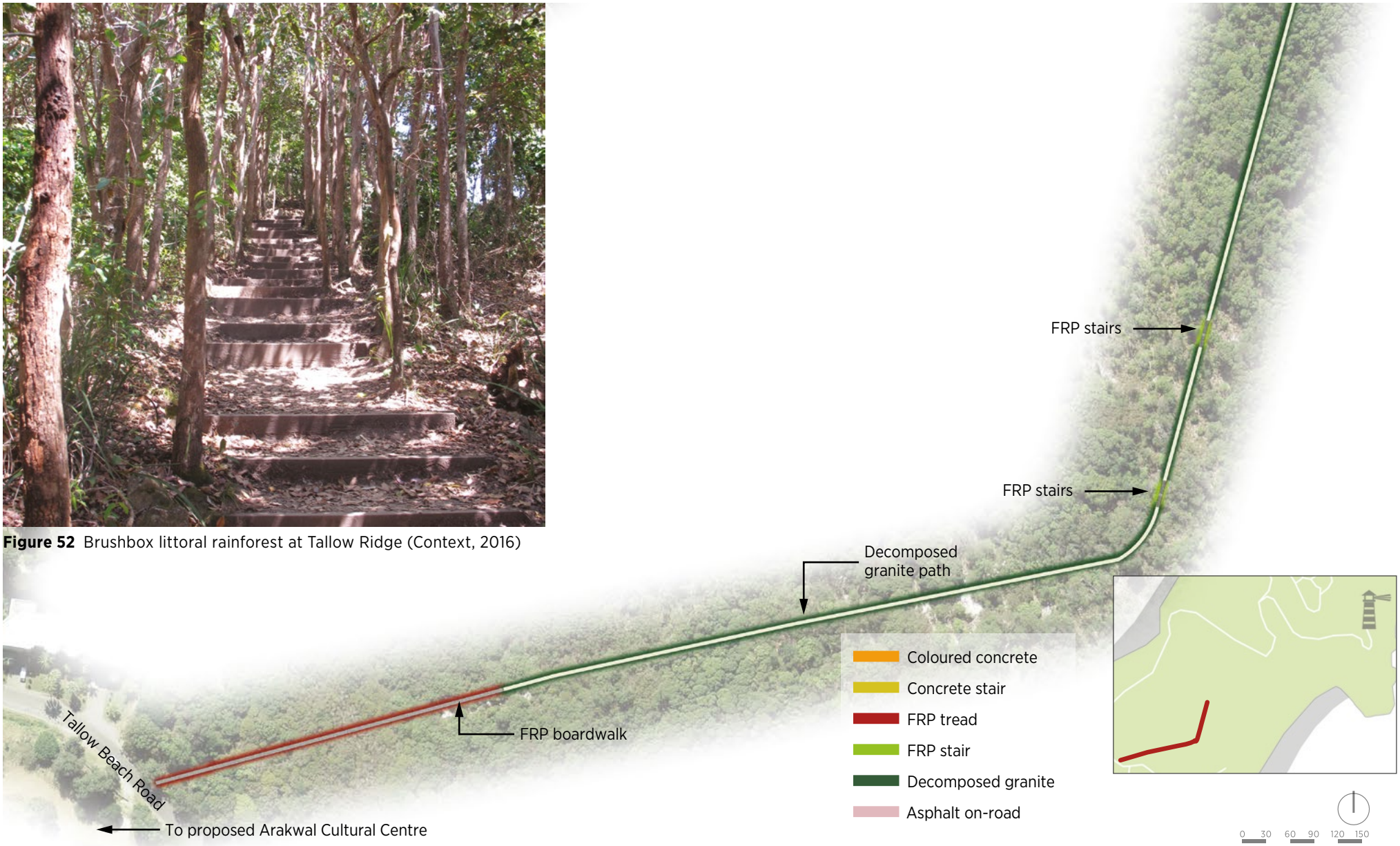


Figure 53 Tallow Ridge Track extension proposed access

4. Tallow Ridge Track enhancement

The existing Tallow Ridge Track has low use compared to other parts of the Cape Byron Walking Track. This is partially due to poor signage and track infrastructure. A track extension and improved signage that enables access to the proposed Arakwal Cultural Centre will likely increase usage of the track significantly.

The proposed extension of Tallow Ridge Track will pass through several distinct ecological communities providing a unique user experience.

The current track includes a connection with the hang glider launch ramp. This poses ongoing safety concerns, as people tend to ignore warning signs and climb onto the launch.

Recommendations include:

- Widen the walking track near the hang glider launch ramp to provide a hang glider set up area separate from the walking track. This will help prevent conflicts between pedestrians and hang gliders (Figure 54).
- Upgrade the existing Tallow Ridge Track where erosion has occurred or grades are steep with raised sections of path or steps.
- Enhance track to protect the natural environment from higher user numbers.
- Define the entrance/exit point – the existing track ends near residential properties and the entrance/exit is unclear. The proposed Arakwal Cultural Centre will provide a more suitable area for an entrance/exit.
- Retain existing access and as an alternative access/exit point.

Figure 54 Existing hang glider launch ramp poses an ongoing safety issue (Context, 2016)

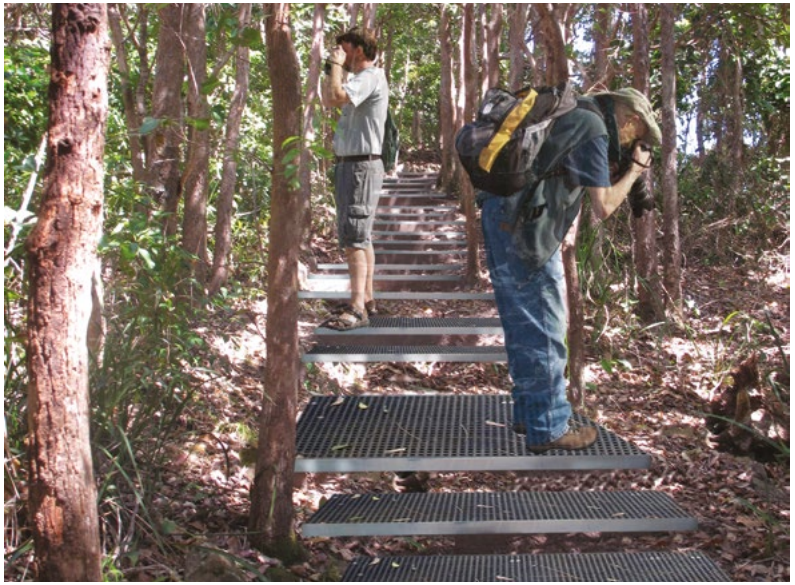


Figure 55 Some areas of the track may require material upgrades (Context, 2016)

Figure 56 Tallow Ridge Track proposed enhancement

5. Little Wategos to Lighthouse precinct

The section of path between the Little Wategos turnoff and the Lighthouse Precinct requires structural upgrades including paving, stairs, fences, balustrades and retaining walls with a new consistent palette of materials.

Multiple rest spots will be enhanced with new materials, seating and signage, complementing this highly visited landmark with an equally high quality finish.

Rest spot upgrades are as noted in previous concept design report (see The Cape Byron Experience).

Concrete footpath to be widened (as shown) to reduce wear and tear on surrounding vegetation. This area has significant space for path widening (three metres) to be adequately incorporated.

Incorporate handrail signage at rest spots.

Figure 57 Little Wategos to Lighthouse precinct current and proposed access (Context, 2016)

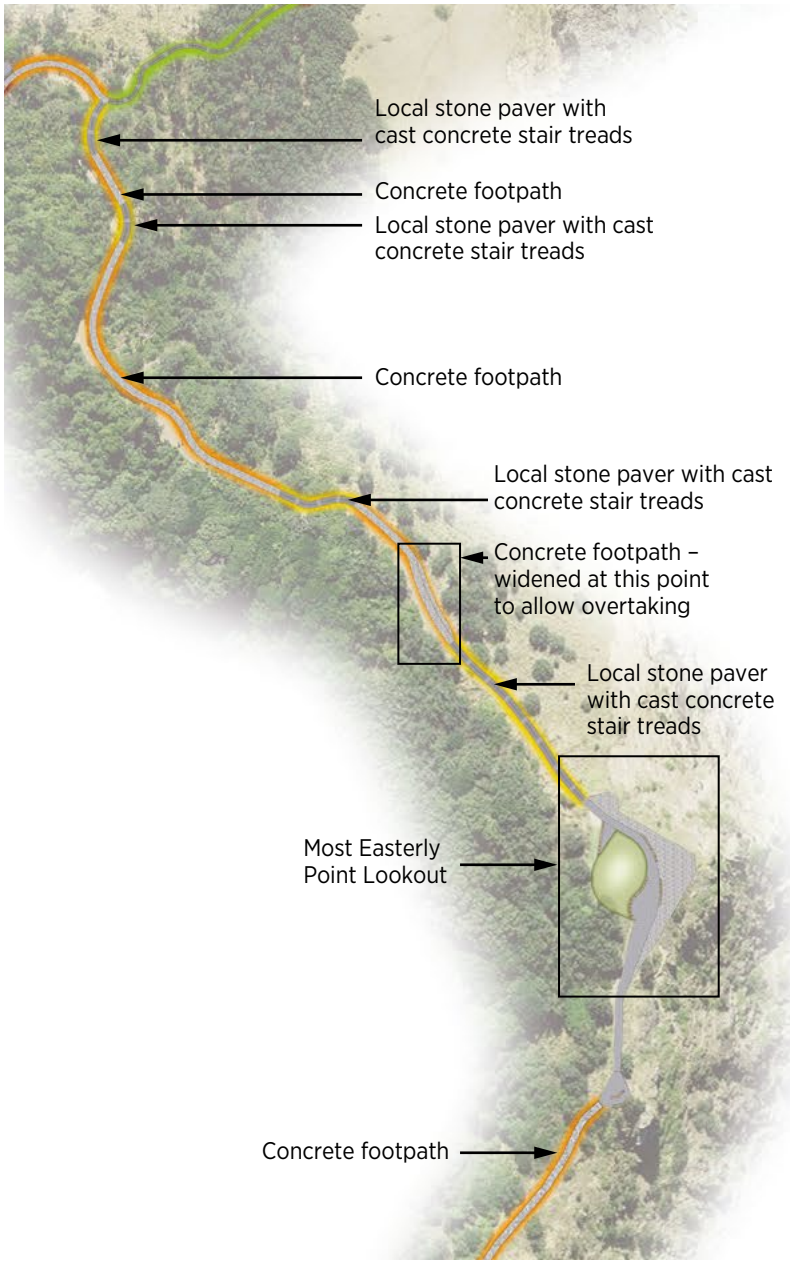


Figure 58 Little Wategos to Lighthouse precinct proposed access (a)

Figure 59 Proposed Plan – Rest Spot 3

Figure 60 Proposed Plan – Rest Spot 4

Figure 61 Proposed Plan – Rest Spot 5

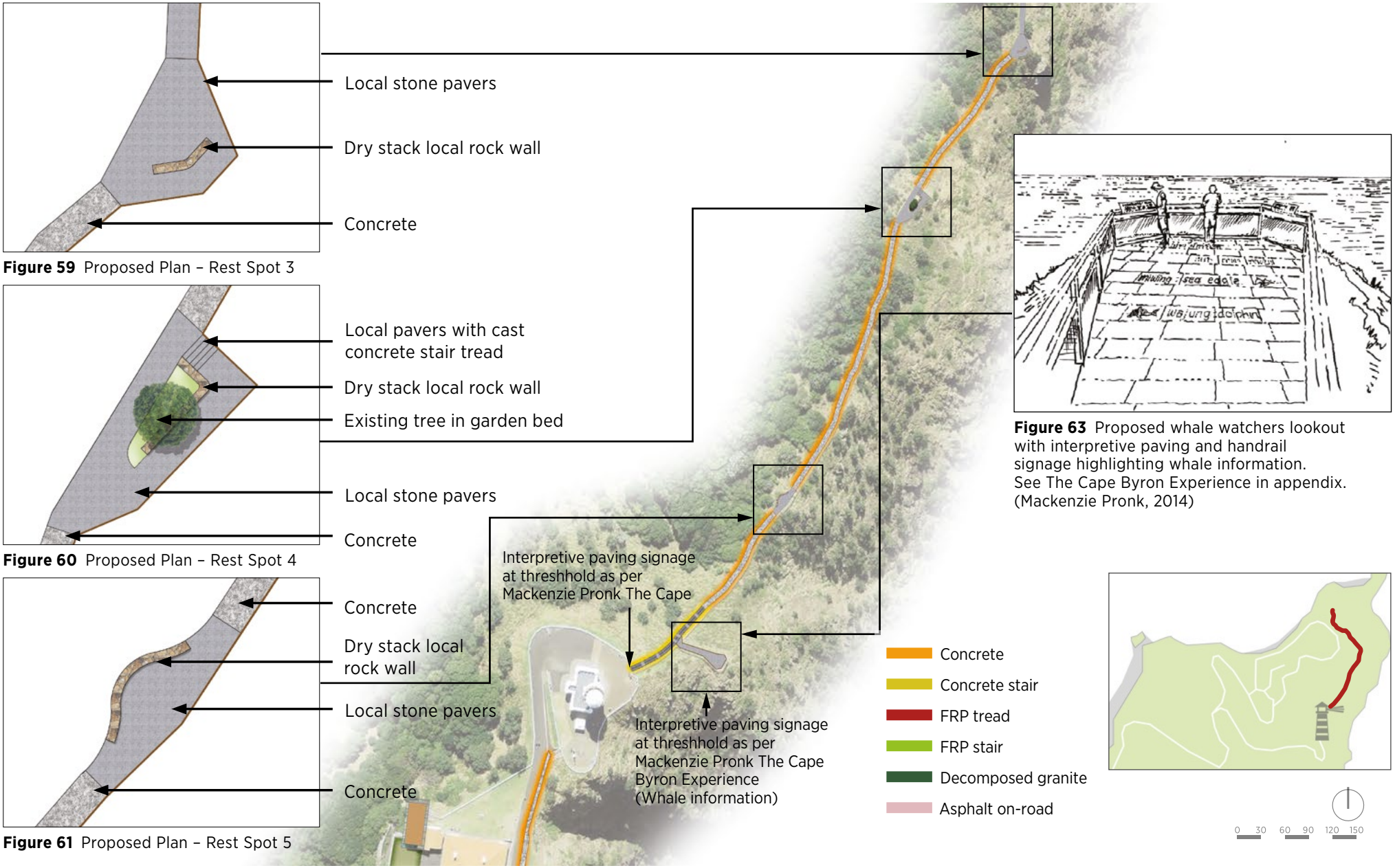


Figure 62 Little Wategos to Lighthouse precinct proposed access (b)

Figure 63 Proposed whale watchers lookout with interpretive paving and handrail signage highlighting whale information. See The Cape Byron Experience in appendix. (Mackenzie Pronk, 2014)

6. The Pass to Wategos Beach

The upgrade of Palm Valley/The Pass car park requires minor track upgrades to link directly with proposed paths through the car park.

A rest spot with gym equipment at the eastern end of Wategos Beach has been recently installed. Refer Figure 53 and appendix: *The Cape Byron Experience* (Mackenzie Pronk, 2014).

It is understood that locals may be concerned that changes to the Cape precinct may impact the Wategos area. The primary concern from locals is the perceived impact of the proposed closure of car spaces at the Cape causing more vehicles to circulate for parking around Wategos Beach. This has been addressed in several ways:

- The master plan proposals along with the Byron Town Centre Masterplan include improved signage on route to encourage walking and a cultural shift to pedestrian priority. Signage will specifically inform drivers that there is “NO WAY” to the Lighthouse if they continue along Lighthouse Road.
- The Byron Town Centre Masterplan proposes parking provisions and traffic improvements will encourage a pedestrian priority town - initiatives which will get more people out of their car and accessing the Cape by foot.
- The proposed Arakwal Cultural Centre will provide some off-street parking coupled with a new bus service operating from the centre.
- Wategos will not be promoted as the beginning or the end of the walking experience. Walkers will be encouraged to start and finish from other locations.
- A turning head will be provided for drivers who inadvertently ignore signs and enter the Lighthouse Road uproad. These drivers will then be presented with a no right turn towards Wategos There will be no bus stop at Wategos and Cape shuttle buses will not be permitted to enter Wategos.
- There will be no bus stop at Wategos and Cape shuttle buses will not be permitted to enter Wategos.

Other issues include:

- NPWS will review the layout and usage of the amenities at Wategos Beach and this will inform any future upgrades.
- A viewing platform over the drainage pipe outlet was previously considered and subsequently deemed inappropriate over a stormwater drain.

Figure 64 Existing balustrade on this section is new and in good condition (Context, 2016)

Figure 65 One of the new dry-stack walls already incorporated from previous plans (Context, 2016)

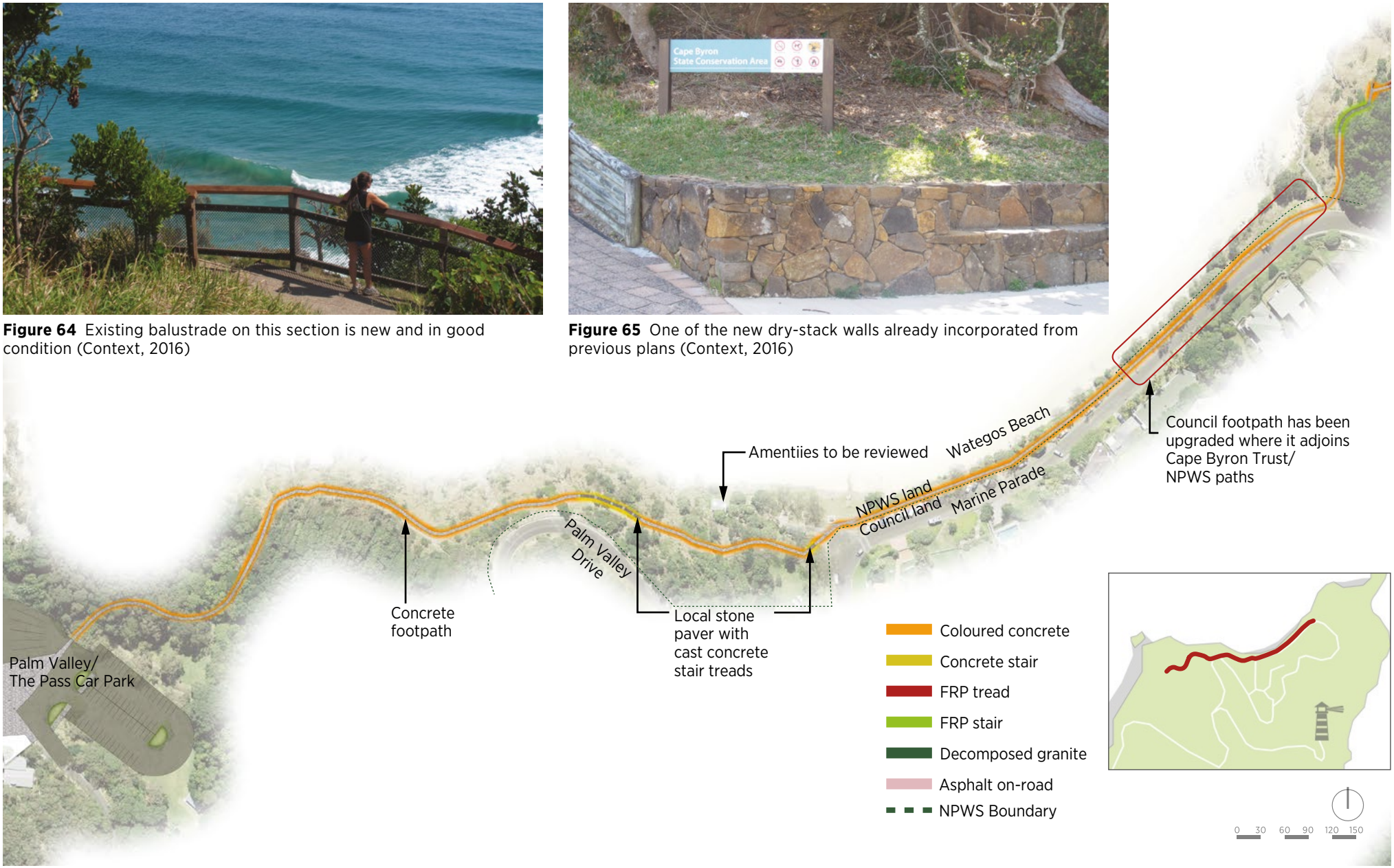


Figure 66 The Pass to Wategos Beach proposed access

Figure 67 Potential to incorporate special events in new green spaces and into the wider Byron town centre events strategy. These temporary events/features can help to increase interest whilst having minimal impact on the heritage Lighthouse Precinct. (Context, 2016)

6.2 Destinations

Several existing proposals required for the proposed enhanced walking tracks and transit have been broken down by precincts.

7. Lighthouse Precinct

The introduction of electric shuttle bus transit will allow visitors to use space at the Lighthouse Precinct that is currently occupied by parked cars. Car parking will only be available for emergency, pre-approved disability parking, service and lessee vehicles and guest parking for Lighthouse accommodation. This will create space for a flexible grassed area for events (in accordance with existing planning controls), outdoor education or passive recreation.

Changes will be in accordance with the CMP (see Appendix) and include:

- Remove car parking at the Lighthouse Precinct except the southernmost car park (six parking spaces) and three spaces adjacent to the Head Lighthouse Keeper's cottage. These parking spaces will be retained for service and lessee vehicles, staff and visitors staying in the Assistant Lighthouse Keeper's cottages. Two additional spaces are to be retained as allocated disabled parking spaces. A process of pre-approval to use these spaces will be implemented. Volunteers will have free travel on shuttle buses. Marine Rescue will have 24 hours access on the gate and one allocated parking space and parking will be available for shift changeovers.
- Replace redundant bitumen surface car park areas with turf grass. Grass areas would be available for picnics, educational opportunities and 'pop-up' events and weddings, noting that currently marquees are prohibited at the Lighthouse due to space restrictions. Grass would also maintain the open and treeless character of the Lighthouse Precinct curtilage, which typifies its utilitarian role.
- Replace Lighthouse lower car park bitumen surface with reinforced turf or native plantings.
- Add building identification to Lighthouse Keeper Cottages as per previous concept plans (see Appendix: *The Cape Byron Experience* Mackenzie Pronk, 2014).
- Integrate interpretive signage into existing buildings and structures as appropriate.
- Convert the Head Lighthouse Keeper's Cottage into an interactive information hub. This could include a tour guide base and high quality, engaging, interactive and educational information. WIFI connectivity and downloadable apps or information could guide users around the Cape.
- Re-configure vehicle circulation for the reduced traffic, taking into consideration emergency vehicle access. Maintain turning circle, allow buses to enter and exit and allow for bus pick up/drop off.
- A precinct plan be undertaken for the Lighthouse Precinct that addresses the CMP and seating.
- Night access should be considered.
- Incorporate shared zone in the Lighthouse Precinct.
- Consider further opportunities for special events, incorporating with the council's Byron Bay town centre events strategy.
- Incorporate interpretive signage element in concrete stair tread at threshold of stairs toward Most Easterly Point.
- Review layout and usage of the Lighthouse Precinct toilets to inform any future upgrades.

Figure 68 Potential to incorporate special events in new green spaces into the wider Byron Bay Town Centre Masterplan events strategy. (Context, 2016)

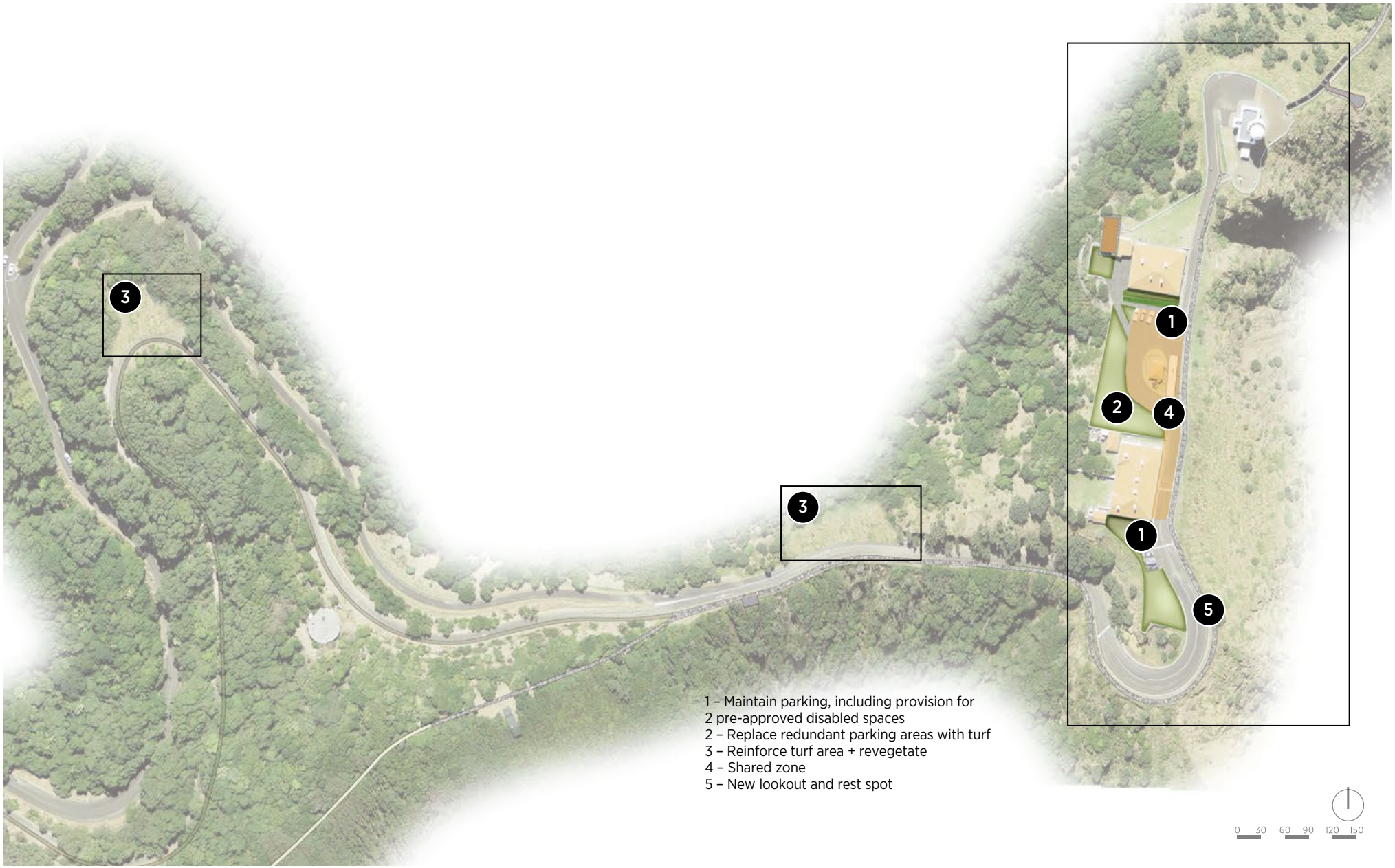


Figure 69 Lighthouse precinct

8. Most Easterly Point Precinct

It is recommended that the existing concept design, prepared by Mackenzie Pronk Architects and Fisher Design + Architecture, be adopted with some amendments. This design should incorporate the new suite of materials proposed in this master plan, in addition to the concept plan's recommended interpretive elements.

The concept design proposes the following background to the design:

> 'The proposed design for the Most Easterly Point of Australia will create a landmark public space, celebrating the natural and cultural significance of the site. The proposed design will provide a unique and iconic experience enhancing the various user experiences, and creating new opportunities for social interaction, learning, story telling and rest. Tangible connections with the surrounding environment are created through the use of a suite of appropriate and durable materials, artwork and interpretive signage. The public space is designed to be elegant, functional, and robust – a valuable public asset and investment for future generations. The interpretive information will be simple, focused and have a timeless quality, elegantly conveying geographic, natural and indigenous stories creating a unique sense of place.' (Mackenzie Pronk and Fisher Design and Architecture 2014)

The proposed lookout at the Most Easterly Point is designed to accommodate education groups on the grassed area and small groups in the circular seating wall area. Paving treatments will delineate faster walkers/runners from slow walkers/sightseers to reduce conflict during busy periods. Existing treated timber retaining walls will be replaced with dry stacked local rock seating walls. Interpretive signage in the form of handrail and in-ground signage will be installed to celebrate the unique cultural and geographic features of the site.

An area of track to the north of the lookout is currently being used as an overtaking area, causing the ground to erode. This area will be widened to reduce the impacts of overtaking.

Figure 70 Proposed concept (Mackenzie Pronk, 2014)

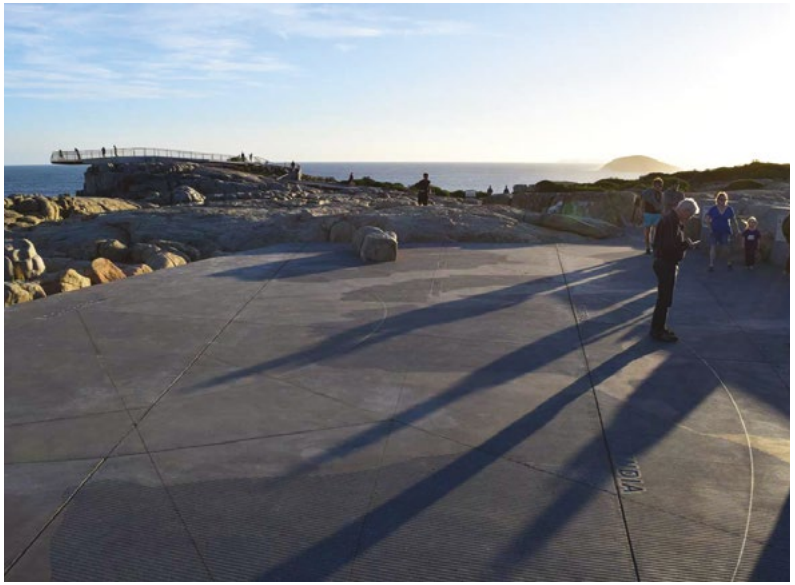


Figure 71 Interpretive signage in the ground plane (Parks WA, The Gap, Albany)

Figure 72 Existing site condition (Context, 2016)

Figure 73 Proposed raised boardwalk to new Little Wategos lookout (Context, 2016)

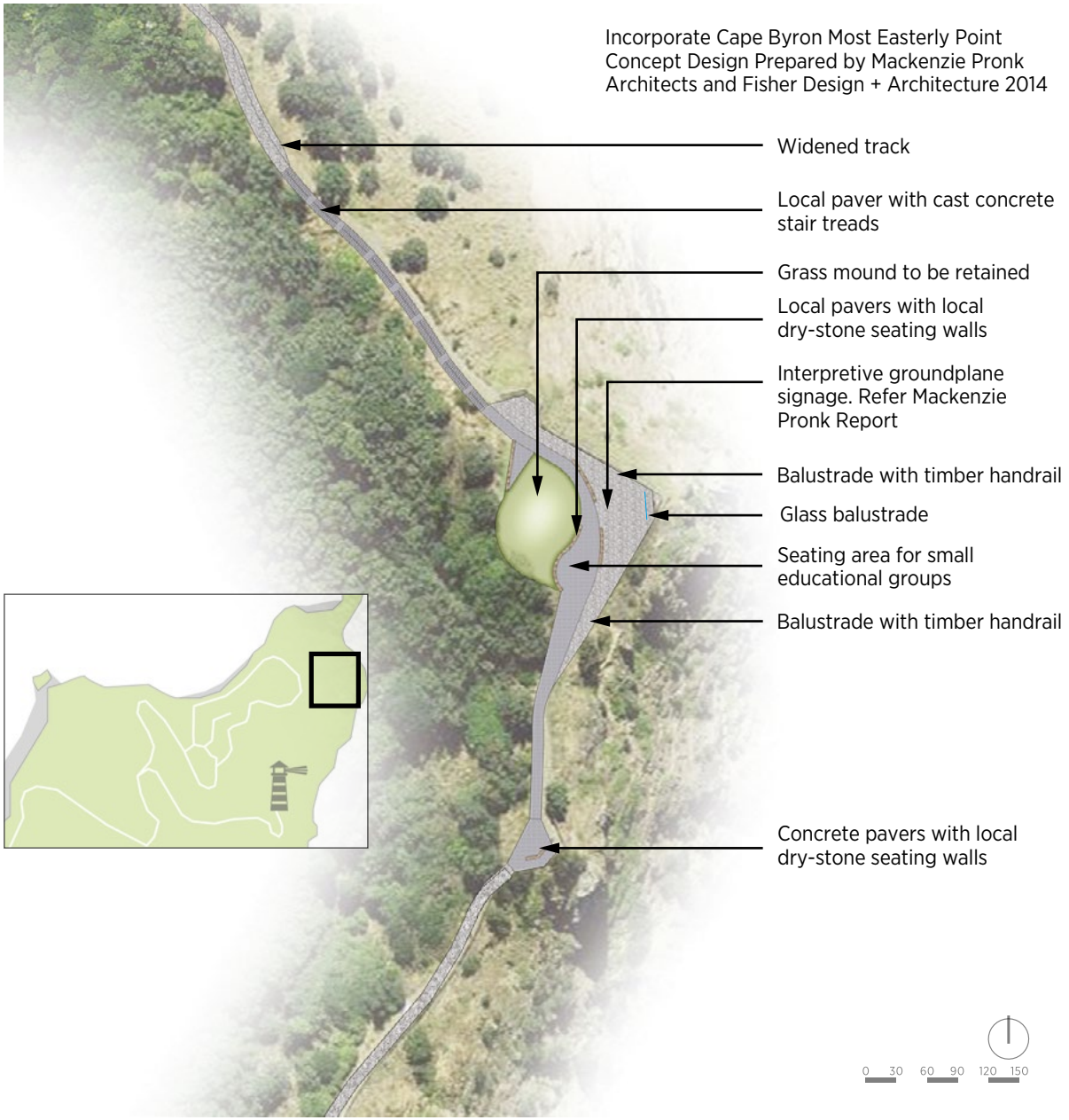


Figure 73 Cape Byron Most Easterly Point concept design

9. Little Wategos Precinct

The previous concept for Little Wategos Lookout proposes an upgrade to the existing lookout structure. The current lookout location allows visitors to navigate around the existing structure to a more desirable location along the point. This unauthorized route is damaging the endangered *Themeda* Grassland community, resulting in serious erosion. It is proposed that a new lookout be constructed following a detailed analysis.

The lookouts will incorporate the same materials used on surrounding tracks and rest spots. A timber balustrade with timber handrail will incorporate interpretive composite metal signage with weathered steel backing, highlighting the importance of Nuthungulli/Julian Rocks. Incorporation of seating and a raised FRP structure will allow the endangered *Themeda* Grassland community to regenerate below.

As the existing lookout location is at a high point and desirable location, it is recommended that a widened boardwalk area following the existing lookout's footprint be constructed in this location. This location will cater for those who do not wish to continue to the end of the track.

Figure 74 Scale of erosion on the *Themeda* grassland community is evident when looking back toward the existing Little Wategos lookout. (Context, 2016)

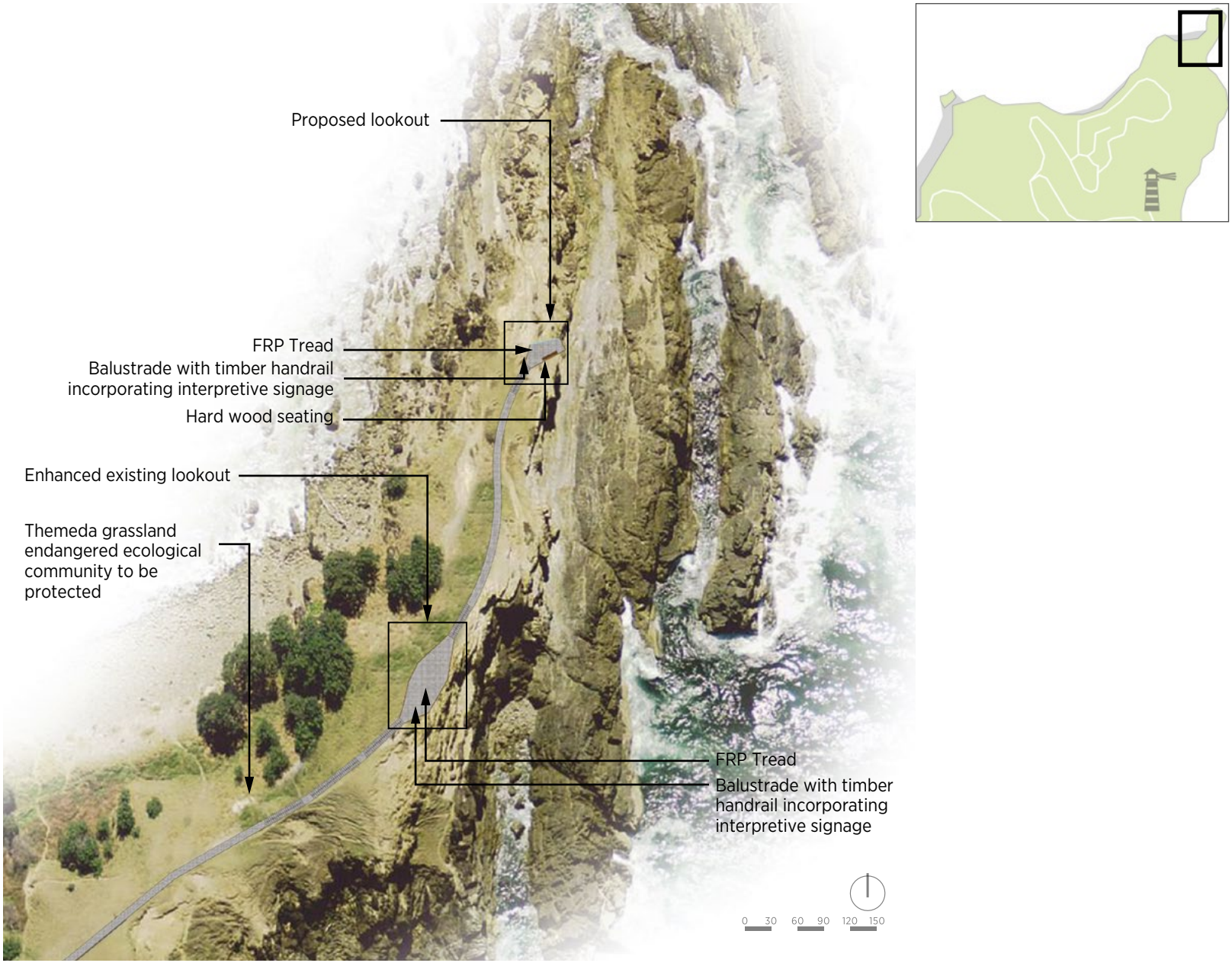


Figure 75 Little Wategos Precinct

10. Palm Valley Precinct

The Palm Valley/The Pass Precinct consists of Fisherman's Lookout, Palm Valley car park and Palm Valley picnic area.

Fisherman's Lookout is one of Byron Bay's most picturesque lookout locations, but the lookout is in poor structural condition. It is proposed to replace with a new lookout structure.

It is recommended that the Cape Byron Headland Reserve draft concept design for the Palm Valley car park, prepared by Geolink, be incorporated into the master plan. The aim of this design is to reduce conflict between vehicles (cars and trailers), and pedestrians. Several businesses currently need access for large boats. Car numbers in peak periods are high, so it is important to clearly delineate pedestrian and vehicle zones.

It is proposed to:

- Realign Brooke Drive at the entry to the car park.
- Create a new shared pedestrian/traffic zone.
- Retain present capacity for 80 vehicles in enhanced lower parking area.
- Provide separate and controlled entry and exit points to the trailer parking area. When not in use the trailer parking area may provide up to 18 additional temporary visitor parking bays.
- Provide wheelchair accessible parking adjacent to the beach front visitor area.
- Remove car parking along Brooke Drive to create a more welcoming entry point.
- Reduce the width of Brooke Drive to two traffic lanes to increase the space available to the beachfront visitor area.
- Realign the Cape Byron walking track to create a more direct connection.
- Install new bike racks within the central area.
- Create new paths and step access between the visitor car park and beachfront visitor area.
- Protect and enhance The Pass midden.
- Explore the feasibility of a bus pick up/drop off location for visitors with a disability.

Figure 76 Fisherman's Lookout is in poor structural condition (Byron4kids.com, 2016)

Figure 77 View toward Palm Valley/The Pass car park from Fisherman's Lookout (Context, 2016)

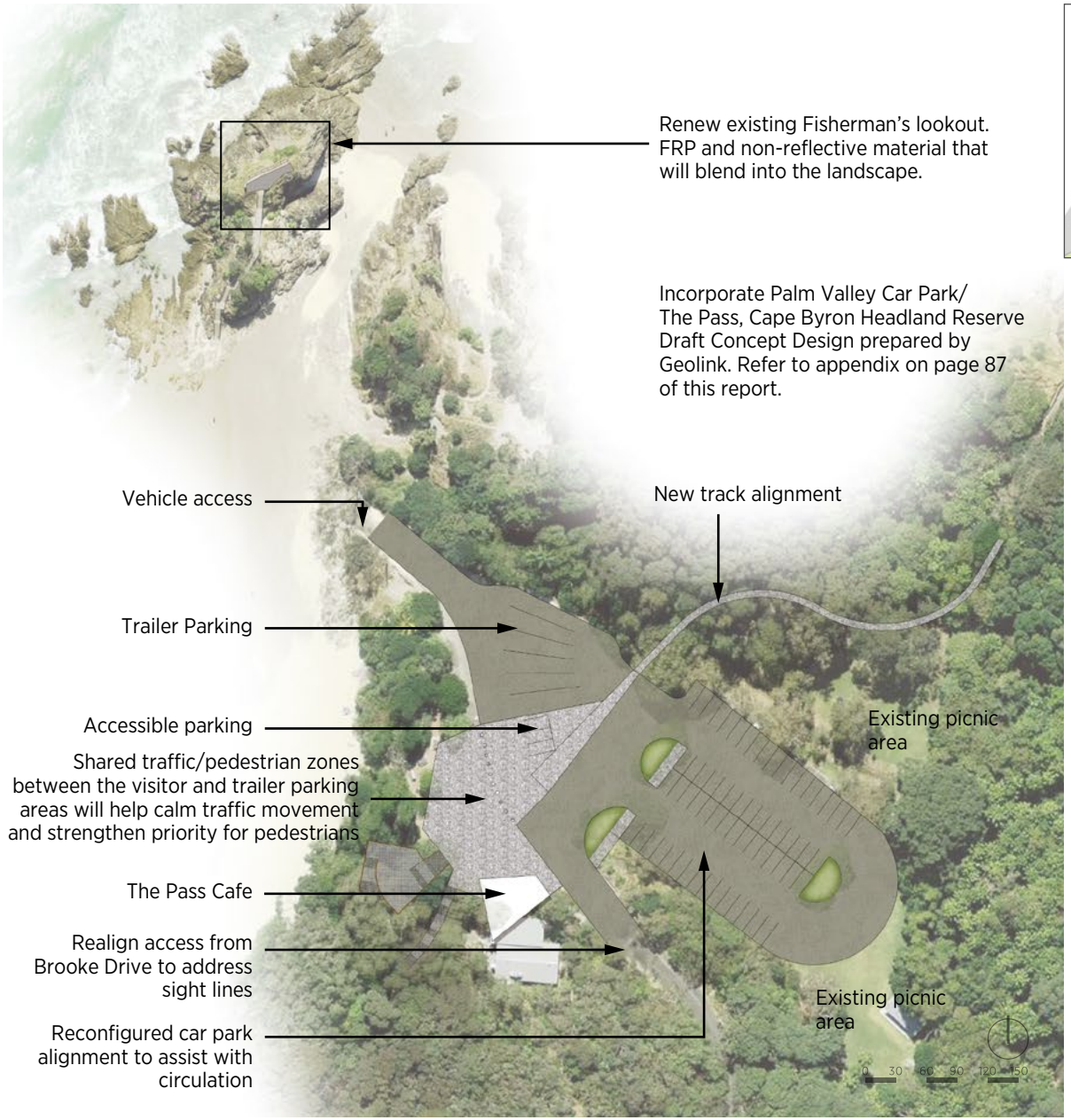


Figure 78 Palm Valley Precinct

Figure 79 Relocate existing signs where required to suit proposed master plan upgrades (Context, 2016)

Figure 80 Existing circular signs to be removed (Context, 2016)

6.3 Signage and interpretive elements

Signage

The existing Cape signage largely conforms to the NPWS Park Signage Manual, which provides guidelines for signage within national parks. The existing signage should be retained pending a review of the location of each sign to determine whether relocation is required to suit proposed master plan upgrades.

A few existing signs do not conform to the signage manual, such as the oval interpretive 'sustainability' signs along walking tracks. Signs that do not conform should be removed and replaced.

New signage will be required for specific sites that are being upgraded. Customised signs will be installed as part of a Cape signage family, which is instantly recognisable and identifiable with the Cape. The Cape Byron Experience Precincts, Pathways and Interpretive Information Concept Design Report, prepared by Mackenzie Pronk Architects and Fisher Design + Architecture Feb 2014, proposed concept designs for new signage (see examples on page 66).

Minor directional signs, walking track markers and a track junction sign will be required for the new Tallow Ridge Track extension to the Arakwal Centre.

Key consistency design characteristics required for new signs are:

- metal composite with a backing of weathering steel
- all signs incorporate the NPWS logo sized to suit
- all signs incorporate the Cape Byron Trust Logo, sized to suit
- all signs have a rectangular format
- park entry signs and primary marker signs will have a graphic panel expressing the personality of the Cape
- all signs other than park entry and primary site marker signs are to be understated so they do not obscure views, are in keeping with the heritage surroundings and do not detract from the natural setting.

Interpretive elements

An interpretive strategy will be prepared. Interpretive elements will be incorporated into signage at several locations as discussed above. Special interpretive information is to be incorporated into the ground plane paving materials at the Most Easterly Point as a one-off item to add an artistic layer without detracting from the natural surroundings. The CMP states:

'The interpretation must not dominate; it should be subtle and integrated into the experience' (CMP 2008)

See figures 81-85.

Head Lighthouse Keeper's Cottage information hub

An interpretation and information hub in the current Head Lighthouse Keeper's Cottage is proposed that will provide a web-connected space for interactive learning and information. The hub will incorporate several key themes and provide more information and education material than will be provided through signage. Combined with mobile apps to guide visitors around the Cape with digital wayfinding options and activities, the hub can act as a major interpretive and educational resource.

The 'hub' will incorporate several key themes:

- Arakwal cultural significance
- the natural environment
- the lighthouse and associated seafaring information.

Four rooms could be used for interactive information and education purposes, with the fifth room becoming a guided tour base.

Location	Signage Type	Suggested Themes
Cape Byron Wallking Track Entry – Wategos	Park Entry Sign with graphic panel (integrate with local stone retaining wall extension)	Information
Rest Spot 1	Information sign (Integrated with balustrade)	Surfing Stories
Rest Spot 2	Information sign (Integrated with balustrade)	Nguthungulli Stories
Themeda Grasslands	Information sign (Integrated with boardwalk)	Flora/endangered species/Conservation
Little Wategos Lookout	Information sign (Integrated with balustrade)	Maritime History
Most Easterly Point	Primary site marker with graphic panel – a focal point for photographs	Information
Most Easterly Point	Information sign (Integrated with balustrade)	Cultural, geographical, historical & environmental importance of the site
Most Easterly Point	Integrated ground-plane signage	N,S,E,W and solstice directional locations
Rest Spot 3	Information sign (Integrated with balustrade)	Arakwal culture
Rest Spot 4	Information sign (Integrated with balustrade)	Geomorphology
Rest Spot 5	Information sign (Integrated with balustrade)	Marine Life
Whale Watchers' Lookout	Information sign (Integrated with balustrade)	Whales
Lighthouse Historic Precinct	Identification signs	These will provide naming and historic information on each of the major buildings at the Lighthouse Precinct. The bronze material will be sympathetic to the quasi-industrial feel of the Lighthouse Precinct.
Lighthouse Precinct southern lookout	Information sign (Integrated with balustrade)	Geography/beach
Tallow Beach Lookout	Information sign (Integrated with balustrade)	Hang gliding/birds
Tallow Ridge Track Extension	Park Entry Sign with graphic panel (integrate with local stone retaining wall extension)	Flora/endangered ecological communities/ conservation
Cape Byron Wallking Track – New Tallow Ridge Track Entry	Park Entry Sign with graphic panel (integrate with local stone retaining wall extension)	Information

Figure 81 Interactive digital education and information displays could be incorporated into the Head Lighthouse Keepers Cottage (Cleveland Art Museum, 2016)

During consultations many visitors expressed a preference for a "human" presence on the Cape and specifically at the Lighthouse Precinct to answer questions, provide advice and give directions. It points to the great job that the rangers and volunteer staff provide and indicates that an increased presence would improve visitor satisfaction.

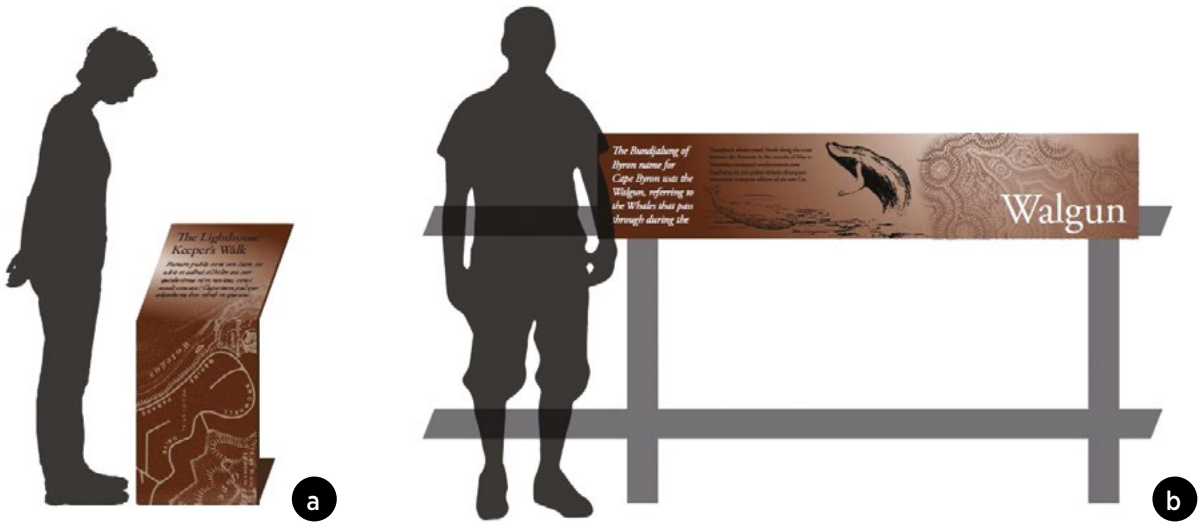


Figure 83 Potential interpretive signage in the ground plane (Parks Western Australia, The Gap, Albany)

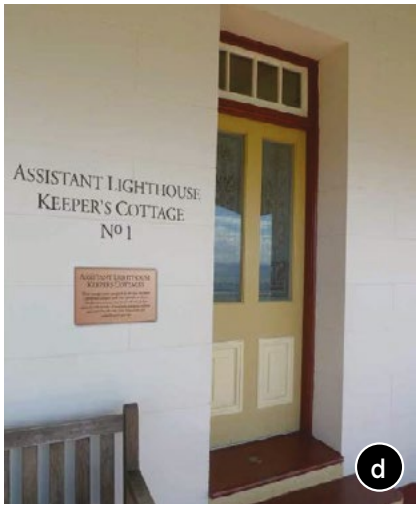


Figure 84 Potential interpretive signage (screenmakers.com.au)

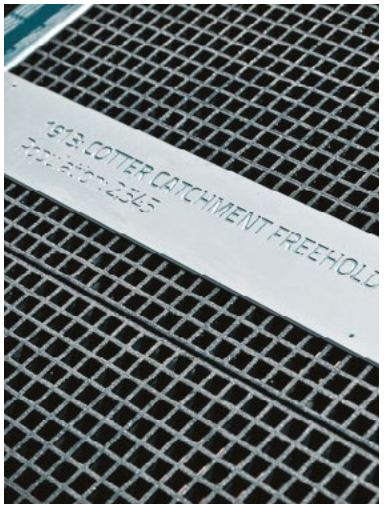


Figure 85 Potential interpretive signage (screenmakers.com.au)

Figure 82 Interpretive signage adopted from previous concept plans
a – Information signs. Composite metal signage with weathered steel backing (Mackenzie Pronk, 2014)
b – Handrail signage. Composite metal signage with weathered steel backing (Mackenzie Pronk, 2014)
c – Composite metal signage on dry stack stone wall (Context, 2016)
d – Bronze building identification plaques (Mackenzie Pronk, 2014)

Figure 86 Cape Byron (John Spencer/OEH 2013)

6.4 Mass transit

A fast and direct electric bus shuttle service from the proposed Arakwal Cultural Centre to the Lighthouse will provide an alternative transit option to walking. This shuttle service would accommodate peak flows and low demand periods and would be relatively easy to implement and trial on existing road infrastructure. The shuttle service must be wheelchair accessible.

A fleet of three 60 seat buses is expected to be required in peak periods. Three trips per hour would be required to accommodate a 150 visitors per hour flow.

Point of sale material and information would be located at the proposed Arakwal Cultural Centre, with the bus stabling and charging station also located within this precinct.

A more detailed transport analysis can be located in the transit option assessment in the Appendix from page 87-93, noting that the master plan provided only a high level review of transit options, it is recognised that further investigation will be undertaken during the detail design and planning phase prior to implementation to ensure:

- bus fleet and bus size matches demand and the design characteristics of local roads
- stops are located and designed for safe access / ingress to buses with no endangerment to pedestrians or traffic
- road turning circles, turning paths, pedestrian intersections and sightlines meet standards.

Certain registered tourist buses would be granted limited entry to the Lighthouse Precinct, so that visitors do not need to disembark at the proposed Arakwal Cultural Centre to embark on another bus. However, it would be worthwhile encouraging these operators to stop at the centre after visiting the Cape. There is also potential for a bus drop off/pick up point at The Pass, however traffic studies will need to be undertaken to investigate the feasibility of this proposal. Buses are not proposed to go to Wategos.

Figure 87 (planetearth5.com 2016)

Figure 88 (pioneersolar.com.au 2016)

Figure 90 Up-road Closure Arm Barrier, exact location yet to be determined (Context, 2016)

Bus pick up / drop off point

Bus stabling and charging at the Arakwal Depot

Recommendation: Car free days could be introduced immediately. These events have proven to be extremely successful around the world. They can help gauge user reaction and the success of a pedestrian prioritised Cape.

0 30 60 90 120 150

Figure 89 Cape Byron vehicle access concept design

Figure 91 Cape Byron (John/Spencer 2013)

7.0 Staging

The delivery of proposals in the master plan is to be carried out in stages to suit budgetary and construction constraints.

At the completion of each stage, public acceptance and response should be monitored to inform, review and reconsider the development for subsequent stages. Interpretive signage elements should be incorporated concurrently with facility and infrastructure upgrades. A detailed Staging and Implementation Plan will be prepared during the detailed design phase to inform future work priorities and funding.

The following table highlights proposed staging opportunities that will require further client feedback and input.

Stage one immediate

- Fisherman's Lookout
- Council's Lighthouse Road path extension* and Lighthouse Road down-road path
- Upgrade Cape Byron Walking track from Wategos to Lighthouse precinct
- Upgrade Most Easterly Point lookout
- Upgrade Little Wategos walking track and lookout

Stage two mid term

- Palm Valley/The Pass car park
- Upgrade Cape Byron walking track – The Pass to Wategos
- Enhancement and extension of the Tallow Ridge Track
- Improve interpretation in Head Lighthouse Keepers Cottage

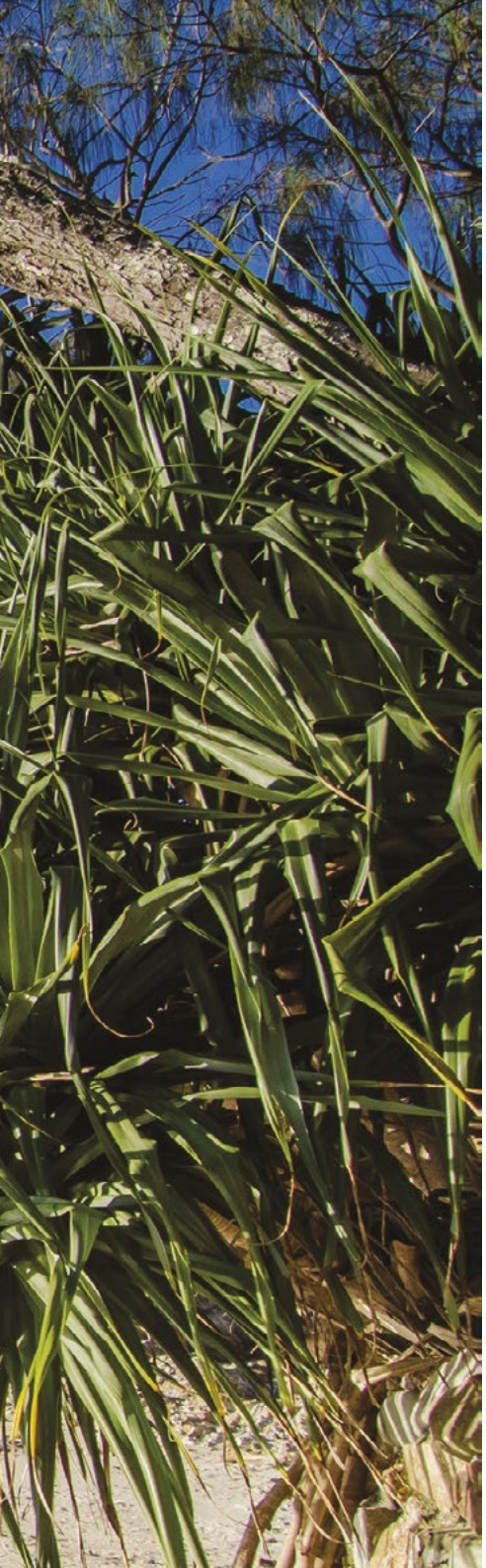
Transport stage immediate

- Shuttle bus hub and service
- Close Lighthouse to cars, install lifting arm and signage
- Conversion of Lighthouse parking areas
- Convert lower Lighthouse car parks to grassed/revegetation areas

* Pending Council approval

Figure 92 Cape Byron Master Plan proposed delivery phases

Figure 93 Cape Byron (John Spencer, 2013)



8.0 Materials palette

Given the challenging topography and harsh coastal environment, the infrastructure required for the master plan upgrades must be constructed from simple high quality and extremely robust materials. They must also read as a family of materials that are identified with the Cape and assist visitors in navigating their way around the Cape.

Secondary elements include:

- hardwood timber benches (Lighthouse Precinct only)
- bike racks – stainless steel hoops
- vehicle barriers – lifting arm barrier with engineered stone support wall
- gates – reconstruction of timber gates to original lighthouse detail.

Figure 94 Locations for proposed material finishes

1. Path Type 1. In-situ concrete path with local stone aggregate. Aggregate to be sourced locally and will match walls and pavers. High slip resistance required.

2. Path Type 2. Asphalt with steel edge – on existing asphalt corridors, such as alongside Brooke Drive and new paths at the Lighthouse Precinct.

3. Path Type 3. Asphalt on road with painted pedestrian separation. Enhance existing road edge to create room for pedestrian path.

4. Raised boardwalks. FRP support structure with FRP deck and stainless steel fixings. Where balustrades are required they will be timber with timber handrail.

5. Path Type 4. Decomposed granite. For tracks less frequently used and in natural settings.

6. Lookouts and rest spots (on grade) – Local pavers/stone setts.

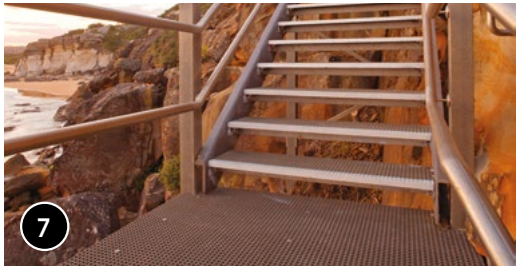
Lookouts and rest spots (on steep grades) – FRP support structure with FRP deck.

Where balustrades are required they will be timber with timber handrail.

7. Major staircases (on grade) – Precast concrete treads with stone tread infill.

Major staircases (on steep grades) – FRP support structure with FRP deck.

Where balustrades are required they will be timber with timber handrail.



8. Walls – Dry stack local stone retaining/seating wall

Figure 95 School tours are popular at the Cape (John Spencer, 2013)

9.0 Visitation data, surveys and findings

9.1 Visitor demand and the appropriate design capacity for the lighthouse precinct

Approximately 1.5 million people visit the Lighthouse Precinct annually. Average daily visitor numbers are approximately 4100 people per day. Current peak day visitor numbers can exceed 6000.

In a national park setting, capacity is generally determined by environmental constraints and the visitor experience standards that managers wish to achieve at the location. Facilities and accessibility are designed to complement each other (access road capacity, number of car parking spaces, number of rest spots and capacity of toilet facilities) and this retains use at a planned level.

There is a high density of people at the Lighthouse on peak days. However, anecdotal evidence suggests that visitors are expecting crowds and are therefore generally satisfied despite the crowds, as long as they can access their chosen destination and connect with their family and friends, take a tour of the Lighthouse, see whales or dolphins, visit the café or simply walk and take in the view.

Based on this evidence, a capacity up to 6000 people per day or about 2.2 million annually could be accommodated.

If cars are removed from the Lighthouse Precinct, more space will be available for visitors. The Stafford Group has estimated that in 2027, after parking is removed and other proposed improvements are made, visitor numbers will increase to 1,974,600 annually or 5400 visitors per day. This is below the current peak of 6000 visitors per day and will be comfortably accommodated when more space is available. Refer to Appendix.

The reasons for a projected increase in visitor numbers include:

- 83% of vehicles are turned away at the Lighthouse. Of the 83% of vehicles turned away, 35% park elsewhere and walk to the Lighthouse. The remaining 48% do not visit the Lighthouse, equating to at least 400 vehicles or 1200 visitors per day. This indicates that there is considerable unmet demand.
- A natural increase due to Byron Bay's increasing popularity as a holiday destination.

Irrespective of the design capacity set for the Cape, it is important there is a balance between the available facilities on site and accessibility. Mass transit, such as shuttle buses and booking systems can be implemented to increase accessibility without increasing car parking capacity.

9.2 Experience demand

The market demand for the types of experiences available at the Cape is based on the following:

- It is the Most Easterly Point of mainland Australia and an important geographic point of reference (a lands end) to visit for many domestic and international visitors.
- Byron Bay has iconic destination status within NSW and a high profile nationally and internationally, particularly seen in the number of backpackers coming to and staying within the area.
- The Byron Bay area for many visitors reflects the relaxed and quintessential Australian beachside holiday destination.
- The high quality beaches, walking tracks and related experiences are seen as important factors that encourage a mixture of day visitors, especially from south east Queensland, as well as overnight visitors from a broad range of visitor markets.

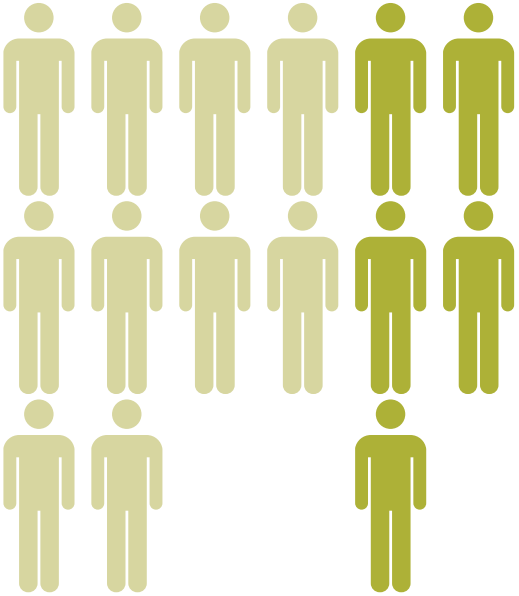
The key attractions for the Cape include:

- the Lighthouse and surrounding built infrastructure and its heritage features
- the lookout points, which provide access to the Most Easterly Point of mainland Australia and marine life viewing opportunities
- access to diverse beaches, surf breaks and stunning vistas
- the ability to walk up to and access the Lighthouse Precinct.

The growth in visitation creates a need to enhance infrastructure, address the issues associated with limited parking facilities at the Lighthouse Precinct and offer alternative mass transit solutions.

Annual visits to the lighthouse precinct

1,500,000



Tourist visitors per annum – **1.0M**

Local visitors per Annum – **0.5M**

* Data compiled from NPWS Traffic/ Parking Data and Surveys 2015–16, Destination NSW Data 2011

Arrival mode

Car	Walk	Other
16%	**71%**	**13%**

32% Walk initially

39% Arrive by car, park elsewhere and are forced to walk

* Data compiled from WSP group research + NPWS Lighthouse road traffic counts + surveys November 2015 and January 2016

The consequences

1615	Car trips up to the lighthouse precinct everyday
1615	Car trips down from the lighthouse precinct everyday
34	Cars parking spaces at the cape (upper + lower car parks)
1340	Cars arriving at the lighthouse precinct are turned away
2680	Unnecessary car trips every day

1,18M

Total car movements per year to and from lighthouse

1,04M

Total pedestrians per year

* Data compiled from NPWS Lighthouse road traffic counts November 2015 and PB Traffic Report May 2016

9.3 Findings

Visitor surveys were conducted at the Lighthouse from 12 January to 16 January 2016. A total of 124 results were compiled. Rain affected the number of surveys received.

Findings included:

- Of the 31 responses on Saturday, 16 January 2016, 16 said they would use a shuttle, 15 said no. 60% of those who said no had walked up to the Lighthouse.
- In total, 59% of respondents (73) said they would use a shuttle, 41% (51 respondents) said no. Of those who said no, just under 65% had walked to the Lighthouse, with many commenting that they love the walk and views/vistas.
- In total, 38% of respondents drove and parked at the Lighthouse, 35% walked and just under 15% parked on Lighthouse road. The remainder were cyclists, coach tour passengers or were dropped off.
- Of those who said they would take the shuttle, approximately 83% (61 responses) said they would take it both ways, with the remainder saying they would take it one way (up, rather than down).
- Of the 13 respondents who indicated they lived in Byron Shire, 77% (or 10 respondents) indicated they would not use a shuttle service. Only three indicated they would.
- Of the 101 respondents who indicated they were visitors to Byron Bay, just under 65% indicated they would use a shuttle service.
- Most respondents who provided additional comment indicated the need for an open air type service to take in the views, with a few suggesting a cable car system.

A second set of surveys using a different questionnaire were conducted from the 15 February to 21 February 2016 at The Pass, Wategos and the Lighthouse Precinct to capture a representative sample of local visitors (those living in Byron Shire). 208 were collected and analysed with 130 from locals and 78 from visitors.

The following suggestions for improvements to the Cape were offered in response to an open ended question. Responses have been separated into those where 10 or more respondents provided the same suggestion, and those where three to nine respondents provided the same suggestion.

Suggested improvements

Suggestions made by 10 or more respondents:

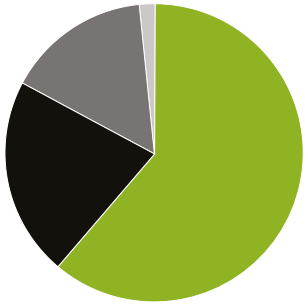
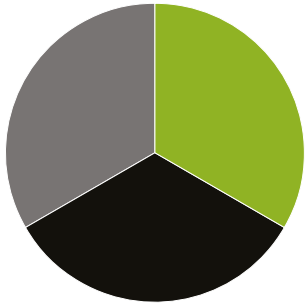
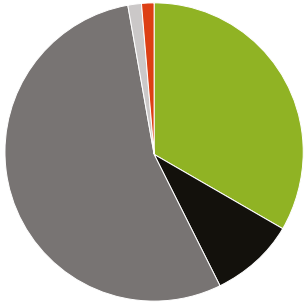
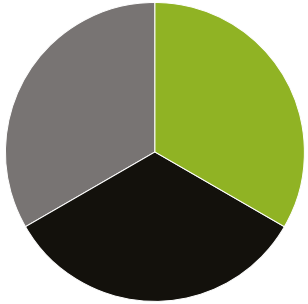
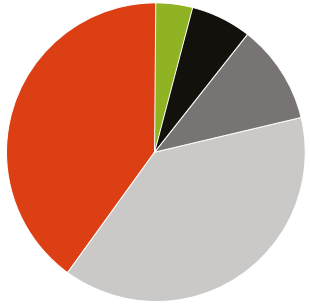
- keep the area as natural as possible with minimal disturbance
- extend the current board walk to offer a continuous walking track along the road to the Lighthouse
- upgrade walking tracks with more fencing where needed, and with stairs and places to rest
- implement a shuttle bus
- implement a gondola
- increase the number of public toilets and improve cleaning and maintenance
- improve directional and interpretive signage
- maintain vehicular access for those with young children and the elderly.

Suggestions made by three to nine respondents:

- increase rest areas and seating
- increase and improve access to drinking water
- provide additional rubbish bins
- do not install light rail
- restrict vehicle access to the Lighthouse
- offer wheelchair accessible parking at the Lighthouse
- provide more walking and bike tracks
- provide a walking track from Lighthouse to Tallow Beach
- remove large buses and campervans from access road
- improve road quality.

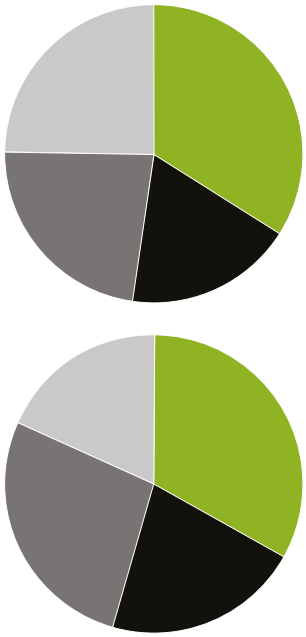
Figure 96 Visitation to lookouts (Context 2016)

Results of surveyed locals (64%) and visitors (36%)

	Q1	Q2	Q3
Question	**How do you usually get to the Lighthouse?**	**For which reason would you most like vehicular movement taken off the road to the Lighthouse?**	**How important is to have a transport system which allows less mobile individuals access to the Lighthouse?**
Local			
Visitor			
Key	Walk Other Drive and Park Cycle Never been	Safety reasons Environmental reasons Improve walking	Not important Somewhat important Undecided/ No opinion Important Very important
Findings	A majority of locals will walk while visitors will drive and park at the Lighthouse.	All 3 reasons were of equal importance to both locals and visitors.	A majority of both the locals and the visitors surveyed felt it was important to include a public transport system.

Q4

What is your preference on the following public transport options to the Lighthouse?



- Shuttle bus
- Cable car
- Light Rail
- No public transport

Opinion of preferred mode of transport varied slightly between locals and visitors.

Q5

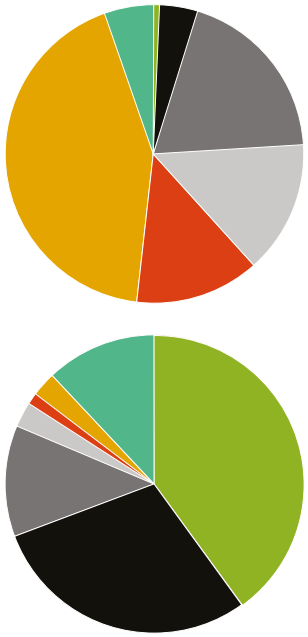
What do you see as the most environmentally friendly public transport option?

- Shuttle bus
- Cable car
- Light Rail
- None of the above

A majority of visitors believe the cable car will be most environmentally friendly. Half of the locals surveyed selected shuttle bus.

Q6

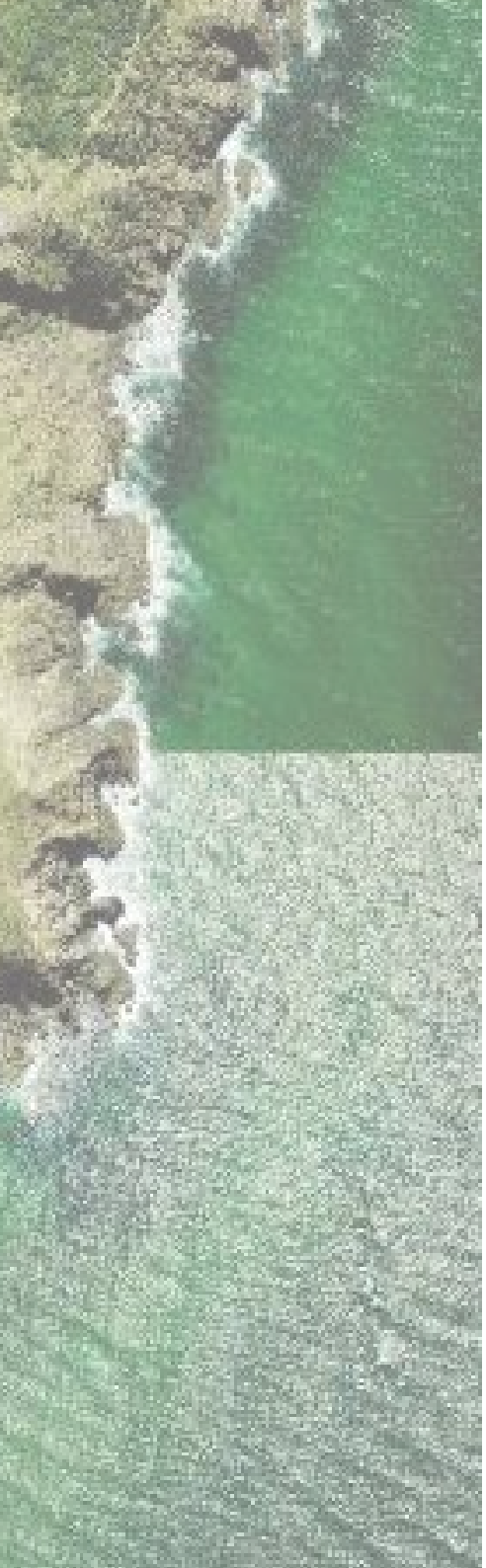
How many times per year, on average, do you visit the Lighthouse?



- First time
- Once a year
- 2–6 times a year
- Once a month
- Once a week
- More than once a week
- Other

Visitations to the Lighthouse returned results as expected.

Figure 97 Transit Options Overview Plan



10.0 Appendices

10.1 Transit options

Overview

The master plan investigated opportunities for implementing a mass transit system to cater for visitors to the Lighthouse Precinct.

Objectives of the transit system

The primary objective of a transit system for the Cape is to:

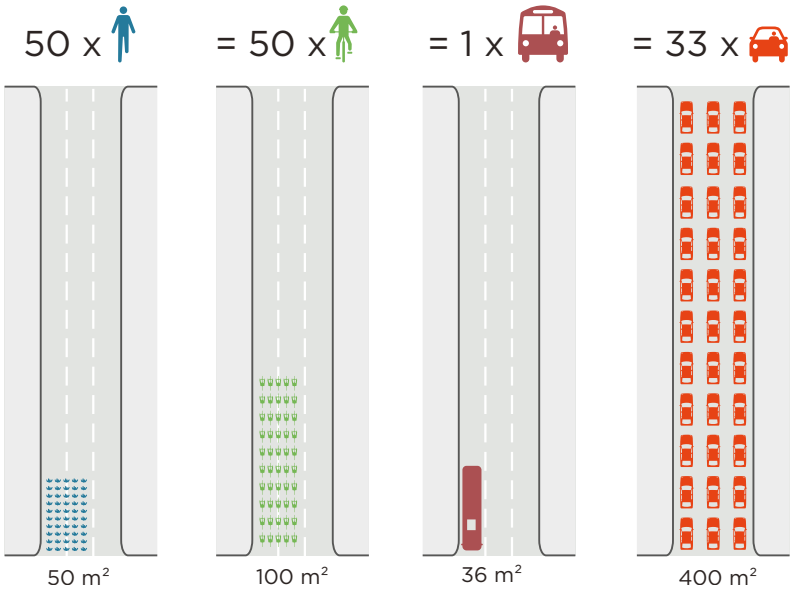
- cater for existing visitor demand for private vehicle or coach access to the Lighthouse Precinct
- cater for future visitor demand.

Additional objectives of a transit system include:

- integrating with Byron Bay town centre
- minimising impacts on the environmental, aesthetic and heritage values of the Cape
- being able to operate without reliance on fossil fuels
- integrating with the proposed Arakwal Cultural Centre.

System costs (capital and operating), safety and accessibility (for visitors with a disability) were also considered.

The above context was taken into account when considering an appropriate transit system.



With the expected growth in visitor numbers, useable space becomes an issue. Cars not only take up large amounts of space, they also create safety issues with rising numbers of pedestrians.

> 'While a bus needs three times as much space as a car, its carrying capacity per lane is unrivaled among other on-street modes. As land in urban areas becomes increasingly scarce, use the space within the street most efficiently to serve the largest number of people.' (Global Street Design Guide – Designing Streets for people p.71)

10.2 System modes and technologies

A number of transit systems were considered. All systems have been considered on the basis that the car park adjacent to the Lighthouse will be closed for general public visitors. All mass transit options will be complemented with enhanced walking infrastructure, including upgraded walking tracks and extensions of the existing walking tracks beyond the Lighthouse and boardwalk.

Cable car

Elevated cable car systems can be found in many natural-environment tourist reserves, particularly where steep gradients and limited space are challenges to accessibility. Examples include the Sky Safari cable car at Taronga Zoo in Sydney and the privately-operated Scenic World cable cars in Katoomba, NSW. They provide an efficient means of transporting people across undulating topography and offer new views across the area.

The system is characterised by an elevated cable/ropeway supported by trestles/towers connecting to boarding/disembarking stations at either end. Carriages (often called 'gondolas') are typically designed to carry six to eight people; they provide an accessible, secure and safe cab for passengers to travel in. The system operates automatically, but staff would be required to guide visitors getting on/off the carriages and provide special assistance for people with a disability, seniors and parents with prams. If aligned through vegetation, it is expected that a clear zone (i.e. clearing vegetation) would be required to enable emergency service access to the entire alignment in the event of an emergency.

Cable car systems can be a complementary tourist attraction and could provide a new way for visitors to experience the Cape. Other aerial ropeway systems could also be implemented, each with advantages and disadvantages. Further assessments would be required to confirm the suitability of a cable car system for the Cape Byron State Conservation Area, including confirmation of a suitable alignment (geotechnical, structural engineering design, cost estimate and economic assessment).

Due to the challenges with developing a cable car option at the Cape, it was not considered further as a mass transit solution.

These challenges include:

- concern of huge environmental impact in a conservation area
- concern of large visual Impact
- not fitting in with the character of Byron Bay.

Shuttle bus

A shuttle bus system would provide a practical means of transporting visitors between the Lighthouse Precinct and a designated collection point. A shuttle bus system would provide flexibility in implementation and operation, e.g. additional buses could operate during peak demand times. A refurbishment of the car park adjacent to the Lighthouse (assuming most car parking spaces are removed) would include a suitable drop-off/pick-up point.

There are opportunities for modern bus engine technologies utilising hybrid technology or pure electric engines to be adopted for this system. A bus powered by an electric engine will easily cope with the steep grades of the Cape but may not be able to operate throughout an entire day. Currently, electric vehicles have a maximum mileage of around 200 kilometres before they require recharging and steep grades will impact on a manufacturer's stated mileage. When the battery is fully discharged, recharging could take several hours, during which time the bus would be out of service. Offsetting this are the short runs required, the close proximity of the recharging station and 'regenerative braking' whereby the motor acts as an electric generator during braking, which is then fed into the bus' batteries. This system works best in stop/go driving, which is the situation that will be experienced when operating on the Cape. If a shuttle bus service was implemented with all-electric engines, then a fleet of electric buses would be required with a solar charging station.

Tourist bus

A tourist bus to transport visitors between the Lighthouse, Byron Bay town centre and other key destinations within Byron Bay would provide maximum opportunity for integrating with the Byron Bay township. There is potential for a new transport interchange (Byron Town Centre Masterplan) including a parking facility on the western side of the railway line adjacent to the Byron Bay railway station in close proximity to the Butler Street car park. Depending on route alignment and stop locations within town, there may also be reduced need for a car park at the base of the Cape.

As per the shuttle bus option, it is expected that a refurbishment of the car park adjacent to the Lighthouse (assuming most car parking spaces are removed) should provide opportunity to provide a suitable drop off / pick up point.

Light rail

Light rail systems are a fixed guideway public transport system, usually configured as an at-grade or elevated system. When at-grade, light rail can be configured either within a road carriageway, alongside the carriageway or on a separate, dedicated corridor. Each configuration has implications for the system's operational efficiency, capital costs and environmental impacts. Stations/stops would need to be constructed along the route.

There are various light rail manufacturers, makes and models available, each with different characteristics in terms of carrying capacity, number of seats, operating characteristics etc. Light rail operates via electric power, typically delivered via either an overhead cable or in-ground power supply along the whole route. Newer systems can be fitted with batteries and charged at closely-spaced stops, however this may not be suitable for the Cape given the steep grades.

A light rail system would require additional infrastructure along the transit route, specifically:

- terminal facilities will require extra space and consideration (i.e. turn-back operation with multiple platforms or a loop facility)
- minimum two lane road width reservation plus additional width for stops, passing and infrastructure
- a depot for light rail vehicles must be located at a location along the length of the transit corridor.

There is no location suitable for a light rail depot on the Cape.

The Council's Byron Bay Town Centre Masterplan is exploring a light rail option within the town. While details remain high-level, it is understood that this option would involve redeveloping the disused heavy rail tracks so they are suitable for light rail, thereby providing light rail connectivity between townships in the surrounding region (e.g. Mullumbimby, Bangalow etc.). The type of light rail system that would be used for regional connectivity (where emphasis is on passenger comfort such as seating and higher operating speeds) is different to a system suitable for steep grades, tight curves and high passenger demand (i.e. standing). It is therefore considered unlikely that any light rail through Byron Bay on the disused heavy rail tracks would provide an opportunity for combining with a proposed light rail at the Cape.

Light rail was not considered further as a mass transit option due to the challenges to achieving light rail at the Cape.

Funicular railway

Funicular systems are another kind of fixed guideway public transport system, typically used for ascending and descending steep grades. Funicular systems are characterised by a straight alignment on rail tracks (curves are not possible) and can be powered by electricity (similar to a light rail) or other means. They can be used in urban and rural environments in locations where walking uphill (or downhill) is considered too onerous.

Funicular vehicles can be built to cater for smaller or larger numbers of people, from four person vehicles up to 120 person vehicles. However, a funicular system is typically limited to two vehicles only, positioned at equally-opposing ends of the alignment (each vehicle acts as a counter-weight to each other). Funicular systems are therefore fixed in their carrying capacity and unable to cater for additional demand during peak times.

A funicular system would have high construction costs and a dedicated clear zone through vegetation would be needed.

A depot and stabling facility would also be adjacent to the alignment. There is no location suitable for such a facility at the Cape.

Funicular systems were not considered further as a mass transit option.

10.3 User and transit supply estimates

Mass transit usage estimate

A high-level review was completed of potential users of the mass transit system. The aim of the review was to provide an indicative estimate of peak usage to compare against transit supply.

The user estimates are based on the findings from the peak attendance calculations discussed earlier, with the three scenarios of 'non-walkers' used to determine potential uptake of a mass transit solution.

Estimates for daily numbers of people using a mass transit system is shown in table 6.1.

The results of table 6.2 indicate that the potential peak demand for a mass transit system is between 150 to 500 visitors per hour.

Transit supply requirements

An indicative estimate of the service capabilities to cater for the expected usage is shown in the table below. Various options of vehicle/carriage size have been provided to provide further understanding. Fleet sizes should be considered indicative only and would be subject to further assessment. Peak headway refers to the time between successive buses, rail train systems or cable car carriages.

The table shows the following:

- Buses would be generally able to cater for demand easily, however if demand is higher, larger buses should be employed to avoid the need for short headways and larger fleet sizes.
- An aerial ropeway system will be able to easily cater for demand, with number and size of carriages dependent on demand; higher-capacity carriages may be under utilised during periods of low demand.
- A light rail system would be generally under utilised, unless demand is at the upper limit of what is expected.
- A funicular system could cater for demand, however if larger-size vehicles are chosen it may be under utilised outside of peak times.

Routes stops and stations

A tourist bus would link the Byron Bay town centre to the Lighthouse utilising Lighthouse Road. Stops would be located at the town centre, Clarkes Beach, proposed Arakwal Cultural Centre, The Pass and the Lighthouse.

A shuttle bus would link the proposed Arakwal Cultural Centre with the Lighthouse utilising Lighthouse Road and Tallow Beach Road. A stop could be located at The Pass for peak days.

An aerial ropeway system would link the proposed Arakwal Cultural Centre traversing the ridgeline towards the south of the Lighthouse Precinct. Stations would be positioned at both the proposed Arakwal Cultural Centre and Lighthouse Precinct. This is a distance of approximately one kilometre.

Usage estimates for mass transit system (Table 6.1)

Uptake of mass transit system	Low scenario	Medium scenario	High scenario
Annual attendance (future-year) as per master plan estimate	240,000 visitors/year	540,000 visitors/year	825,000 visitors/year
Peak monthly attendance January	28,800 visitors/month	64,800 visitors/month	99,800 visitors/month
Weekly attendance (of peak month)	6624 visitors/week	14,904 visitors/week	22,770 visitors/week
Peak daily attendance. Sunday of typical week in peak month	1325 visitors/day	2981 visitors/day	4554 visitors/day
Peak hourly attendance. Lunch time of peak day	146 visitors/hour	328 visitors/hour	501 visitors/hour

Transit service requirements (Based on peak demand of 150,330 and 500 visitors/hour. Table 6.2)

Type		Vehicle/carriage capacity	Low scenario requirements		Medium scenario requirements		High scenario requirements	
			Peak headway	Fleet	Peak headway	Fleet	Peak headway	Fleet
Bus (shuttle or tourist)	Minibus	12 per vehicle	3 mins	4 vehicles	1 mins	10 vehicles	1 mins	14 vehicles
	Small Bus	30 per vehicle	9 mins	2 vehicles	4 mins	4 vehicles	2 mins	6 vehicles
	Standard Bus	60 per vehicle	18 mins	1 vehicle	8 mins	2 vehicle	5 mins	3 vehicle
	Double-deck bus	100 per vehicle	30 mins	1 vehicle	13 mins	2 vehicle	9 mins	2 vehicle
Cable Car		4-seat carriage	75 sec	17 carriages	30 sec	37 carriages	20 sec	56 carriages
		6-seat carriage	90 sec	13 carriages	40 sec	29 carriages	30 sec	43 carriages
		8-seat carriage	100 sec	11 carriages	50 sec	23 carriages	30 sec	35 carriages
Light Rail	Small LRT	120 per vehicle	30 mins	1 vehicle	20 mins	1 vehicle	10 mins	2 vehicles
	Medium LRT	200 per vehicle	60 mins	1 vehicle	30 mins	1 vehicle	20 mins	1 vehicle
Funicular		25-85 per vehicle	10 mins	2 x 25 per vehicle	10 mins	2 x 55 per vehicle	10 mins	2 x 85 per vehicle

10.4 Reports

Three recent reports commissioned by the Cape Byron Trust proposed a number of major and minor upgrades on the Cape. The reports are:

- Cape Byron Most Easterly Point Concept Design Report, prepared by Mackenzie Pronk Architects and Fisher Design + Architecture
- The Cape Byron Experience – Precincts, Pathways and Interpretive Information Concept Design Report, prepared by Mackenzie Pronk Architects and Fisher Design + Architecture
- Palm Valley Car Park/The Pass, Cape Byron Headland Reserve Draft Concept Design, prepared by Geolink

These reports have been referenced throughout this document.

Figure 98 Cape Byron Experience reference report

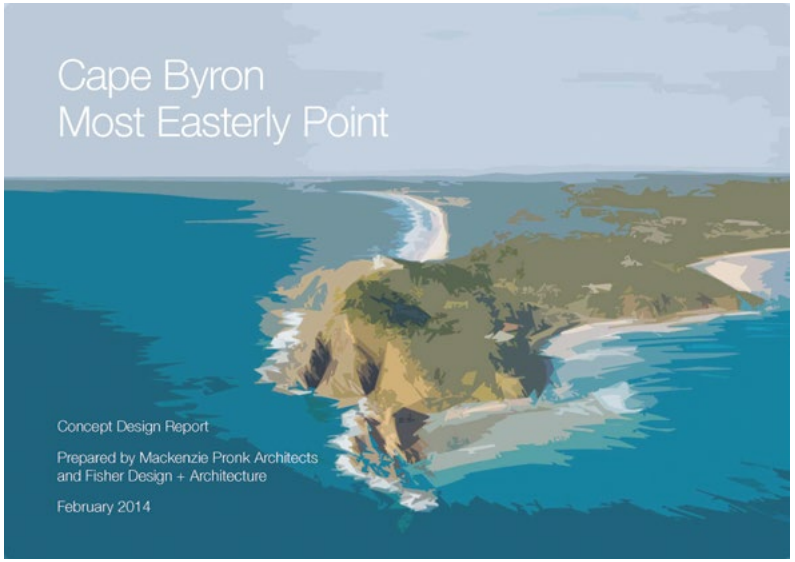


Figure 99 Cape Byron Most Easterly Point reference report

Figure 100 Palm Valley Carpark referenced report

Figure 101 Wategos beach (Context, 2016)

11.0 References

Australian Government Department of Resources, Energy and Tourism 2011, *Byron Shire Visitor Profile and Satisfaction Report: Summary and Discussion of Results*.

OEH unpub. (prepared by Baker A) 2013, Vegetation and Flora of Cape Byron State Conservation Area and Arakwal National Park.

Byron Shire Council (Prepared by McGregor Coxall) 2016, *Byron Bay Town Centre Masterplan*.

Cape Byron Trust (Prepared by Geolink environmental management and design) *Palm Valley Capark, The Pass, Cape Byron Headland Reserve. Draft Concept Design*.

Cape Byron Trust (Prepared by Mackenzie Pronk architects and Fisher Design and Architecture) 2014, *Cape Byron The Most Easterly Point, Draft Concept Design Report*.

Cape Byron Trust (Prepared by Mackenzie Pronk Architects and Fisher Design and Architecture) 2014, The *Cape Byron Experience, Precincts, pathways and interpretive information, Draft Concept Design Report*.

Cape Byron Trust and the Parks and Wildlife Group of the Department of Environment and Climate Change (Prepared by Freeman Ellsmore) 2008, *Conservation management plan the Cape Byron Lightstation Precinct*.

Collins, JP 1994, Archaeological Investigation and Conservation of Aboriginal Midden Site 4-5-61 at The Pass, Byron Bay, N.S.W. (Cape Byron Trust unpub.)

Freeman Ellsmore 2008, *Conservation Management Plan – The Cape Byron Lightstation Precinct.*

Cape Byron Trust (Prepared by Geolink Environmental Management and Design) 2009, *Palm Valley Capark, The Pass, Cape Byron Headland Reserve – Draft Concept Design*.

Office of Environment & Heritage, NSW National Parks & Wildlife Service 2010, *Park Facilities Manual*.

Office of Environment & Heritage, NSW National Parks & Wildlife Service 2015, *Plan of Management, Cape Byron State Conservation Area*.

Office of Environment & Heritage, NSW National Parks & Wildlife Service 2015, *Tourism Master Plan 2015-2020 Report*.

Tourism Australia 2012, *Australia's Green Cauldron: A guide book to making the most of your Landscape Positioning*.

Wildsite Ecological Services 2012, *Vegetation of Cape Byron State Conservation Area and Arakwal National Park*.

Data and information used to support the visitation findings included:

- Census data and Byron Shire Visitor Profile.
- NPWS Lighthouse Precinct vehicle counts and parking records from 2008 to 2016.
- Traffic counts on Lighthouse Road, Tallow Beach Road and Brooke Drive between 29 September 2015 – 13 October 2015.
- Cameras placed at the Lighthouse Precinct between 16 November and 24 November 2015 with the number of cars observed travelling to and away from the Lighthouse counted.
- Visitor surveys conducted at the Lighthouse from 12 January to 16 January 2016 with a total of 124 results.
- Second set of surveys using a different questionnaire conducted from the 15 February to 21 February 2016 at The Pass, Wategos and the Lighthouse Precinct to capture a representative sample of local visitors (those living in Byron Shire). 208 were collected and analysed with 130 from locals and 78 from visitors.

The data was compiled and analysed by experts in the field of tourism and traffic and is considered adequately robust to inform the master plan proposals.

Construction of new features will be subject to detailed environmental assessment and design prior to commencement. Transport elements will be subject to a detailed exploration of service requirements and options to meet these requirements.

Figure 102 Cape Byron Lighthouse (John Spencer/OEH 2013)

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