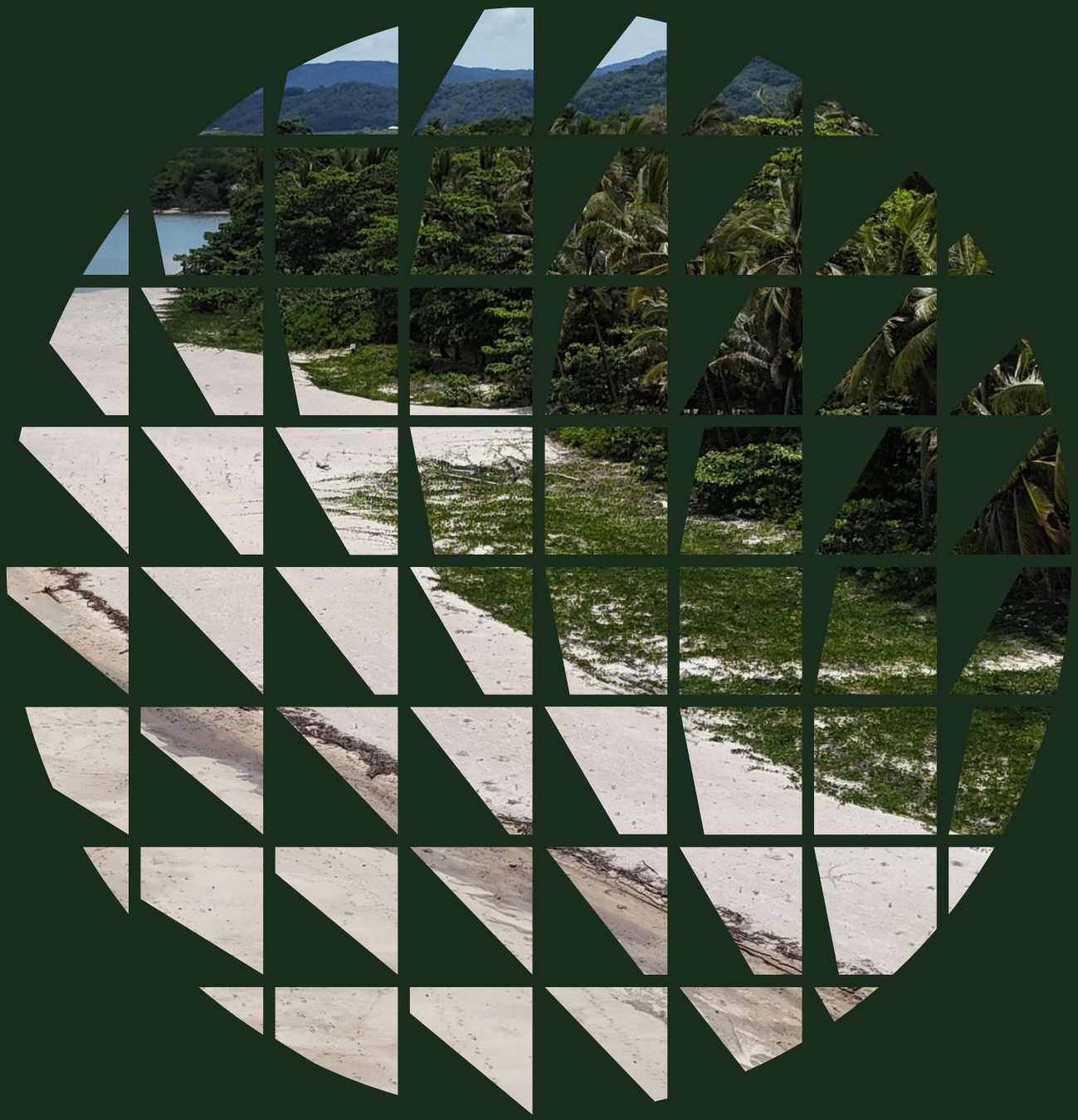


Douglas Shire Council

Draft - Shoreline Erosion Management Plan (SEMP) for Newell Beach and Four Mile Beach

Prepared for
Douglas Shire Council
October 2026

DOUGLAS SHIRE COUNCIL

alluvium consulting



Alluvium Consulting recognises and acknowledges the unique relationship and deep connection to Country shared by Aboriginal and Torres Strait Islander people, as First Peoples and Traditional Owners of Australia. We pay our respects to their Cultures, Country and Elders past and present.

Artwork by Melissa Barton. This piece was commissioned by the Alluvium Group, and tells our story of caring for Country, through different forms of waterbodies, from creeklines to coastlines. The artwork depicts people linked by journey lines, sharing stories, understanding and learning to care for country and the waterways within.

This report has been prepared by Alluvium Consulting Australia Pty Ltd for Douglas Shire Council under the contract titled Draft - Shoreline Erosion Management Plan (SEMP) for Newell Beach and Four Mile Beach.

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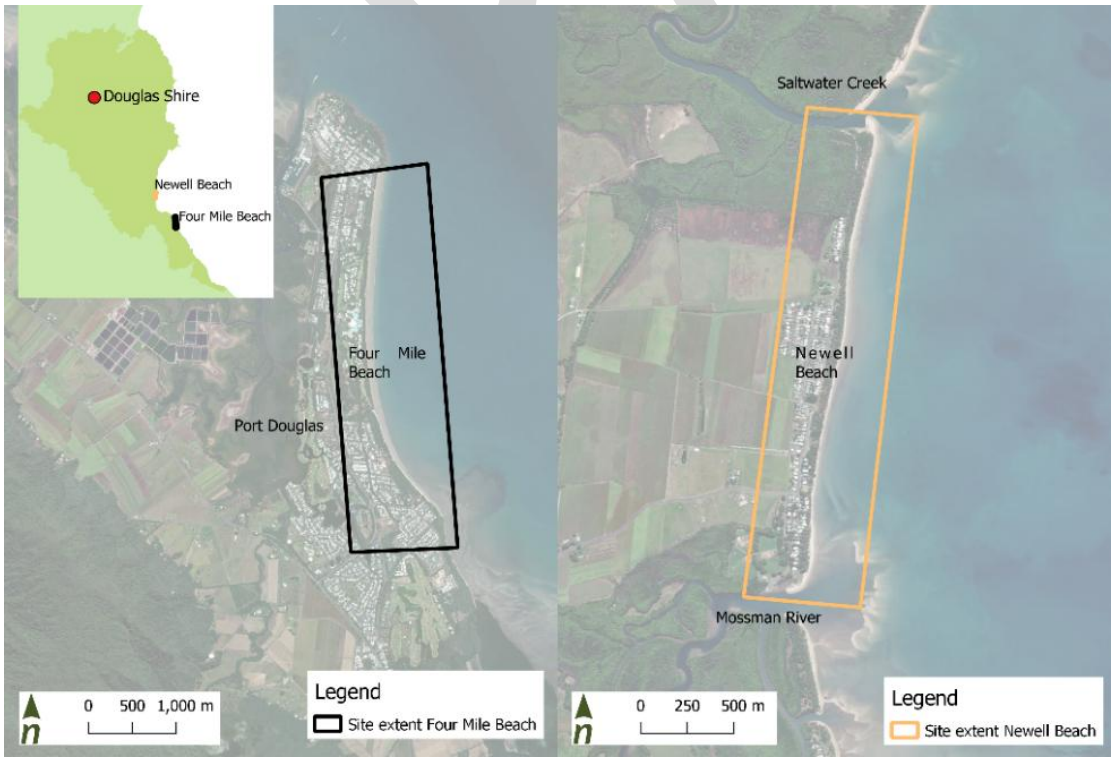
Executive Summary

Newell Beach and Four Mile Beach are located within the Douglas Shire region of Far North Queensland and represent two important coastal environments valued by Traditional Owners, local communities and visitors. Newell Beach extends approximately 2.4 km between Saltwater Creek to the north and the Mossman River to the south. The beach forms part of a dynamic barrier spit system, with shoreline conditions strongly influenced by coastal processes, sediment transport and changes in the adjacent river entrances. Four Mile Beach extends approximately 4 km along the eastern coastline of Port Douglas, from Flagstaff Hill in the north towards the Mowbray River in the south. The beach is an important recreational and tourism destination, supported by an established coastal vegetation buffer and foreshore infrastructure.

Both beaches hold significant environmental, cultural, social and economic values. Their natural character, coastal vegetation and accessibility are highly valued by the community, while the coastal lands and waters hold important cultural significance for Traditional Owners. However, the dynamic nature of these environments means that sections of the shoreline are experiencing erosion, with potential implications for coastal vegetation, public infrastructure, recreational access and private properties.

The Newell Beach and Four Mile Beach Shoreline Erosion Management Plan (SEMP) provides Douglas Shire Council (Council) with a framework to proactively manage coastal erosion while maintaining natural coastal processes and protecting the values of the foreshore. The SEMP considers the findings of Council's Resilient Coast Strategic Plan, developed through the QCoast$_{2100}$ program, and incorporates technical investigations, coastal hazard assessments and engagement with Traditional Owners, stakeholders and the broader community.

The development of this draft SEMP has been informed by community engagement undertaken between December 2025 and January 2026, together with further Traditional Owner engagement during 2026. Feedback highlighted the importance of maintaining the natural character of the coastline, protecting coastal vegetation, ensuring safe beach access and adopting practical management approaches that respond to local erosion risks.



SEMP Study area

Objectives of the Shoreline Erosion Management Plan

A SEMP addresses the following management goals:

- Provide direction for the management of key parts of the coastline in the immediate to short-term (up to 20 years) planning horizon
- Investigate and address the underlying causes of shoreline erosion and future impacts
- Enable efficient use of Council resources in alignment with community values.

A SEMP is informed by a strong technical understanding of the coastal processes and the values and knowledge of the stakeholders and community. This is aligned with an appreciation of the means, opportunities, and resources of the Council to deliver management actions.

A range of shoreline management options have been considered to mitigate the erosion threat on the local foreshore areas. However, preferred options vary depending on site context and stakeholder preferences. The appropriate options to mitigate erosion threats at specific locations depend on the nature and level of threat as well as the consequences if they are disregarded. Erosion threats that require prioritisation are typically those resulting in immediate risks to public infrastructure and loss of beach amenities in public spaces.

Coastal processes

Newell Beach and Four Mile Beach are located within the Great Barrier Reef lagoon, where the offshore reef system provides substantial shelter from ocean swell. The regional wave climate is predominantly influenced by locally generated wind waves associated with prevailing south-easterly trade winds, with larger wave conditions occurring during tropical cyclones and significant storm events.

Both beaches are classified as tide-modified coastal systems, characterised by relatively steep upper beach profiles and flatter intertidal terraces. Sediment movement is influenced by the combined effects of waves, tides, alongshore transport and riverine processes.

At Four Mile Beach, shoreline changes are primarily influenced by wave-driven sediment transport, seasonal fluctuations and storm events. While the coastline is generally considered relatively stable, localised erosion can occur during periods of elevated water levels, including larger king tides and tropical cyclones. Tropical Cyclone Jasper in December 2023 caused significant erosion along sections of Four Mile Beach, damaging several formal beach access points, including the accessible beach ramp, and undermining the slab supporting the Surf Life Saving tower.

Newell Beach is a more dynamic coastal system, with shoreline changes strongly influenced by its location between Saltwater Creek and the Mossman River. The movement of sediment around the Mossman River entrance, including changes in the position and configuration of offshore sandbars and the river mouth, plays an important role in determining erosion and accretion patterns along the beach. Significant flood events, including Tropical Cyclone Jasper, have contributed to the redistribution of sediment at the river entrance, with subsequent wave action continuing to reshape these deposits.

Coastal erosion at Newell Beach has been particularly evident towards the southern end of the beach, where residential properties are located close to the foreshore. Previous coastal management works have included the installation of geotextile sandbag groynes, beach nourishment and more recent beach scraping activities. Council completed beach scraping works in first half of 2026, with further works planned to improve the resilience of the foreshore.

The assessment identifies the importance of understanding these natural coastal processes when selecting management options, particularly where interventions may influence sediment movement or require ongoing maintenance.

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Key coastal issues and erosion threats

To identify appropriate shoreline erosion management responses, the SEMP study area has been divided into four coastal management segments. Each segment has been assessed based on its existing shoreline condition, exposure to coastal erosion, assets at risk and environmental and cultural values.

Coastal segment	Shoreline condition and key erosion threats
Newell Beach North	The northern section of Newell Beach is characterised by a relatively narrow beach and an established coastal vegetation buffer. Localised erosion scarps, fallen trees and changes in shoreline position have been observed. Changes in the Saltwater Creek entrance, including sandbar formation and channel migration, may influence future erosion and sediment movement. There are limited built assets immediately at risk from coastal erosion.
Newell Beach South	This section experiences ongoing coastal erosion, with residential properties at Cyril Close located close to the active beach system. Shoreline conditions are strongly influenced by sediment movement around the Mossman River entrance. Previous beach nourishment, geotextile sandbag groynes and recent beach scraping activities have provided varying levels of protection. Continued erosion presents a potential risk to private properties and the existing foreshore.
Four Mile Beach North	The northern section of Four Mile Beach is generally stable, with a relatively flat beach profile and well-established vegetation buffer. Localised erosion and scour have been observed around formalised beach access points and towards the northern end of the beach, particularly following elevated tides and storm events. Existing recreational facilities and beach access infrastructure may require periodic maintenance and repair.
Four Mile Beach South	Localised erosion has been observed along sections of the foreshore, including erosion scarps of up to approximately 1 m, exposed tree roots and fallen vegetation. The beach is relatively narrow compared with Four Mile Beach North, although an established vegetation buffer remains. This section has significant cultural values, and there are limited built assets immediately behind the foreshore.

The overall intent of the management actions identified for these four coastal segments is to address existing and potential erosion risks while maintaining natural coastal processes and protecting the social, cultural, environmental and economic values of the coastline.

Recommended shoreline erosion management options

Potential management opportunities have been identified at each site, including coastal hazard protection and access improvements. Proposed options aim to address the increasing frequency of coastal erosion events relative to the present day whilst maintaining the natural environment and minimising the economic cost to the community.

Options development has also considered community values and perspectives and their potential influence over management initiatives or works. All potential management options have undergone a qualitative Multi-Criteria Assessment (MCA) to identify a preferred option at each site for consideration before moving to design, further assessment and implementation. The assessment criteria and weightings were developed with Council to shape key considerations in assessing the proposed management options.

Criteria included asset protection, durability, accessibility, amenity, environmental, cultural, value (cost) and approvals. After reviewing the coastal processes, opportunities, risks and values at each site, various potential coastal management options were defined, and a preferred option was selected following a structured appraisal process. The recommended management options are summarised in the tables below.

Table 1. Recommended erosion management options for the coastal segments

Coastal segment	Recommended management option
Newell Beach North	Active sand management and monitor
Newell Beach South	Active sand management and monitor
Four Mile Beach North	Maintain status quo (reactive management)
Four Mile Beach South	Do nothing

Implementation plan

The scheduling of the various tasks associated with the implementation of the recommended strategy is as follows in Table 2.

1. **Immediate** (recommend implementation within 2 years) & ongoing for relevant actions
2. **Medium-term** (recommend implementation within next 2 – 4 years)
3. **Future** (recommend implementation within 5 – 10 years)

Table 2. Actions summary

Location	Recommended action	Timing	Description
All sites	Shoreline monitoring and review	1	Undertake regular visual inspections and periodic beach profile surveys to assess shoreline change, dune condition, vegetation loss and erosion risks. Complete additional inspections following significant storm and cyclone events. Use monitoring results to inform future management actions.
	Traditional Owner engagement	1	Continue engagement with relevant Traditional Owners regarding coastal management activities, cultural heritage values and potential impacts of proposed works. Incorporate cultural heritage considerations into the planning and implementation of management actions.
Newell Beach North	Monitoring – site survey	1	Annual and event-based review of shoreline profile change. Establish four new transects.
	Active sand management	2 & 3	Consider targeted beach scraping or sand redistribution if monitoring identifies erosion requiring intervention. The need for works should be assessed against the limited risk to built assets and potential disturbance to the natural foreshore. Undertake works in conjuntion with Newell Beach South works.

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Newell Beach South	Monitoring – site survey	1	Annual and event-based review of shoreline profile change.
	Active sand management	1 & 2 3	Initial beach scraping and revegetation works to be undertaken in late 2026 /early 2027 Consider targeted beach scraping or sand redistribution if monitoring identifies erosion requiring intervention.
	Investigate seawall approvals & design.	3	Investigate the feasibility of a standard seawall design and approval along the Cyril Close, Olive Street and Marine Parade Sth foreshore. Subject to Council endorsement – council with consultant support develop a standard seawall design and gain state approvals in advance. Allowing private property owners to construct walls to protect their properties in the future.
	Tier 2 action – Seawall (if triggered)	3	If erosion threatens residential properties and active sand management is no longer sufficient, residents may consider construction of an engineered seawall. The structure would be positioned as far landward as practicable. Construction and implementation costs would be borne by private property owners.
Four Mile Beach North	Monitoring – site survey	1	Annual and event-based review of shoreline profile change.
	Maintain status quo	1	Continue to undertake access point maintenace and small scale beach scraping reactively post weather events.
	Improvement to access points	2 3	Council will seek to improve beach access management, initially at Four Mile Beach and progressively across the region. Routine maintenance and replacement works will provide opportunities to adopt designs better suited to erosion and changing beach conditions. Options include replacing seaward concrete sections with more natural and adaptable alternatives, such as sand-based access, sand ladders and other innovative designs.
Four Mile Beach South	Monitor	1	Let natural processes take place and monitor site.
	Tier 2 action (if applicable and triggered by an erosion event and Traditional Owners highlight significance for area to be protected)	3	If further assessment identifies a need for intervention, consider localised beach scraping to regrade erosion scarps and provide additional protection to exposed vegetation. Works would be subject to suitable machinery access, available sand and consideration of potential environmental and cultural heritage impacts.
All sites	**HOLD POINT review of SEMP actions and effectiveness**	3	**Review of SEMP actions and effectiveness within 10 years. SEMP update if required.**

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1 Introduction

1.1 Purpose of a Shoreline Erosion Management Plan

Coastal zones are naturally dynamic and complex places that are highly valued by the community. Ongoing interactions occur between waves, winds, tides, rivers and the natural environment. Coastal erosion is a natural process that shapes and reshapes coastlines over long timeframes. However, erosion processes may become problematic when interacting with communities and built infrastructure. The Queensland Government states that 'Developed areas impacted by erosion require balanced management to protect infrastructure and preserve coastal values and amenity' (DES 2018).

The Newell Beach and Four Mile Beach Shoreline Erosion Management Plan (SEMP) (this report) provides Douglas Shire Council (Council) with a framework to proactively plan for the erosion management of their coastline while ensuring natural coastal processes are maintained. A SEMP is informed by a strong technical understanding of the coastal processes and the values and knowledge of Traditional Owners, stakeholders and the broader community. This is aligned with an appreciation of the means, opportunities, and resources of the Council to deliver management actions. In addressing this goal, SEMPs provide direction for the management of key parts of the coastline in the immediate to short-term (up to 20 years) planning horizon and enable efficient use of Council resources in alignment with community values.

1.2 SEMP context

This SEMP has been commissioned by Council to assist with the proactive management of the shoreline. Council has been supported in the SEMP development process by Alluvium Consulting (Alluvium) in partnership with Natural Capital and Climate (NCC). The SEMP study area focuses on Newell Beach and Four Mile Beach.

This Newell Beach and Four Mile Beach SEMP (Figure 1) is informed by:

- A technical understanding of coastal processes
- Understanding of local coastal values and the experience of stakeholders and community
- An appreciation of the means, opportunities, and resources of Council to deliver management actions, as well as policy and legislative context relevant to implementation.

Council has also completed the *Resilient Coast Strategic Plan* as part of their Coastal Hazard Adaptation Strategy (CHAS) for the Douglas Shire coastline (DSC 2019). This adaptation planning work was completed in 2019 and focuses on long-term planning to 2100. The CHAS's tailored adaptation framework for Newell Beach and Four Mile Beach includes:

- Newell Beach (Rocky Point, Newell and Cooya Beach) - 'mitigate' adaptation response:
    - Present-day mitigation works include the defined Shire-wide actions, including dune protection and maintenance.
    - The economic case for additional coastal engineering works becomes viable by 2060.
    - By 2100 some limited areas of land within the Newell locality may need to be transitioned to an alternative landuse.
- Four Mile Beach (Port Douglas and Craiglie) - 'mitigate' adaptation response:
    - Present day mitigation works include the defined Shire-wide actions, including to maintain the existing vegetated dune system along Four Mile Beach.
    - The economic case for additional coastal engineering works becomes viable by 2060.

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- By 2100 some limited areas of land within the Port Douglas locality may need to be transitioned to an alternative landuse.

The outcomes of this SEMP consider shorter-term strategies that align with Council's longer-term CHAS. The SEMP will therefore provide Council with a plan to address issues of immediate concern. A recommended action to be implemented from the CHAS is continuous monitoring of coastal erosion, as well as a SEMP for the remaining Newell Beach and Four Mile Beach foreshore.

The preparation of the SEMP has been undertaken in line with the State Government guidelines, Preparing a shoreline erosion management plan (DES 2018). The SEMP development has included consultation with the Council, State Government, and community stakeholders at relevant stages of the process. This draft SEMP has incorporated public and stakeholder values provided through workshops and surveys (between 8 December 2025 and 26 January 2026). Additional Traditional Owner engagement has been completed during 2026. The final SEMP will incorporate feedback from public consultation on this draft SEMP.

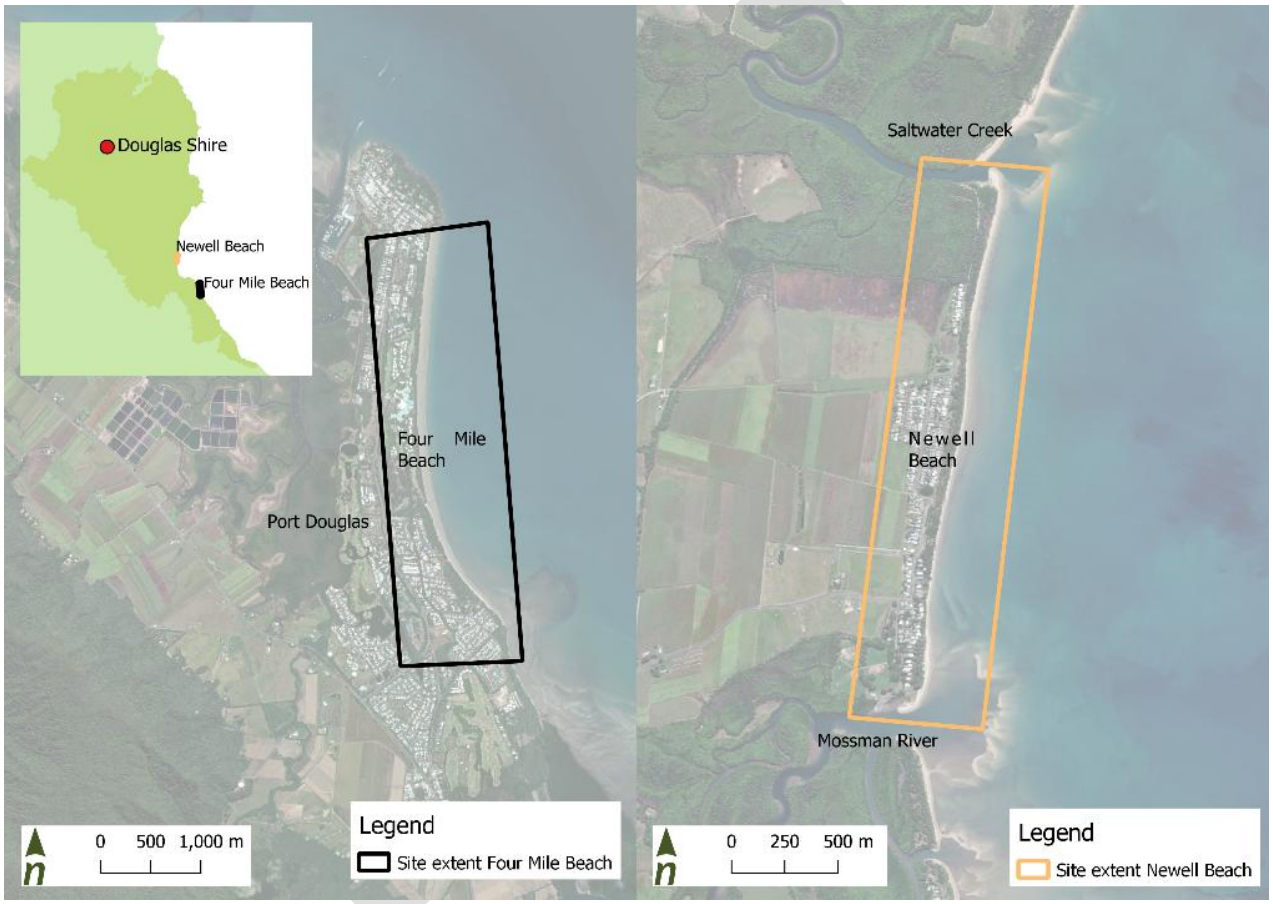


Figure 1. Area of interest for the Four Mile Beach and Newell Beach SEMP in the Douglas Shire Council LGA.

1.3 Plan structure

This SEMP draws on a range of technical studies, engagement activities, and a strategic options assessment, which have informed and shaped the Plan. The SEMP structure is shown in Table 3.

Table 3. SEMP structure

Section	Content
Section 2: Newell Beach and Four Mile Beach context	Landscape setting Geomorphic context
Section 3: Coastal values	Environmental, social, economic Engagement activities
Section 4: Coastal processes	Coastal processes Erosion prone area Trends in shoreline change Present-day shoreline Trajectory of change and management focus
Section 5: Shoreline erosion management options	Generic option considerations Options assessment appraisal
Section 6: Options assessment approach	Option assessment approach Criteria Weightings
Section 7: Assessment of shoreline erosion management options	Management options Recommended options
Section 8: SEMP implementation plan	Implementation plan Policy context and approvals

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2 Newell Beach and Four Mile Beach context

This section of the SEMP provides a summary of the landscape setting and geomorphic context for Newell Beach and Four Mile Beach. It considers the natural processes that shape the landscape, trends in shoreline changes over time, the current shoreline conditions, and the likely trajectory of change.

2.1 Newell Beach

Newell Beach is a small coastal community situated along a 2.4 km stretch of foreshore between the Saltwater Creek and Mossman River estuaries (Figure 2). It is the head of a barrier spit system, fronted by a narrow dune system approximately 20 to 80 m wide. This foredune system has been primarily shaped by wave action, with a steep upper and lower beach profile and an intertidal zone approximately 10 to 20 m wide.

Due to its position between the two estuaries, Newell Beach is a very active system, experiencing changes in shoreline position, with erosion and accretion documented as early as 1968. A rock revetment was constructed along the northern bank of the Mossman River in 1975 adjacent to the boat ramp to limit northward channel migration that could also threaten houses.

In 2016, geotextile sandbag groynes were installed at the southern end of Newell Beach, accompanied by beach nourishment works, with further sand replenishment undertaken in 2019. In September 2024, Maritime Safety Queensland (MSQ) undertook additional beach nourishment works at Newell Beach. These works involved placing sand along the beach to address erosion and stockpiling additional sand at the southern end, towards the Mossman River. More than 20,000 m³ of sand was placed as part of these works, using material from previous Dickson Inlet dredging campaigns that MSQ needed to remove from dredge ponds near Port Douglas.

In late 2025, Council successfully secured funding through the Disaster Recovery Funding Arrangements (DRFA) to undertake coastal recovery works at Newell Beach, including beach scraping and nourishment activities. The first stage of works was completed in January 2026, involving the redistribution of sand along the beach and the use of excess sand stockpiled at the southern end of Newell Beach following the 2024 beach nourishment campaign. While the benefits of the additional sand placed in 2024 may not have been immediately apparent, the availability of this stockpiled sand has since proven beneficial, providing a valuable source of material for subsequent beach recovery works. The January 2026 works have demonstrated positive results in restoring sand to the upper beach, with the restored beach profile generally maintained since completion. Further beach scraping and nourishment activities are planned for late 2026 as part of the ongoing coastal recovery program, with the aim of improving the resilience of the foreshore to future erosion events.

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Figure 2. Newell Beach SEMP study area.

The *Resilient Coast Strategic Plan* indicates that at Newell Beach, several assets are at medium to high risk from open coast erosion and tidal area inundation in the present day. These asset types include beach and foreshore, marine, road, and water reticulation infrastructure, and a limited number of dwellings. There is a notable increase in the number/extent of these assets at medium to high risk by 2100.

Through community engagement undertaken as part of the *Resilient Coast Strategic Plan* (DSC/Alluvium 2019) and the *Newell Beach Foreshore Management Plan* (Alluvium 2021), we have gained valuable insights into what the community values most about this coastline. Residents of Newell Beach place high importance on the natural beauty, wildlife, and sense of open space along the foreshore, with many considering it an extension of their backyard. The beach is regularly used for exercise, relaxation, fishing, walking dogs, and socialising with friends and family. Maintaining the natural and largely untouched character of the foreshore—including its littoral rainforest and views to the ocean and nearby islands—is seen as essential. The community also recognises the environmental significance of habitats such as the foreshore rainforest, potential turtle nesting sites, and important plant species including beauty leaf and coconut palms.

At the same time, residents raised concerns about foreshore degradation. Key issues include vegetation clearing for access tracks and views, weed invasion, garden waste dumping, and the impacts of erosion and sea level rise. There is strong support for improved vegetation management, including weed control and revegetation with native species, potentially involving community volunteers. Other priorities include enhancing amenity and cleanliness through additional rubbish and recycling bins, maintaining disability access, and limiting large-scale built structures to preserve the natural character and scenic values of the beach.

2.2 Four Mile Beach

Four Mile Beach stretches approximately 4 km along the eastern edge of the Port Douglas township, which is the largest settlement in Douglas Shire. Four Mile Beach forms part of an extensive sandy beach ridge system, running south from the rocky headland of Flagstaff Hill at the northern end of Port Douglas to the mouth of the Mowbray River (Figure 3).

According to the most recent census, the Port Douglas area has a resident population of approximately 5,600 people, which can almost double during the peak tourist season. At the northern end of Four Mile Beach, a Surf Life Saving Club provides year-round patrols, supported by a guard tower and a seasonal stinger net enclosure to ensure safe swimming conditions.

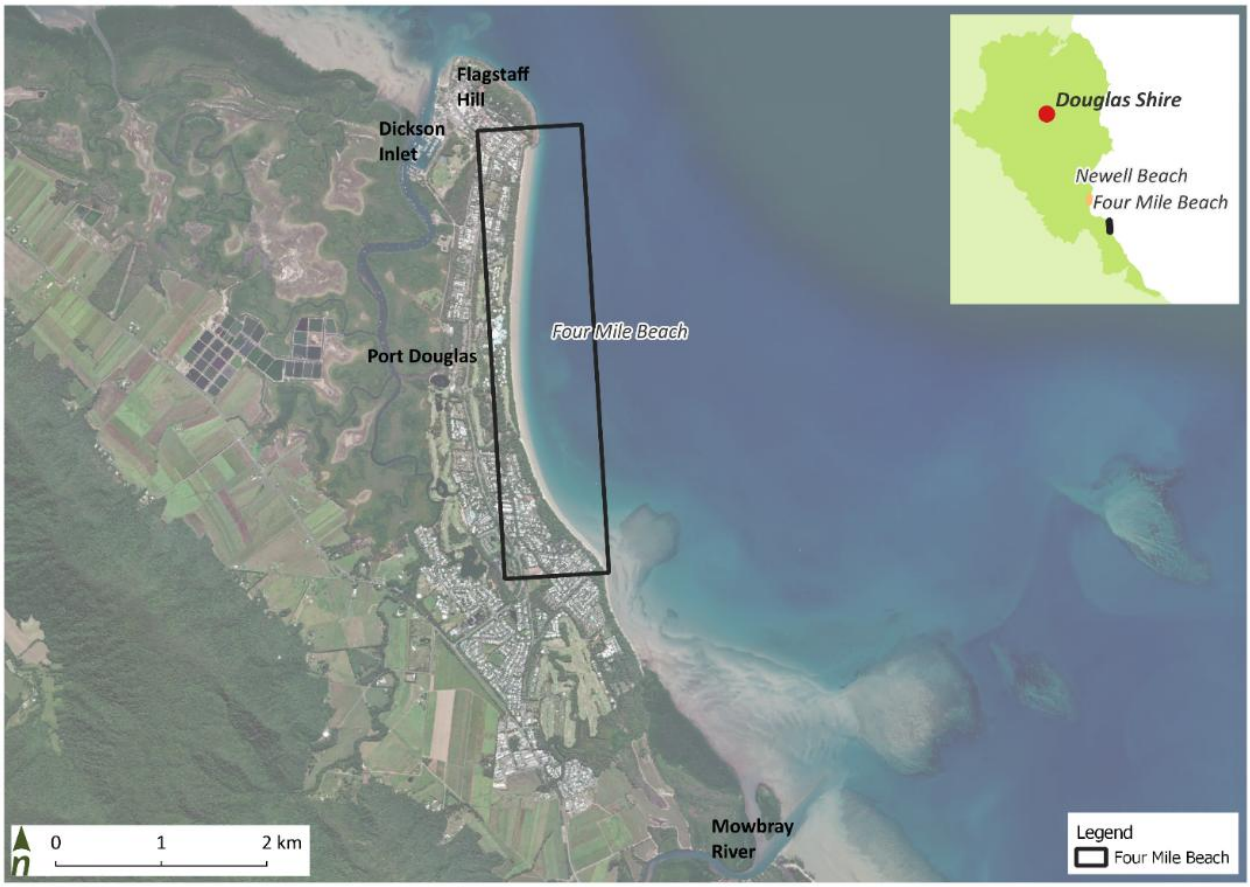


Figure 3. Four Mile Beach SEMP study area.

Four Mile Beach experienced significant erosion during Tropical Cyclone (TC) Jasper, with several formal access points damaged or lost, reducing safe entry to the foreshore. This included the accessible beach ramp, a popular entry point for people of all abilities. The concrete slab of the Surf Life Saving tower was also undercut.

In addition to erosion associated with significant storm and cyclone events, Four Mile Beach can also experience regular, localised erosion during periods of elevated water levels, particularly during the larger king tides that occur throughout the year.

The *Resilient Coast Strategic Plan* indicates that Port Douglas has several assets currently have a medium – high risk of open coast erosion and tidal area inundation. These asset types include beach and foreshore, marine, road, sewerage, water reticulation assets and some dwellings. Assets with medium to high risk are mainly clustered towards the northwest side of the spit. There is a notable increase in the number/extent of assets with a medium to high risk by 2100, including an increase in assets at risk towards the southern end of the spit, such as sewerage infrastructure.

Through community engagement undertaken as part of the *Resilient Coast Strategic Plan* (DSC/Alluvium 2019) and the *Foreshore Management Plan* (Alluvium 2022) for Four Mile Beach, we have gained valuable insights into what the community values most about this coastline. Residents place high importance on the natural beauty, tropical atmosphere, and sense of seclusion created by the established coastal vegetation buffer. They particularly appreciate the coconut palms, shaded areas, open parklands, and safe spaces for children, while also recognising the beach's role as a unique and accessible tourist destination. The foreshore is widely used for exercise, relaxation, and social activities, with many residents viewing it as an extension of their backyard.

Community feedback also highlighted concerns regarding foreshore vegetation management, including weed control, coconut palm maintenance, and the impacts of informal clearing and garden waste dumping. Misuse of the foreshore through illegal camping, fires, and littering was also raised as an issue. While some residents supported upgrades to amenities such as BBQs, seating, and picnic areas, there was strong opposition to any large-scale development near the foreshore that could compromise the natural character and scenic values of the beach.



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3 Coastal values

The coastal areas of the Douglas Shire hold significant cultural, social, environmental and economic value to the Traditional Owners, residents and visitors of the region. The rich and diverse community and landscape of the area support a number of interrelated values. This section provides a summary of key values to protect and consider in the management of shoreline erosion processes.

Council has undertaken a range of engagement and consultation activities in the development of the SEMP. The purpose of this engagement was to develop a shared appreciation of coastal values, aspirations, and concerns to inform management options (including preferences) for the Douglas Shire coastline. There was also prior broader engagement on the coastal zone as part of the region-wide CHAS – *Resilient Coast Strategic Plan*. This section provides a summary of key values to protect and consider in the management of shoreline erosion processes.

3.1 Traditional Owners' cultural values

The Djabugay Nation and Eastern Kuku Yalanji People #2 have active Native Title Claims at Four Mile Beach and Newell Beach respectively (Figure 41). The community includes a number of indigenous groups with interest in Four Mile Beach and Newell Beach, including:

- Eastern Kuku Yalanji People #2 Native Title Claim Group
- The Djabugay Nation Native Title Claim Group
- Eastern Kuku Yalanji People (Jabalbina Yalanji Aboriginal Corporation RNTBC)
- Yirrganydji People (Dawul Wuru Aboriginal Corporation)
- Kubirriwarra Yalanji Aboriginal Corporation
- Bamanga Bubu Ngadimunku Aboriginal Corporation

The Djabugay Nation has a Native Title Claim over the Four Mile Beach area (Figure 41). The Eastern Kuku Yalanji People have Native Title Determinations in effect around Newell Beach (Figure 42), as well as Indigenous Land Use Agreements on Newell Beach (Figure 43) with the Douglas Shire Council and others.

These coastal lands and waters hold significant value to the Traditional Owners and indigenous peoples of the area. Engagement undertaken for this project identified that the beaches contain culturally significant areas and cultural heritage sites.

3.2 Environmental values

The region contains several vegetation and wildlife habitats that are of State environmental significance (Figure 44). Along much of the coastline there are wetland areas of high ecological significance, wildlife and essential vegetation habitats. Anecdotal evidence of the presence of sea turtle nests has been provided for Newell Beach during the engagement activities. The Great Barrier Reef marine park (Figure 45) extends onto both beaches. The Four Mile Beach site is all Conservation Park Zone and Newell Beach includes Habitat Protection Zone and Estuarine Conservation Zones at either end where the river mouths are present.

3.3 Social values

Figure 4 illustrates the key values and activities associated with Four Mile Beach and Newell Beach. Social values can represent the things people find important or meaningful that make up the region's identity,

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lifestyle and social fabric. The natural coastal environments are used by residents and visitors for many activities, including traditional uses and ceremonies, connecting with others, exercise and recreation.

The top activities identified at Four Mile Beach and Newell Beach include exercise, relaxation, meeting friends and family, walking the dog, recreation and fishing. These environments also provide important spiritual and passive recreation opportunities. Residents have identified that: maintaining easy and safe access for recreation; protecting the natural environment; and preserving the unique sense of place is important to them, especially to preserve activities of social value.

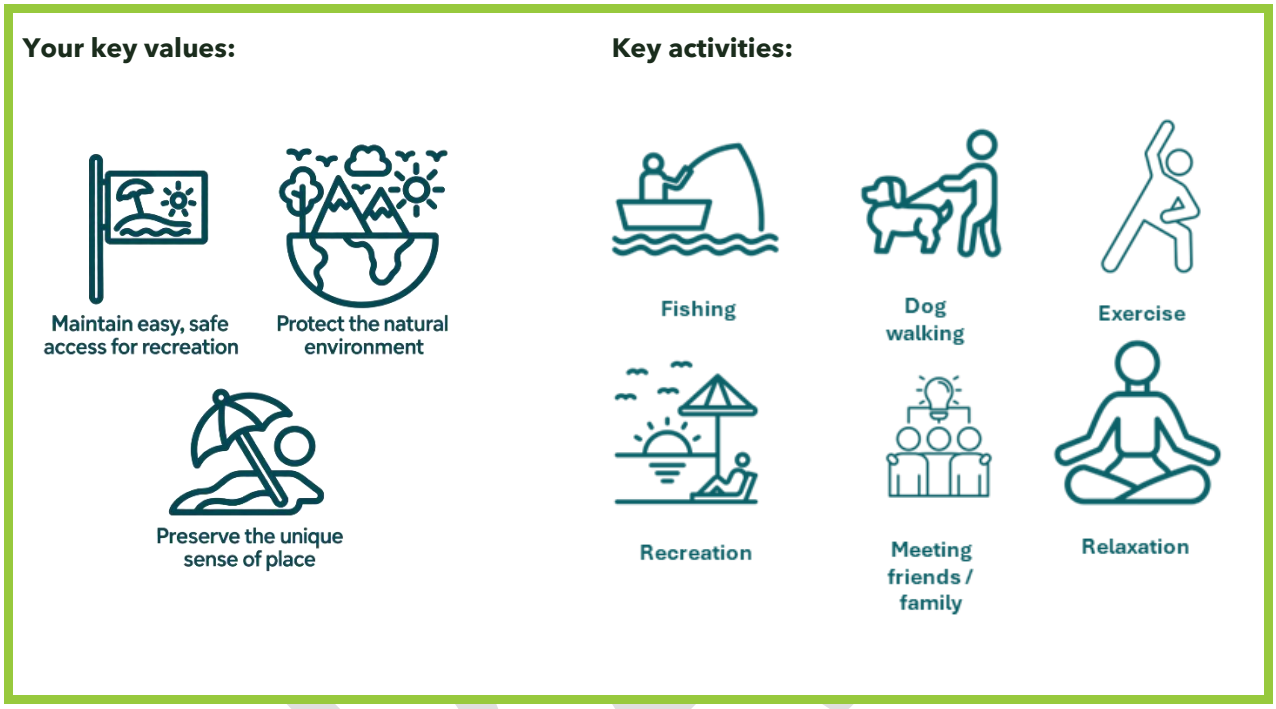


Figure 4. Social values and activities for Four Mile Beach and Newell Beach

3.4 Economic values

Tourism is an important economic input to the region. Douglas Shire receives 443,000 overnight visitors and 264,000 day visitors each year, generating $611 million per year (Douglas Shire Council, 2026). Tourism in the region supports 2,500 jobs, mostly in accommodation and food services (Douglas Shire Council, 2026). The region's appeal for tourism is strongly associated with the natural environment including, the Great Barrier Reef, Daintree Rainforest National Park, unspoilt beaches, and freshwater waterfalls (Douglas Shire Council, 2026).

Agriculture was historically a key industry in the region and remains an active industry (Douglas Shire Council, 2026). Agricultural land is used primarily for sugarcane production, with cattle grazing and tropical fruit growing also occurring in the region (Douglas Shire Council, 2026).

Other industries including construction, transport, retail, health care, agriculture and education contribute to regional employment and economic diversity (Douglas Shire Council, 2026).

3.5 Engagement activities and feedback

Engagement activities focused on Council, community leaders, Traditional Owners, community members and stakeholders. Consultation activities occurred between Monday 8 December 2025, and Tuesday 27 January 2026. Participants contributed their thoughts via meetings, an online survey, and pop-up events (Figure 5). The focus of this engagement was to provide input on the validation of values, aspirations, and concerns related to Four Mile Beach and Newell Beach.



Figure 5. Summary of engagement activities

3.5.1 Traditional Owners

A series of meetings were held with Traditional Owners groups to discuss engagement approaches and timing, cultural values of the beaches, key concerns and site-specific priorities, and preferred outcomes for Four Mile Beach and Newell Beach:

Dawul Wuru Aboriginal Corporation - Yirrganydji People on 8 Dec 2025
Eastern Kuku Yalanji People (Jabalbina Yalanji Aboriginal Corporation RNTBC) on 8 Dec 2025
Kubirriwarra Yalanji Aboriginal Corporation on 9 Dec 2025
Bamanga Bubu Ngadimunku Aboriginal Corporation on 10 Dec 2025
The Djabugay Nation Native Title Claim Group on 8 Sep 2026
Eastern Kuku Yalanji People #2 Native Title Claim Group on 23 September 2026

3.5.2 Community drop-in sessions

Community drop-in sessions were attended by a total of 44 people. These sessions were held at:

- Newell Beach (Mossman Golf Club) on 8 December 2025; and
- Four Mile Beach, near the Surf Life Saving Tower, on 9 December 2025.

The drop-in sessions provided an opportunity for community members to discuss coastal issues, values and potential management responses. Key themes raised during the sessions included:

Newell Beach

- Concern about ongoing erosion, particularly at the southern end of Newell Beach, and the potential impacts on properties, infrastructure and beach access.
- Concern about changes to natural sediment movement, including the potential influence of the sandbar at the Mossman River mouth, and the effectiveness of recent beach nourishment activities.
- A preference for management approaches that work with natural coastal processes where possible, supported by improved monitoring, historical shoreline information and other available evidence.
- Interest in temporary protection measures in areas of more immediate erosion risk, together with further community consultation before additional beach nourishment activities are undertaken.

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Four Mile Beach

- Concern about localised erosion, particularly towards the southern end of Four Mile Beach and between the Mirage and Mowbray Street.
- Access and safety issues along the foreshore, including steep or uneven beach access points and accessibility following periods of erosion.
- A preference for maintaining a natural coastline and avoiding hard coastal protection structures where possible.
- Strong support for protecting and maintaining foreshore vegetation due to its role in supporting dune stability and reducing erosion.

3.5.3 Survey

An online survey was conducted and received 49 responses. Of the respondents to the online survey, 57% live within 1 km of Four Mile Beach or Newell Beach, and 56% describe themselves as a local resident of either Four Mile Beach or Newell Beach. Of survey respondents, 38% indicated that their coastal values had changed since Tropical Cyclone Jasper, with feedback highlighting increased expectations for practical, coordinated and evidence-based coastal management.



Figure 6 – *Engagement with Traditional Owners*

4 Coastal processes

This section describes the coastal processes that influence the two study locations of Four Mile Beach and Newell Beach, including winds, waves, tides, river processes, and sediment transport. This section describes the environmental processes and shoreline changes for both study locations, and particularly focusses on identifying drivers of long-term recession at Newell Beach.

4.1 Astronomical tides

The Douglas Shire region experiences a mixed semi-diurnal tidal regime, with two high and two low tides each day. The heights of the tides can vary significantly, creating an uneven pattern that frequently blends spring and neap tidal water levels. The spring tide range can reach approximately 3m. These irregular tidal movements drive sediment transport and tidal circulation within the Great Barrier Reef lagoon. Tidal planes for Port Douglas (PSM 10077) are shown in Table 4 from Queensland Tide Tables (2025).

The highest spring tides, often referred to as 'king tides', occur twice in any year due to the alignment of the sun and moon. Though the summer king tide is regularly regarded as the most significant high tide of the year, the winter king tide can be nearly as high, but occurs at night. The summer 2026 king tide at Port Douglas was 1.76 m AHD (6 cm below HAT).

Table 4. Tidal planes for Port Douglas (PSM 10077)

Tidal plane	2025 (m LAT)	2025 (m AHD)
Highest Astronomical Tide (HAT)	3.40	1.82
Mean High Water Spring (MHWS)	2.54	0.96
Mean High Water Neap (MHWN)	1.88	0.30
Mean Sea-level (MSL)	1.65	0.07
Australian Height Datum (AHD)	1.58	0
Mean Low Water Neap (MLWN)	1.42	-0.16
Mean Low Water Spring (MLWS)	0.75	-0.83
Lowest Astronomical Tide (LAT)	0	-1.58

4.2 Wind climate

The Douglas region lies in the trade wind belt for most of the year resulting in a primarily easterly to south-easterly wind climate. Seasonal wind conditions measured at the Low Isles Lighthouse automatic weather station (AWS), located around 15km offshore of Port Douglas, are shown in Figure 7. Wind rose plots show the dominance of trade winds, with winds from the southeast occurring most frequently. The figures also show the presence of more easterly conditions during the wet season (October to April).

Long term trend analysis of wind conditions for this region indicates the tendency for multi-year and decadal fluctuation, likely driven by broad-scale climate drivers such as the El Nino/La Nina oscillation. Figure 8 shows analysis of monthly averaged wind direction at Low Isles. The variation of averaged wind direction about the mean (151 degN for this station). Between 2007 and 2014 the data shows a tendency for more southerly wind. This shifts in 2014 to a trend of more easterly winds. This long term shift to more easterly winds is likely to influence regional sand transport patterns, potentially slowing down longshore drift for beaches in the Douglas region.

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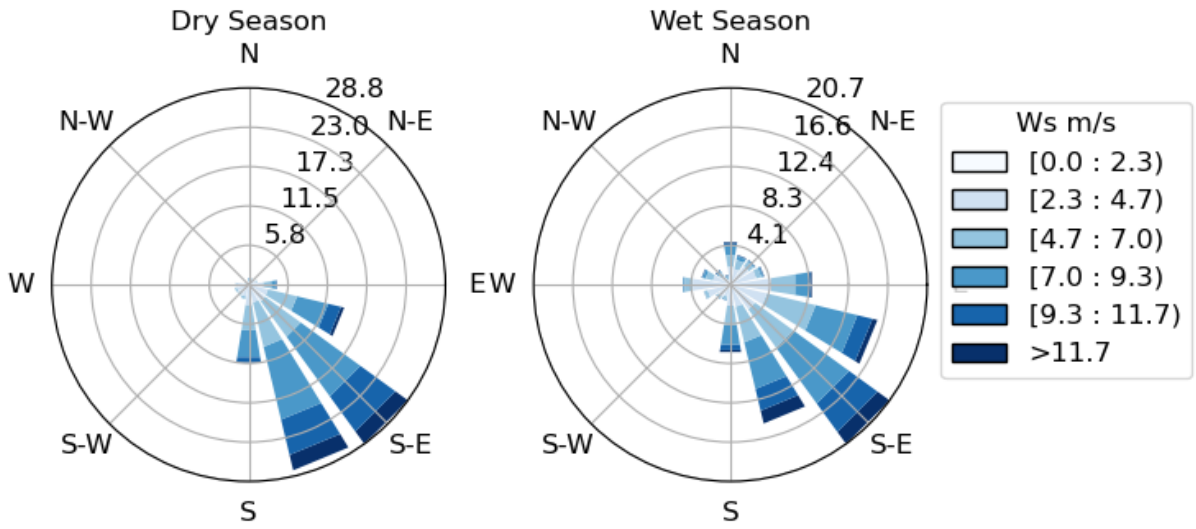


Figure 7. Seasonal wind roses for recorded wind conditions from Low Isles AWS for wet season (October to April) and dry season (May to September). Length of wind record Nov. 1998 to Feb. 2024.

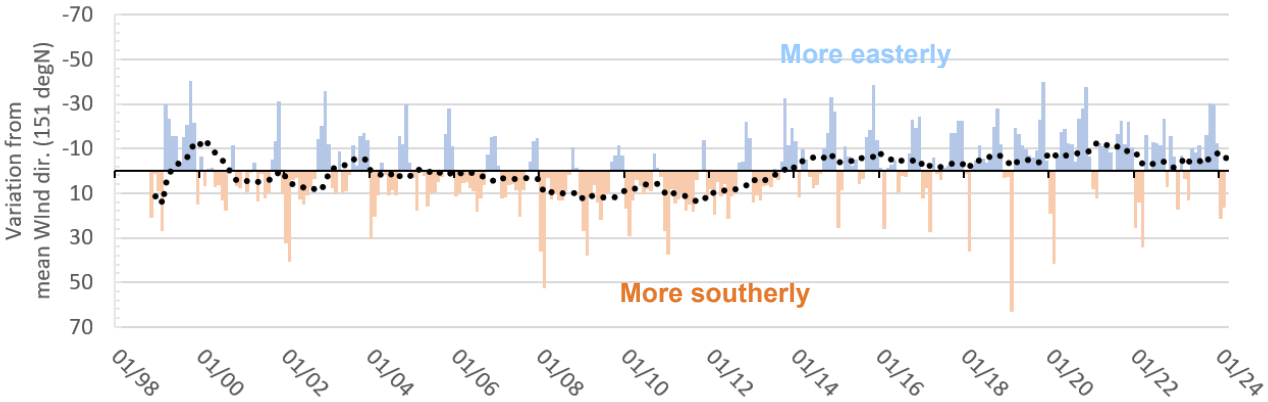


Figure 8. Timeseries of Low Isles AWS monthly averaged wind direction deviation from mean direction (151 degN). Blue bars for months with more easterly winds than the mean, orange bars indicate months with more southerly winds than the mean. Dotted black line shows 12-month rolling average.

4.3 Wave climate

The regional wave climate is relatively low energy due to sheltering from offshore ocean swell by the Great Barrier Reef shelf, the seaward extent of which is located around 60 km offshore of Port Douglas. The longest continuous wave record for the area is available from the Cairns Mk4 wave rider buoy (WRB), located offshore of Palm Cove, approximately 35 km south of Port Douglas at a depth of 12 m. This data is available from 1975 to 2025, with directional data from 2016. A wave rose for the Cairns WRB data is shown in Figure 9. The wave climate for the Cairns WRB is characterised by two dominant sea wave directions, as indicated in Figure 10:

- East and ESE-ly wind-driven waves propagating across the GBR lagoon, tending to be more easterly during the wet season associated with shifting of the trade winds and monsoon. It is noted that the wave buoy is sheltered from southerly waves by the Yarrabah/Cape Grafton headland, which explains the limited representation of southerly waves in the wave rose.
- North-easterly waves arriving via a natural break in the reef known as the Trinity Opening that channels some deep ocean swell, albeit attenuated from interacting with the GBR shelf and lagoon. These conditions are unique to the Cairns area and are unlikely to impact the Douglas coast further north.

Significant wave height (Hs) at this location is typically less than 0.5 m with wave period between 3 and 5 seconds, indicating short-period wind-driven conditions. The wave record does contain some longer period (approximately 9s) swell from the north-east, indicating a minor contribution of deep ocean swell originating from beyond the GBR shelf. The wave roses shown in Figure 9 indicate the wave climate under typical conditions, however much larger waves can occur during storms and tropical cyclones. It is important to note that the wave climate at Port Douglas and Newell Beach is expected to be more strongly dominated by south-easterly waves, consistent with the prevailing wind directions shown in Figure 7. This is due to the absence of sheltering from southerly waves provided by the Yarrabah/Cape Grafton headland at the wave buoy location, together with the Trinity Opening being located to the south-east of Port Douglas and Newell Beach, allowing greater exposure to south-easterly wave conditions.

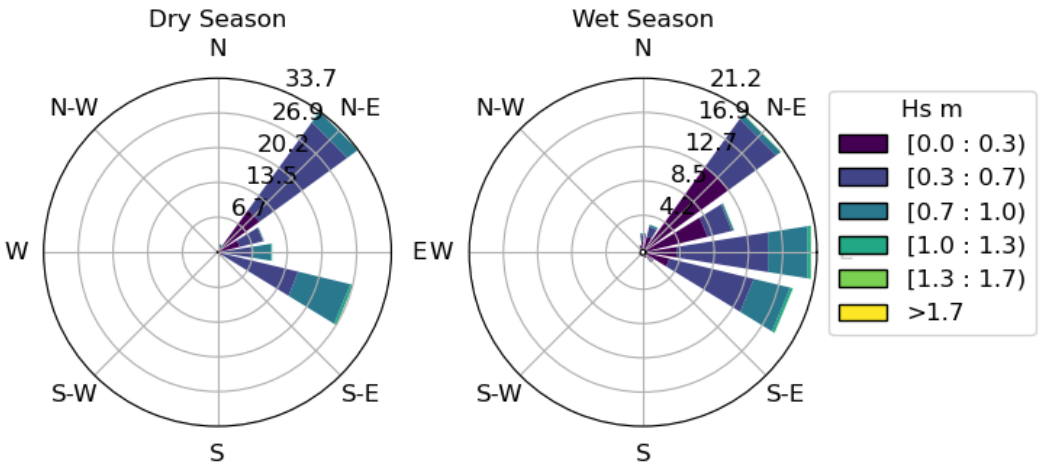


Figure 9. Local wave climate from Cairns WRB (approx. 35km south of Port Douglas). Seasonally averaged wind roses show wave climate for the dry (right) and wet (left) seasons.

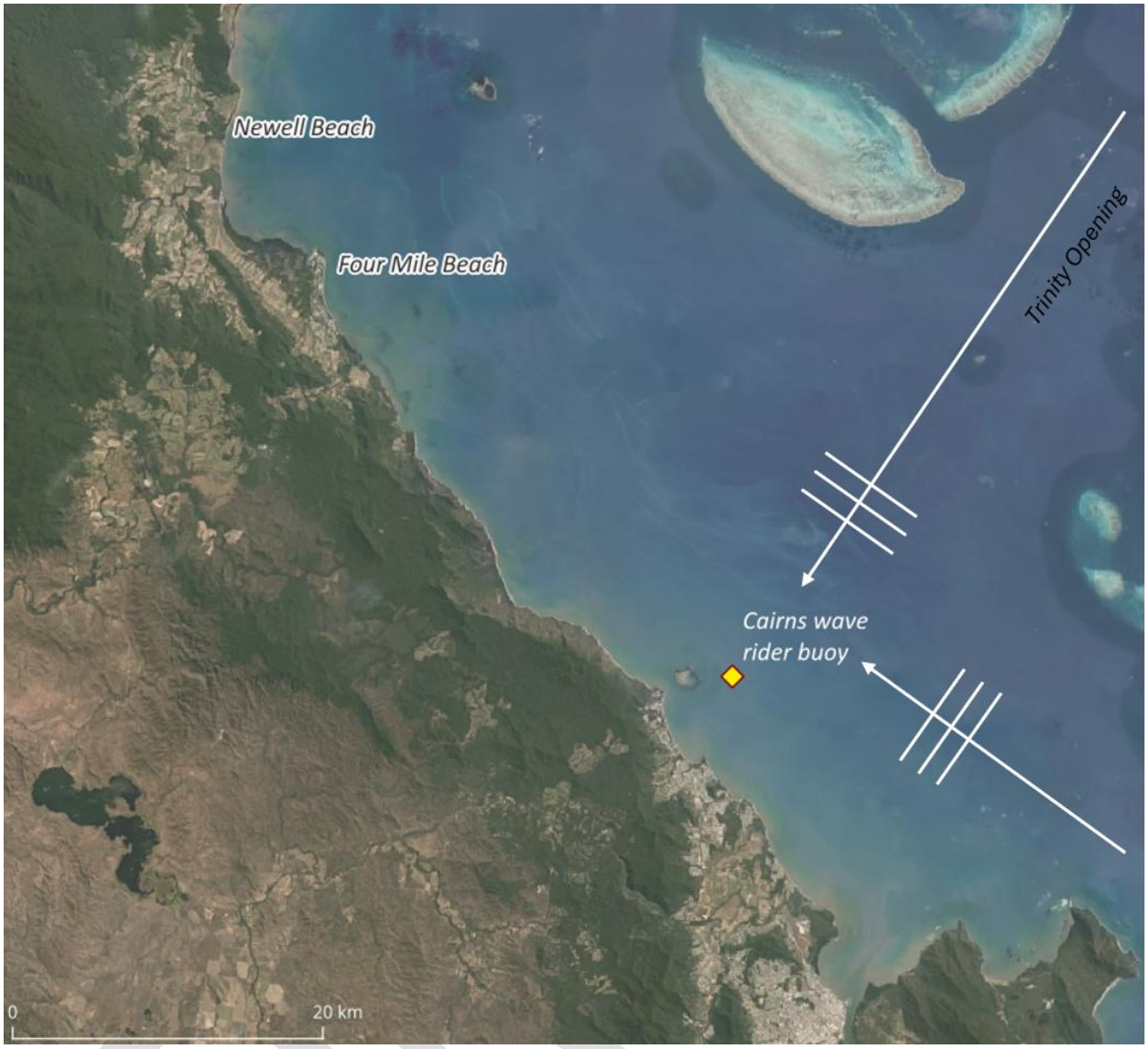


Figure 10. Recorded wave data is available from the Cairns wave rider buoy (noting that the Cairns wave rider buoy is sheltered from southerly waves due to the Yarrabah Headland). In addition to SE-ly sea waves, this location experiences a portion of NE-ly swell via the Trinity Opening. The Four Mile or Newell Beach locations are not exposed to these NE-lies due to sheltering from the offshore reef.

4.4 Tropical cyclones

The Douglas Shire region is vulnerable to impacts from severe tropical cyclones (TCs) which can produce extreme waves, storm tides, and coastal erosion. Though infrequent, cyclones play a significant role in the redistribution of coastal material along the coast of tropical north Queensland. Cyclones can cause significant redistribution of marine sands and severe terrestrial erosion along large stretches of the coastline. Since 1969, more than 40 tropical cyclones have passed within 200 km of Port Douglas, of varying intensity.[1]

At this latitude, tropical cyclones typically follow an east to west track, often tracking over the northern peninsula and out into the Gulf of Carpentaria. However, systems that track southward along the Queensland coast, such as TC Ita (2014), can often be the most destructive, bringing sustained rainfall, storm tide and coastal erosion to large areas. Recent notable cyclones which have affected the Douglas

[1] http://www.bom.gov.au/cyclone/tropical-cyclone-knowledge-centre/history/tracks/

area include TC Rona (1999), TC Ita (2014), TC Owen (December 2018) and TC Jasper (2023). Recorded wind and wave data recorded at Low Isles weather station and Cairns WRB respectively from these events is summarised in Table 5.

Table 5. Peak wind and wave conditions from recent tropical cyclone events

Event	Wind speed - 10-minute averaged (and 3-sec gust) (km/h)	Wave height - Hs (and Hmax) (m)
TC Rona (Feb. 1999)	99 (122)	3.6 (6.3)*
TC Ita (Apr. 2014)	86 (101)	3.4 (5.6)
TC Owen (Dec. 2018)	83 (100)	2.0 (3.4)
TC Jasper (Dec. 2023)	90 (115)	2.3 (4.3)
TC Narelle (Mar. 2026)^	-	2.0 (4.2)

*Recorded at Low Isles temporary wave gauge (1998– 1999)
^Recorded winds not available for TC Narelle as of writing. Wave data is preliminary from near-real time observations, pending review and publication by MSQ.

Tropical Cyclone Jasper (2023)

Of these recent cyclones, TC Jasper is of particular relevance to this study. TC Jasper formed in December 2023, peaking as a severe category 5 system in the Coral Sea, before weakening on its approach to the north Queensland coast. Jasper crossed the coast on 13th December as a category 2 system at Wujal Wujal causing widespread rainfall, flooding, and coastal erosion.

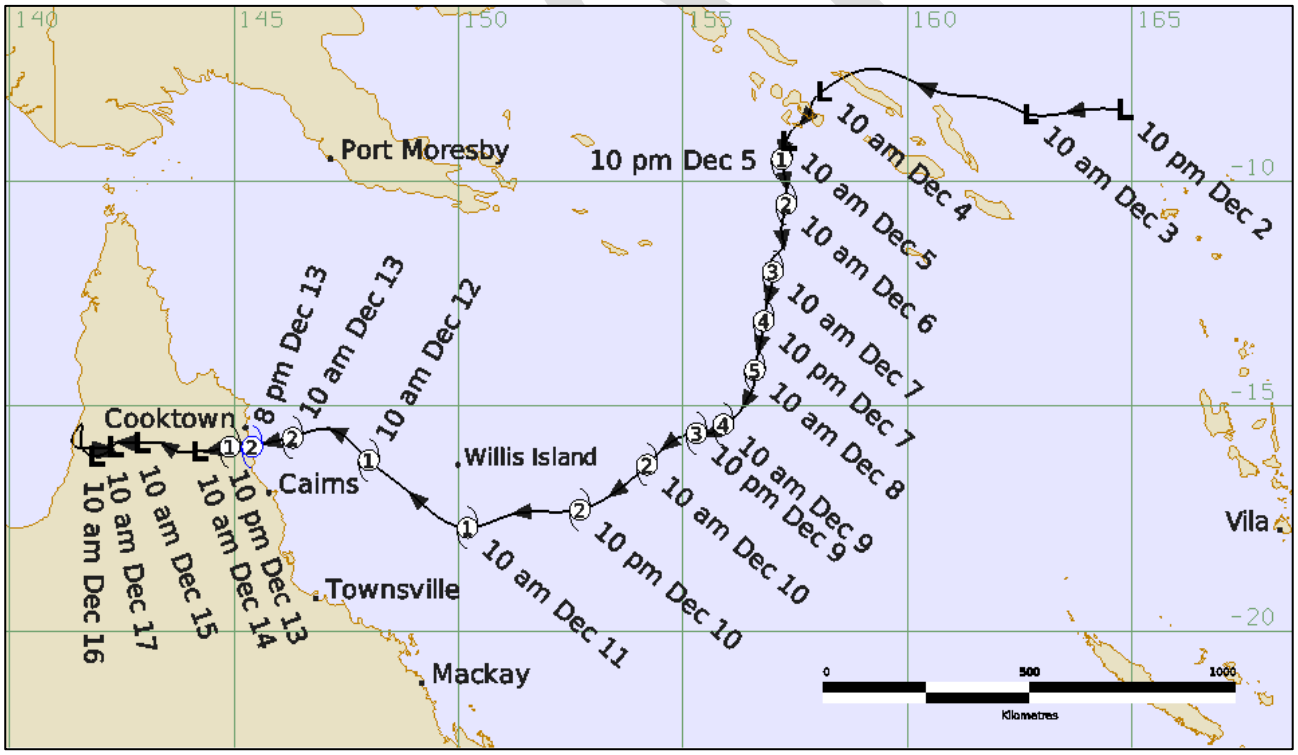


Figure 11. Track map of Severe Tropical Cyclone Jasper (2023). Source: Bureau of Meteorology (BoM)

At Four Mile Beach, waves and storm surge from TC Jasper caused significant erosion along the beach, with several formal access points damaged or lost, reducing safe entry to the foreshore. This included the accessible beach ramp; a popular entry point for people of all abilities. The slab of the Surf Life Saving tower was also undercut.

Within the Mossman River, the recorded discharge at Mossman peaked at approximately 1,700 m^3/sec, the largest discharge event recorded since records began in the 1940s. This flow volume caused significant sediment transport and deposition within the river system. Flood waters reaching the mouth of the Mossman deposited a large amount of riverine sand offshore of Newell and Cooya, forming a fan-shaped sandy delta at the outlet. The storm also produced a new breakthrough at Cooya, with a smaller sand delta forming at this new outlet.

In the years since TC Jasper, ocean waves have reformed the deposited sand, gradually reworking it landward to form a linear sand bar across the mouth of the river and corresponding ebb tide channel draining toward Newell beach. This process is shown from satellite derived imagery in Figure 12.



December 2nd 2023

Early December, pre-TC Jasper. The entrance to Mossman River is narrowed by sand salients at the north and south bank of the entrance.

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 **December 27th 2023**	**Late December, post-TC Jasper.** Sand has been removed from the entrances of Mossman River. A sand fan is visible offshore of the river entrance. A new breakthrough has occurred south of the Mossman River at Cooya.
 **May 30th 2024**	**Approx. 6 months post TC Jasper.** Offshore fluvial sand deposits at the river mouths (and new breakthrough) are being reworked by wave processes, forming new sand shoals

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June 4th 2025

Approx. 18 months post TC Jasper. Over approximately 1 year, the sand shoals at Mossman River have been moved landward by waves, coalescing into a sand bar and likely ebb tide channel immediately north of the entrance

Figure 12. Timeseries of coastal sand deposition and morphology resulting from TC Jasper (2023). Imagery sourced from Copernicus, Sentinel-2 satellite program.

Tropical Cyclone Narelle (2026)

During the course of this study, the Port Douglas coastline was again impacted by severe tropical cyclone Narelle in March 2026. This event provided additional insight into the ongoing dynamic nature of the coastal area and the important influence of inter-related climatic processes on the state of the coast.

TC Narelle approached the Far-North Queensland coast as a Category 5 system, making landfall north of Cape Melville near Coen. However, the coastal influence of the cyclone was felt along large sections of the coast further south, including Port Douglas and Cairns. A complete review of this system's impacts on the FNQ coast is not yet available from the Bureau of Meteorology, however satellite imagery, on-ground photos, and available metocean data provides information on its impacts to the region. The Cairns WRB, located offshore of Palm Cove, recorded a peak significant wave height (Hs) of 2.0m, with a Hmax of 4.2m, comparable to that of TC Jasper (2023).

The conditions from this event have further altered the morphology of sand deposits at the mouth of the Mossman River. Following TC Narelle, the sand bar has been significantly reshaped and reduced in size. These changes are due to larger waves impacting the area as well as catchment flooding from increased rainfall reshaping the mouth and bar. New sand shoal deposits appear to be forming at the widened outlet as well as the smaller outlet further south at Cooya. These processes are shown in the satellite imagery in Figure 15.

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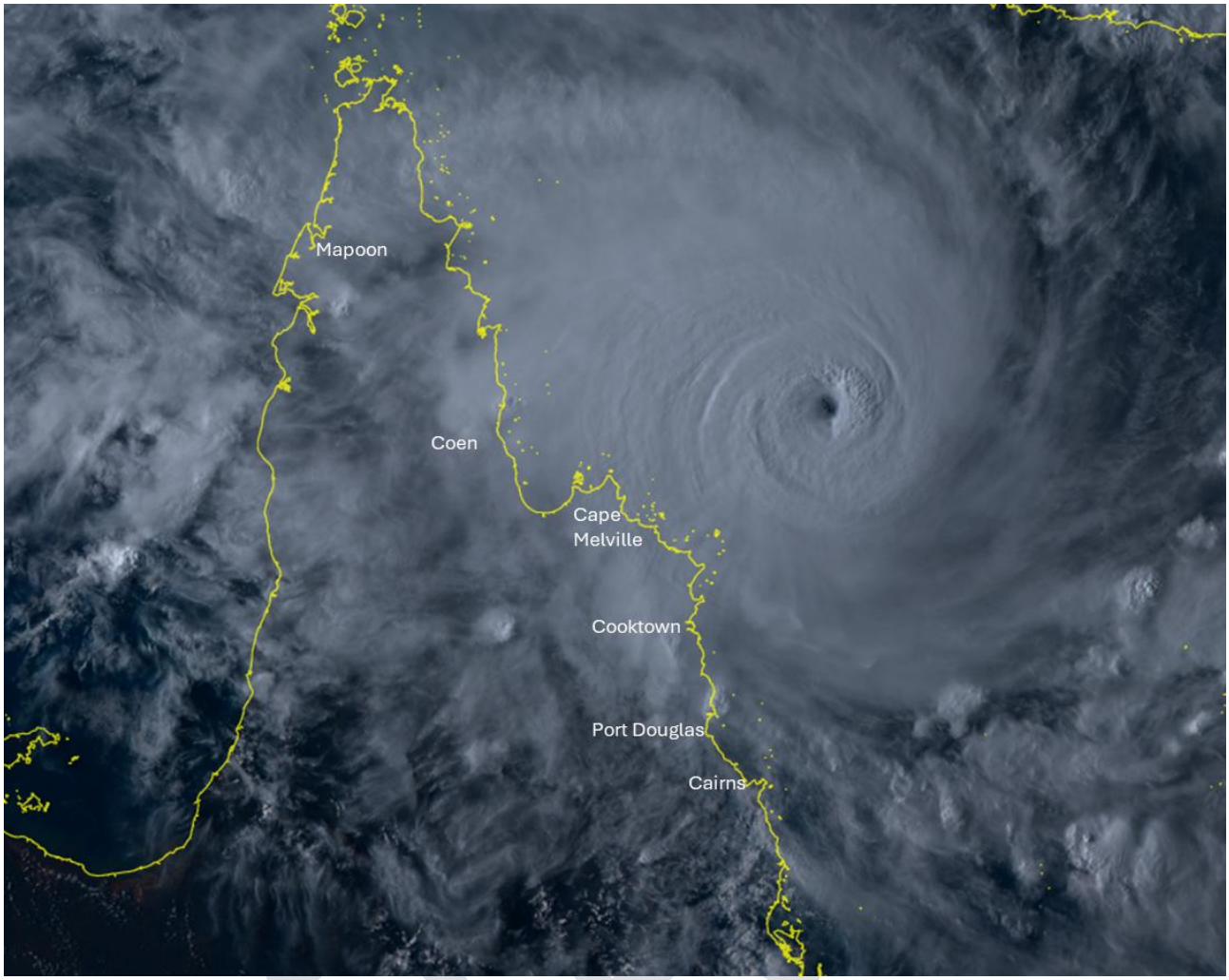


Figure 13. TC Narelle approaching FNQ Coast on March 19th. Imagery from Himawari satellite program.



Figure 14. Coastal erosion at Newell Beach from TC Narelle. Image source Douglas Shire Council.

 **March 1st 2026**	**Early March 2026, pre-TC Narelle.** The sand bar at the river mouth is formed into a long, continuous bar with a narrow outlet at the northern end.
 **March 21st 2026**	**Post TC Narelle.** Larger waves and river discharge generated by the cyclone appear to have reduced the sand bar significantly and widened the outlet mouth

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March 26th 2026

Post TC Narelle. Days after the event, the outlet mouth continues to be wide, with recurving at the end of the sand bar caused by exiting flows. There is evidence of new sand shoal deposits at the main outlet mouth, as well as at the smaller southern outlet.

Figure 15. Timeseries of coastal changes from TC Narelle (March 2026). Imagery sourced from Copernicus, Sentinel-2 satellite program.

Extreme storm tides and waves

Severe cyclone events can produce extreme storm tide and wave conditions which can lead to inundation and erosion of the coastal zone. A storm tide is the ultimate water level produced by the combination the astronomical tide and storm surge. Storm surge is a rise in sea level above the expected tide to produce a storm tide level driven by a combination of low pressure on the water surface and extreme winds, as conceptualised in Figure 16. The continuous wave breaking action, including wave runup on the shoreline and wave set up due to breaking waves, subsequently create a locally higher water level at the shore.

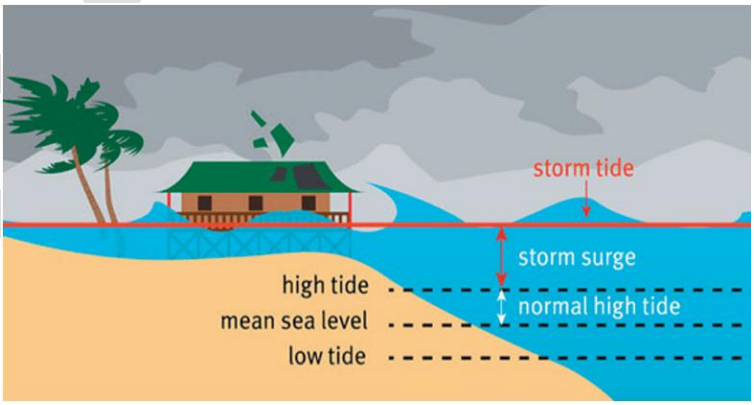


Figure 16. Components of storm tide *(source: coastadapt.com.au)*

Extreme wave and storm tides for the Douglas region are reported by the *Cairns Regional Storm Tide Inundation Study (CRSTIS*) produced by BMT WBM (2013). These have been used in this SEMP for the present-day climate scenario. Storm tide levels have been taken from the CRSTIS for Newell Beach and Port Douglas location for a range of Annual Exceedance Probabilities (AEPs). Table 6 presents extreme wave conditions for both locations. Table 7 and Table 8 present cyclonic storm tide conditions without and with wave runup and setup effects, respectively. With the effects of wave runup and setup, the total storm tide level is increased by more than 1 m for each AEP.

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Table 6. Present-day offshore extreme wave height AEPs (m)

	CRSTIS output ID	2 % AEP	1 % AEP	0.5 % AEP
Four Mile Beach	248	2.76	2.85	2.91
Newell Beach	273	2.64	2.70	2.74

Table 7. Present-day extreme storm tide AEPs (mAHD)

	CRSTIS output ID	2 % AEP	1 % AEP	0.5 % AEP
Four Mile Beach	248	1.68	1.90	2.20
Newell Beach	273	1.73	2.07	2.40

Table 8. Present-day extreme storm tide AEPs inclusive of wave setup and runup (mAHD)

	CRSTIS output ID	2 % AEP	1 % AEP	0.5 % AEP
Four Mile Beach	248	2.70	3.07	3.43
Newell Beach	273	2.77	3.21	3.58

4.5 Catchment processes

Catchment processes also influence the volume of sand that is delivered via rivers to the coasts. Within the Great Barrier Reef lagoon, offshore sediment drift is slowed due to reduced wave climate and the influence of headlands, tidal estuaries, etc. Therefore, a significant source of sand for beaches in the Douglas region is deposited from rivers.

For the Newell location, analysis of river discharge within the Mossman River indicates that there is a long-term trend of increased discharge in the river year on year. This is likely associated with broad-scale climate drivers such as increased La Nina. Larger flood events in the river system, like that resulting from TC Jasper, are a crucial natural process for bringing sediment to the coast. This sand is deposited as nearshore sand shoals at the mouth of the Mossman River. More sediment delivered to the coast is typically beneficial for beach growth, however it is likely to be a driver of localised recession at Newell, as described below.

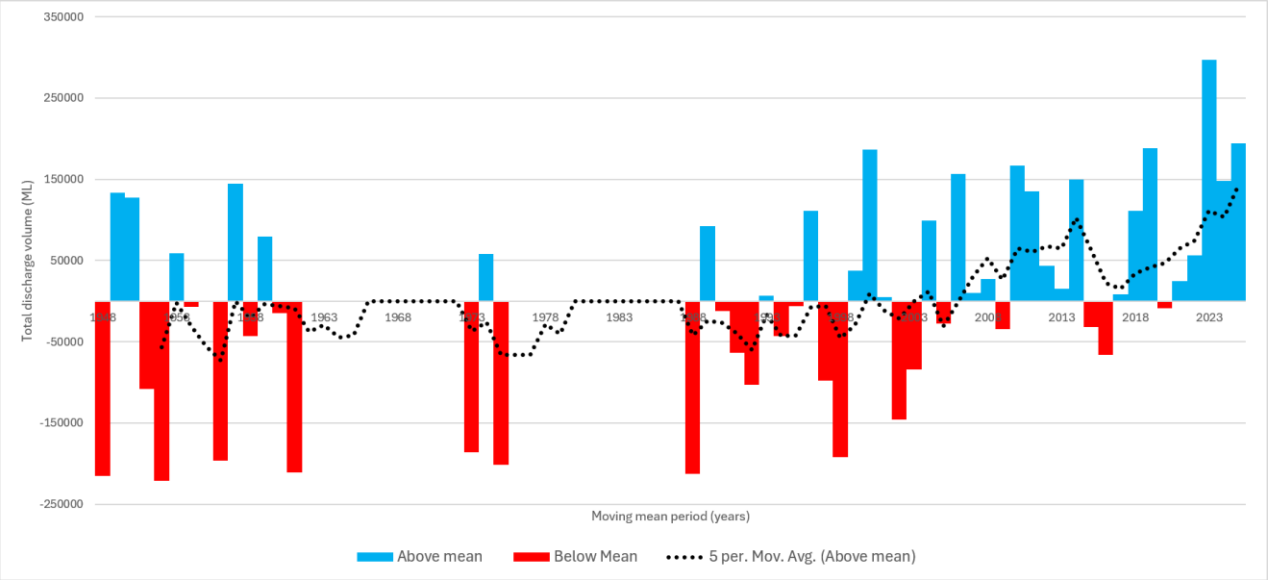


Figure 17. Yearly variation of river discharge (ML) about the mean for the Mossman River. 5-year rolling average trend line (dashed black) shows a trend of increased discharge over the past approx. 20 years

4.6 Coastal typology and geology

Newell and Four Mile Beach can both be classified as tide-modified beaches. Tide-modified beaches are typical in northern Queensland as they are usually found in locations where the tidal range is several times larger than the average wave height, due to sheltering provided by the Great Barrier Reef shelf. These beaches have a steeper slope, reflective high tide beach that transitions to a flatter low-tide terrace extending seaward. The combination of a large tidal range and relatively smaller offshore waves means that during high tide, a portion of wave energy can propagate unbroken across the intertidal flat and only break on reaching the steeper high tide beach, producing sand cusps. As the tide recedes, waves begin to progressively break over the flat terrace, producing a wide, shallow surf zone across the terrace. The upper beach is usually composed of medium grained sand, with finer material across the low tide terrace. Sand material collected from upper beach indicates a moderately-sorted quartz-rich sand with some carbonate content, medium grained with median diameter (D50) less than 500 µm.

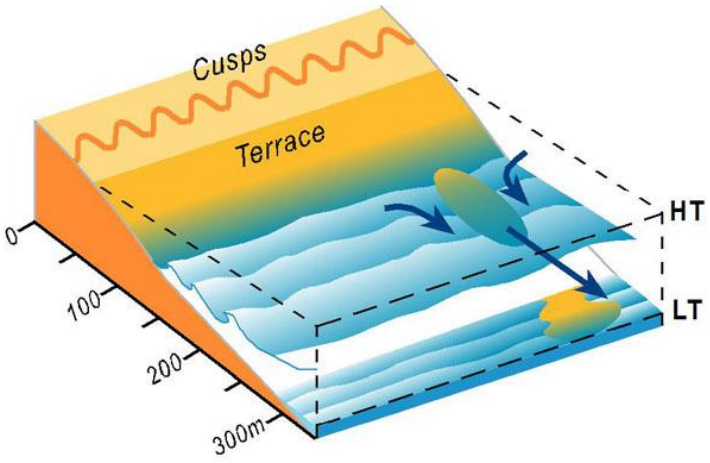


Figure 18. Conceptual diagram of a reflective, tide-modified beach with low tide terrace. Source: OzCoasts.org.au

At Four Mile Beach the coastal geology is dominated by well-sorted quartzose sandstone as a result of coastal conditions. A harder conglomeratic formation forms the northern headland, whilst tidal to supratidal mangrove flats dominated by silt and mud extend further inland. This unit is also exposed on the foreshore at Newell Beach. Swampy, riverine terrain at Mossman and Saltwater creeks bounding the site extent at Newell are charactered by sandy mud and peat deposits, while clay, silt and gravel colluvium and alluvium is exposed in lower lying areas inland of both Newell and Four Mile beach.

Table 9. Formation name for geology map legend

Code	Description
Dh/a	*Pale to dark or greenish grey, fine to medium and locally coarse-grained, quartz intermediate greywacke, interbedded with minor siltstone and mudstone; minor conglomerate, conglomeratic greywacke (arenite)*
Dh/cg	*Dark grey, thick-bedded pebble to boulder conglomerate, conglomeratic greywacke (rudite)*
Dh/m	*Mainly dark grey, thin bedded, mudstone, subordinate thin to thick bedded arenite beds, minor chert and basalt (mudrock)*
Qcs	*Silt and clay; supratidal deposits (mud)*
Qhcb	*Moderately well-sorted, fine to coarse-grained quartzose to shelly sand and some gravel: beach ridges and cheniers (sand)*
Qhct	*Silt, mud, sand and minor salt; coastal tidal flats, mangrove flats, supratidal flats, saltpans and grasslands*
Qhmr	*Carbonate gravel, sand and coral rock; fringing/nearshore reef*
	Silt, mud, sand and minor salt; coastal tidal flats, mangrove flats, supratidal flats, saltpans and grasslands
TQr	*Clay, silt, sand, gravel and soil; colluvial and residual deposits - generally on older land surfaces (colluvium)*
Qa	*Clay, silt, sand and gravel; flood-plain alluvium (alluvium)*
Qcw	*Mud, muddy sand, sand and minor peat; swamp and heath deposits in coastal areas (mud)*



Figure 19. Four Mile Beach and surrounds – geology map (reproduced from GeoResGlobe (Queensland Government). See Table 8 for legend definitions.



Figure 20. Newell Beach and surrounds – geology map (reproduced from GeoResGlobe (Queensland Government). See Table 8 for legend definitions.

4.7 Trends in shoreline change

An assessment of historic shoreline change has been undertaken using satellite-derived shoreline data from Digital Earth Australia (DEA) Coastlines[2]. The DEA Coastlines application uses a large database of satellite imagery and tidal models to map the mean annual shoreline position since 1988 across the Australian coast and islands. Satellite images from Landsat are paired with coincident tide levels to approximate the location of mean sea level (MSL). This enables the analysis of coastal rates of change (accretion or recession), with data being regularly updated as it is acquired and allowing an overview of broad trends to be identified.

For Four Mile Beach, the annual average shoreline data from DEA Coastlines shows a net stable shoreline trend for the majority of the beach extent. At the southern extent of the beach the shoreline data shows a moderate recession trend of approximately 0.2 to 0.3 m/year (Figure 21). Directly south of this location, fluctuation of the intertidal flats produces a larger negative rate in the data but is not directly related to beach recession.

At Newell Beach, the long-term recession trend is between 0.8 and 1.2 m/year for the south section of Newell adjacent to the Mossman River entrance (Figure 22). Shoreline timeseries shows a period of beach growth beginning around 2016 and peaking in 2021. Site imagery taken by Alluvium in October 2020 show the beach at Newell having a wide sandy beach with little to no evidence of erosion scarp. Following this period of growth, there was a return to recession which has persisted to the present day.

The timing of recent tropical cyclones is also represented on the shoreline timeseries for Newell Beach. Although the long-term trend of recession at this location is not fully explained by impacts from cyclone events, their occurrence does align with periods of beach erosion in the satellite-derived record.

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[2] https://cmi.ga.gov.au/data-products/dea/581/dea-coastlines

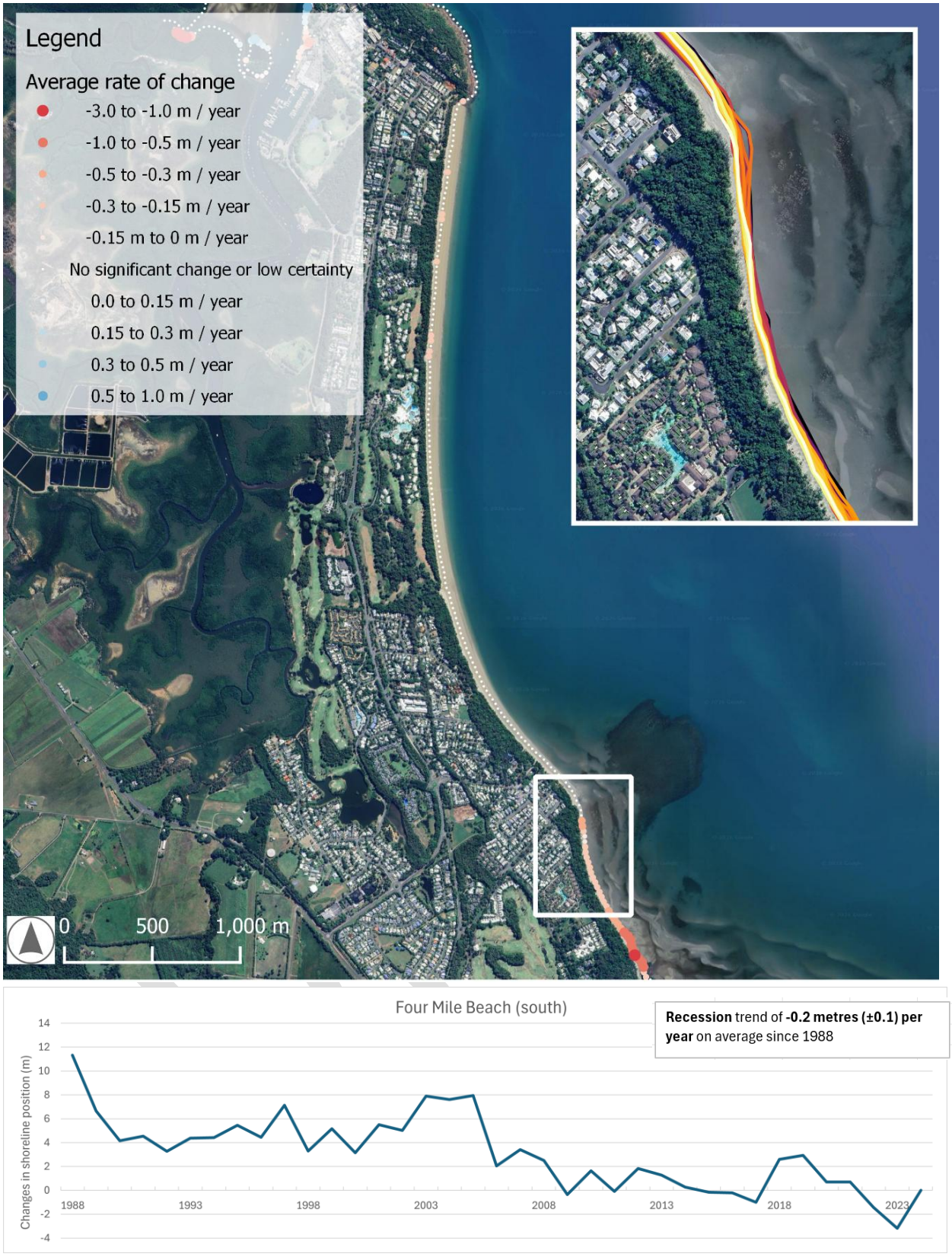


Figure 21. Map of satellite-derived shorelines and timeseries of shoreline position from DEA Coastlines for Four Mile Beach. Timeseries output point is roughly in the centre of inset map. Shoreline position accuracy is ±0.2 m/yr.



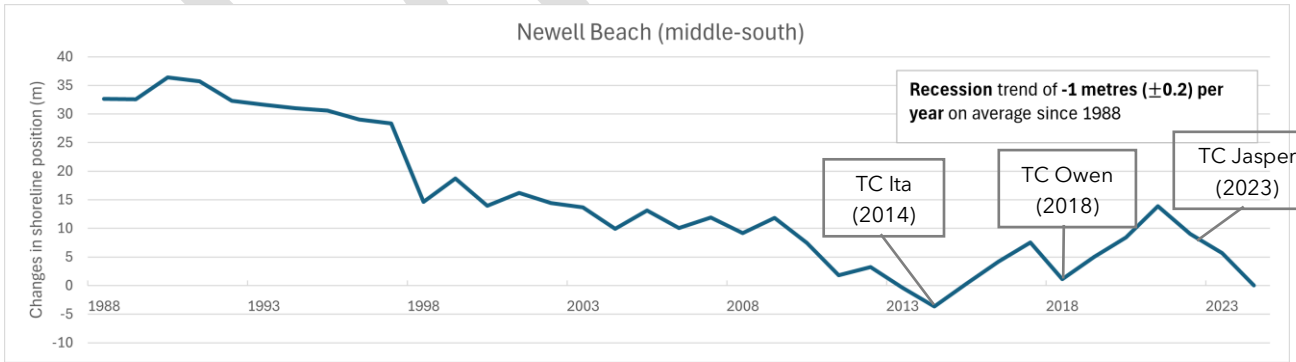


Figure 22. Map of satellite-derived shorelines and timeseries of shoreline position from DEA Coastlines for Newell Beach, showing timing of recent cyclone events. Timeseries output point is roughly in the centre of inset map. Shoreline position accuracy is ±0.2 m/yr.



Figure 23. Newell Beach in October 2020, looking south toward Mossman River entrance, following recent beach growth. After this period, the beach at Newell has returned to a trend of shoreline recession and beach erosion.

4.8 Sediment transport and shoreline dynamics

Beaches are a naturally dynamic feature that are constantly fluctuating in response to change coastal conditions and sediment transport patterns. The movement of coastal sediments is typically influenced by two processes, longshore transport and cross-shore transport. Longshore transport (often called littoral drift or longshore drift) occurs along the beach in the intertidal area and is the result of offshore waves breaking at an oblique angle to the coastline, inducing sediment to move along the beach. On the east coast of Queensland, longshore transport generally follows a south to north direction due to the prevalence of south-easterly trade winds. Conversely, cross-shore transport occurs when waves erode and redistribute sand up and down the beach profile. Storms and cyclones create large, higher energy waves that erode the upper beach and dune, depositing the sand as an offshore bar. During calmer periods the offshore material is gradually reworked landward by lower-energy waves.

Estuary dynamics are also key to understanding sediment transport pathways. Estuary dynamics are influenced by fluvial, tide, and wave process. Fluvial flows and tides, particularly ebb tides, move sand from within the estuary to be deposited offshore. Waves produce littoral drift causing build up of sediment at the estuary mouth, often forming sand shoals and bars. Waves also rework deposited sediments offshore of the mouth into sand bars and gradually push sediment back landward.

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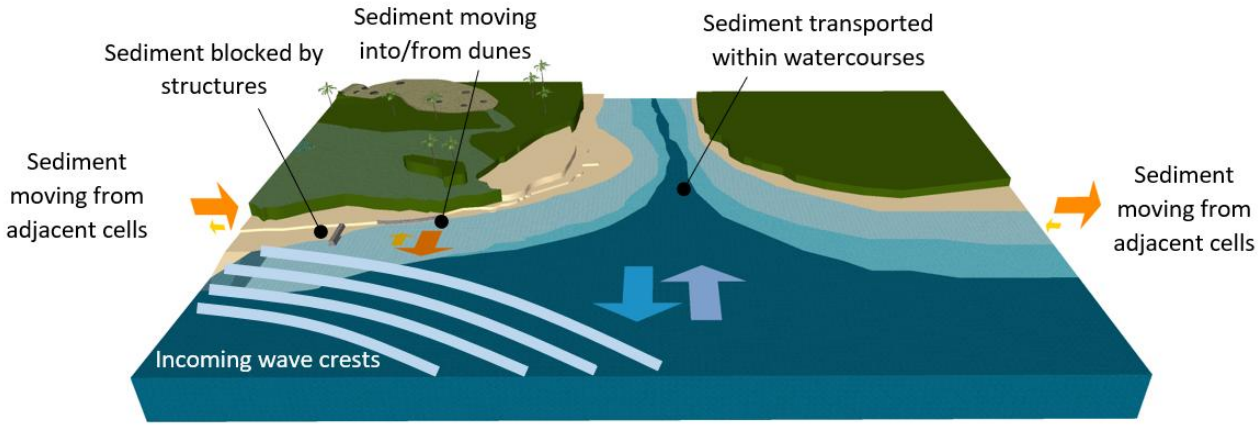


Figure 24. Conceptual diagram of different coastal sediment transport processes.

Following a large river flood event, the sediment deposited at the river mouth is reworked into an offshore bar which creates a low energy lagoon within the delta at the creek mouth. This low energy zone causes sand to be retained at the river mouth, and stalls littoral drift, thereby starving adjacent beaches of new sand.

4.8.1 Four Mile Beach

Four Mile Beach is relatively stable overall, as indicated by the shoreline change analysis in Section 4.7. The headland at its northern end, combined with relatively low rates of northward sediment transport, helps retain sand within the beach system. Sand transported from the south accumulates against the headland, maintaining beach width, before potentially bypassing it and continuing northwest towards Dickson Inlet.

In addition to regional sediment transport along the coastline, the Mowbray River provides a source of sediment to the beach system from the south. Overall, Four Mile Beach is expected to remain relatively stable over the SEMP's 10–20-year planning horizon.

4.8.2 Newell Beach

At the mouth of the Mossman River, sand bars occur semi-regularly, such as following TC Jasper. Previous occurrences were also observed in the satellite record in 2018 and 2019 in response to large fluvial flow events. Over time these sand bars become reworked by waves and transported landward to be redistributed to the beach.

As the sandbar is reworked landward, the driving wave energy is competing with outgoing ebb tide and fluvial flows from the river. Over time this interplay produces an ebb tide channel that is deepened and becomes the dominant outflow pathway. This in turn reshapes and redirects the landward translation of the sand bar. As tides and fluvial flows continue to flush out through the channel it diverts sand transport and prevents sand from bypassing and reaching Newell Beach.

This process is likely being further exacerbated by recent increasing trend in Mossman River discharge, as described in Section 4.5. The more recent increase in fluvial discharge means that more sand is deposited to the ocean from the Mossman year on year. While increased sediment influx is generally good for beach growth, because of the local morphological effects previously described, it is having the long-term effect of shoreline recession at Newell Beach.

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The alignment and meander of the Mossman river mouth can change with each flood event, and this also plays a role in long-term shoreline change at Newell. Historic aerial imagery (Figure 25) shows a more diagonal orientation of the outflow channel, which was associated with beach growth. When the outflow channel is orientated more shore parallel, as was the case following TC Jasper (2023), it will continue to disrupt sediment transport, resulting in shoreline recession. The behaviour of the channel mouth is highly dynamic and influenced by channel dominance within the estuary, which can vary significantly between individual flood events.

Increased rainfall and river flows are generally associated with long term, climate patterns including the El Niño/La Niña oscillation. These broadscale climate factors are cyclic on the scale of several years to decades, meaning that current trends are likely to change, which may induce a reversal of current shoreline recession in the long term, however the timing of this is difficult to forecast.



Figure 25. Aerial imagery of Newell and Mossman River – 1974. The orientation of the river mouth was associated with accretion of the beach on the northern bank.

Key erosion drivers for Newell Beach

This assessment has undertaken a desktop assessment of coastal processes based on the available metocean, environmental, and spatial data to understand the drivers behind recent and longer-term historic erosion at locations along the Douglas Shire coastline.

For Newell Beach, several contributing drivers act to stall sand supply before it can reach the beach, resulting in long-term recession:

- **Flow in the Mossman River** – Discharge rates in the Mossman appear to be increasing on an inter-annual scale, likely associated to broad-scale climate drivers. More frequent flow events in the river bring more sand to the coast, which forms sand shoals and bars at the mouth of the River.
- **Wave sheltering from sand bars** – Sand bars at the mouth of the Mossman are a recurrent, regular feature produced by upstream flooding. When present, these sand bars produce a shadow effect, limiting waves and reducing the amount of sand transported to the beach north of the River mouth. The fringing reefs and intertidal flats extending approx.1.5 km offshore at Cooya Beach are likely to also cause sheltering from southerly wind-waves, reducing northward transport.
- **Ebb tide channel formation** – Wave shadowing is exacerbated by ebb tide channel formation. As a concentrated ebb tide channel forms through the sand bar, it acts as a sand sink, diverting transport and preventing it from bypassing and arriving at Newell Beach. Ebb tide meandering parallel to the beach may also be contributing to erosion.
- **Long term climate drivers** – These effects are likely exacerbated by broad-scale climate fluctuations. While more sand arriving to the coast from catchment flooding is typically beneficial for supplying sand to nearby beaches, the present trend for more easterly-orientated winds (described inSection 4.2) will slow northward transport, increasing accretion on the southern Cooya Beach, and corresponding recession to the north at Newell.

The combined and repeated influence of these natural processes produce a sand deficit at Newell Beach, driving the present trend of shoreline recession. Similar erosion mechanisms have been suggested previously, including in Projex Partners (2014) which assessed shoreline recession at Newell Beach following TC Ita (April, 2014). It is important to note however that the effects of these natural drivers are often non-linear and may revert in coming years or decades in response to broader climate cycles. These processes are conceptualised in Figure 26 & Figure 27.

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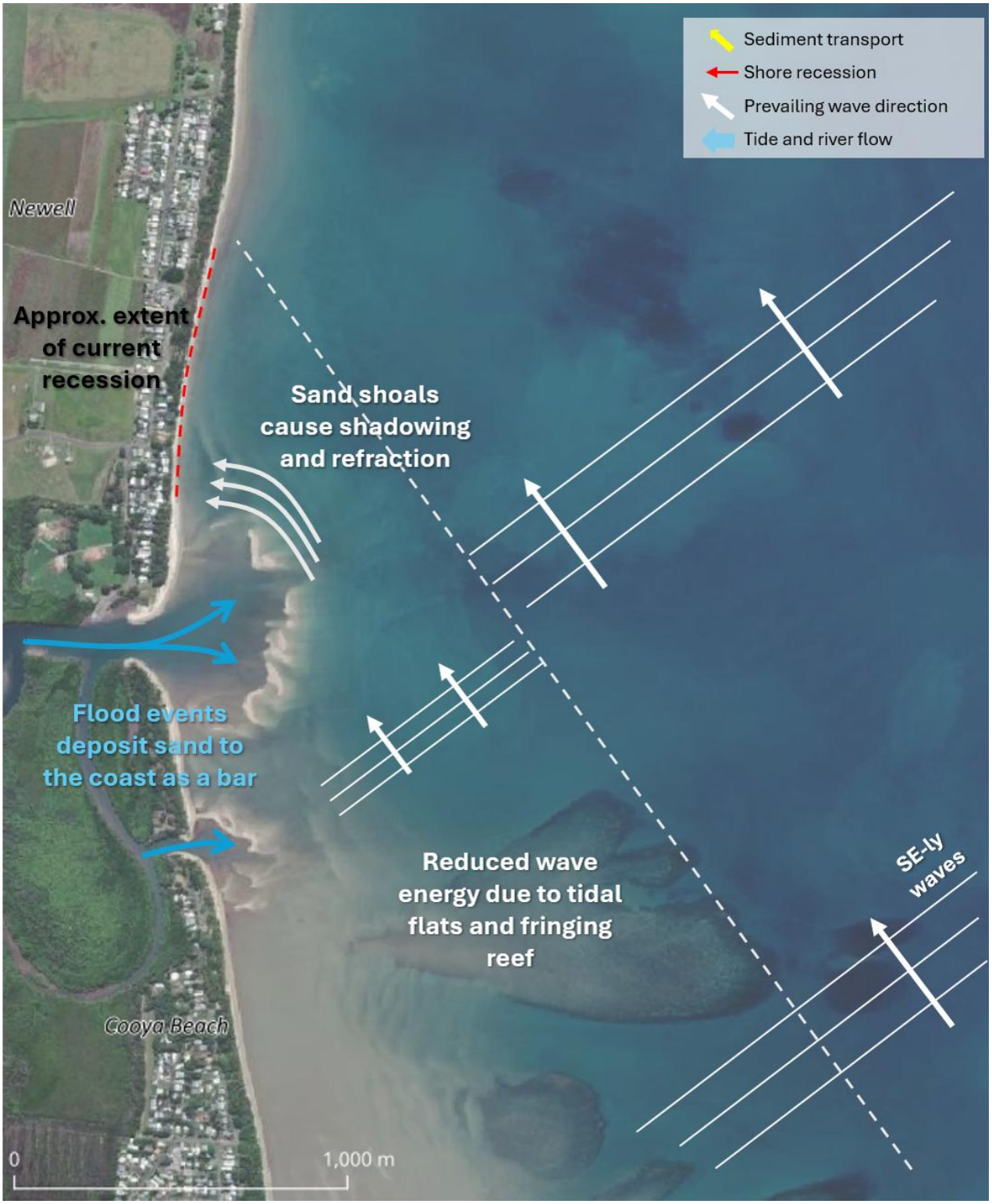


Figure 26. Concept diagram of the coastal processes that influence shoreline change and erosion at Newell Beach

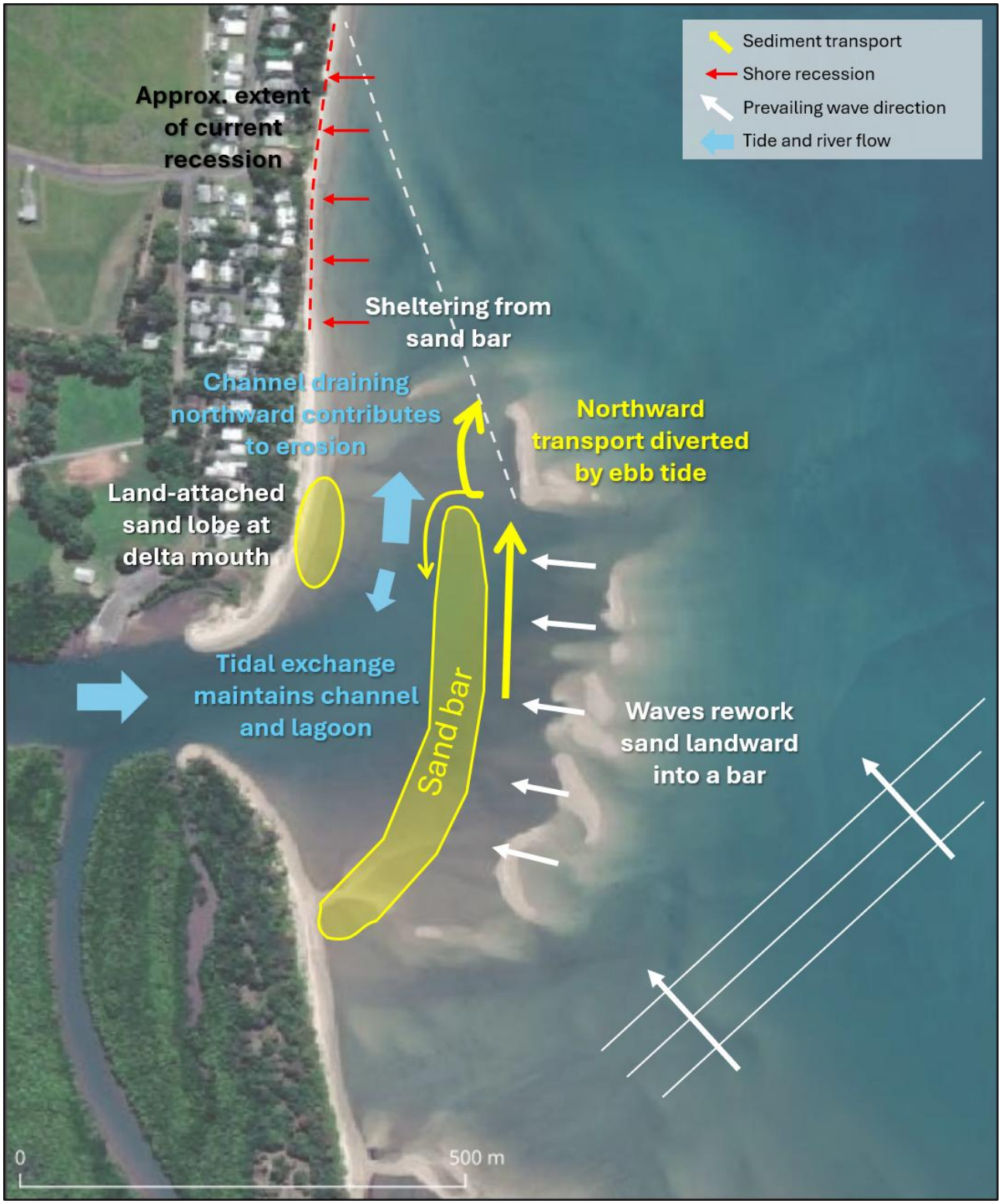


Figure 27. Concept diagram of the coastal processes that influence shoreline change and erosion at Newell Beach

4.9 Erosion prone area (EPA)

The Erosion Prone Area (EPA) for the Douglas Shire coastline has been defined in the *Resilient Coast Strategic Plan*. The EPA indicates areas that may be exposed to coastal erosion hazard by 2100. This includes open coast erosion, based on a 1% AEP storm event, erosion from underlying shoreline recession, as well as erosion from projected sea level rise. As part of the *Resilient Coast Strategic Plan* updated Erosion Prone Areas (EPA) were developed, these were done for large coastal compartments to align with the State EPA segments. Observations from the *Resilient Coast Strategic Plan* 2100 EPA mapping include:

Newell Beach

At Newell, several assets currently have a medium to high risk of open coast erosion and tidal area inundation. These assets include beach and foreshore, marine, road, and water reticulation infrastructure, and a limited number of dwellings. There is a notable increase in the number/extent of these assets at medium to high risk by 2100.

Port Douglas (Four Mile Beach)

Several assets currently have a medium to high risk of open coast erosion and tidal area inundation in Port Douglas. These assets include beach and foreshore, marine, road, sewerage, water reticulation assets and some dwellings. Assets at medium to high risk are mainly clustered towards the north west side of the spit. There is a notable increase in the number/extent of assets with a medium to high risk by 2100, including an increase in assets at risk towards the southern end of the spit as well. Most notable is the risk for sewerage infrastructure.

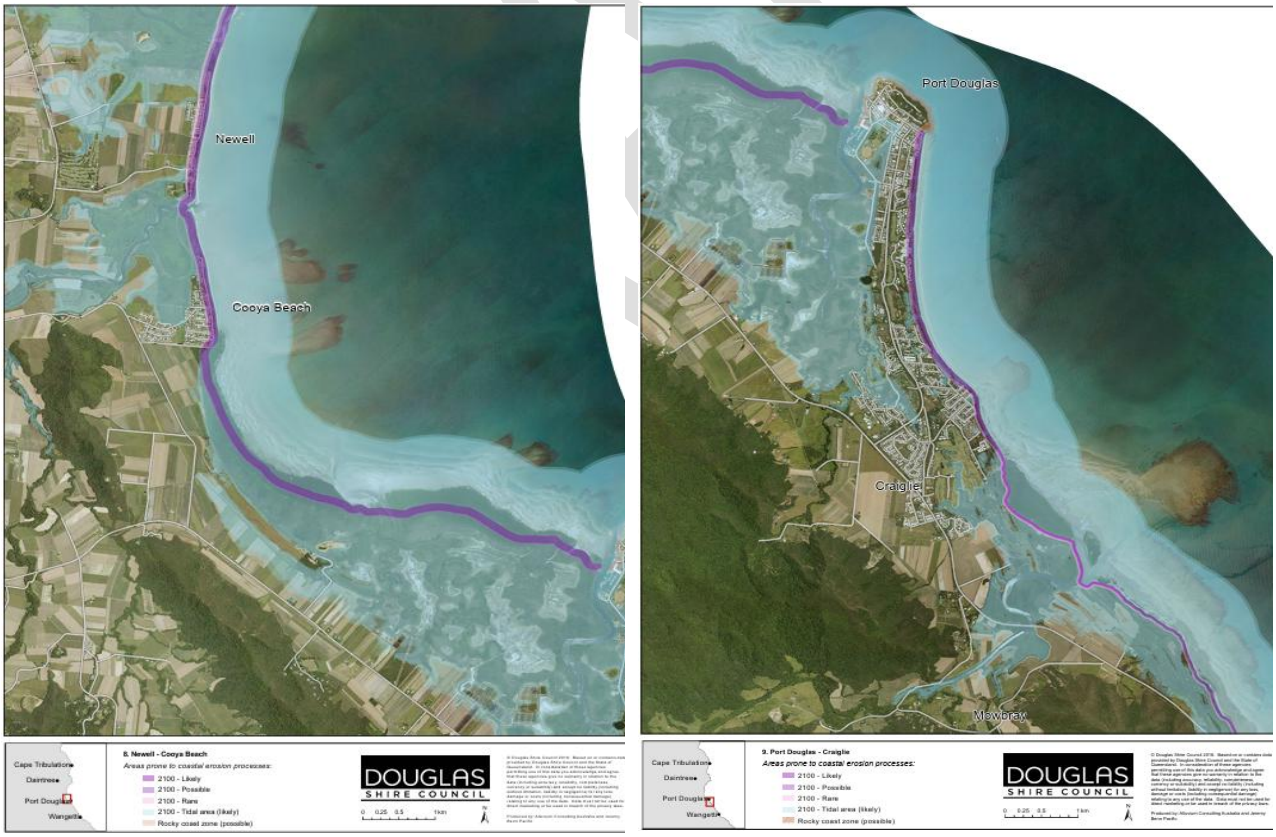


Figure 28. 2100 Erosion Prone Area mapping for Newell Beach-*left (source: Resilient Coast Strategic Plan) and 2100 Erosion Prone Area mapping for Port Douglas-right (source: Resilient Coast Strategic Plan)- Refer to Appendix A4 for higher resolution maps*

4.10 Short-term erosion

As previously noted, the *Resilient Coast Strategic Plan* assesses long-term coastal erosion hazards along the Douglas Shire coastline, including Newell Beach and Four Mile Beach, accounting for projected sea level rise to 2100. The purpose of the SEMP is to assess short-term coastal erosion over a 15-20 year planning horizon.

Assessment of short-term erosion provides a more relevant basis for management decisions within the SEMP horizon of approximately 15–20 years. The results will be utilised to inform the alignment and design of potential coastal protection measures, which may include hard protection options, and to estimate indicative storm erosion loss volumes to support consideration of beach nourishment and other adaptation measures. By considering erosion risks over both short- and long-term timescales, the SEMP can identify management responses that are appropriate for current conditions while remaining consistent with the longer-term strategic direction established by the Resilient Coast Strategic Plan.

Updated modelling has been completed to estimate the short-term erosion extent from a present-day 1% AEP design storm event. Key areas of the coastline are also experiencing underlying shoreline recession. This has been estimated for the SEMP short-term timescale for these key areas.

This SEMP has assessed erosion prone area for four coastal segments:

- **Newell Beach – South:** North of Mossman River between Newell Road and Pacific St.
- **Newell Beach – North:** North of Pacific St. to Saltwater creek
- **Four Mile Beach – South:** South of Reef St. to Sagiba Ave.
- **Four Mile Beach – North:** North of Reef St. to Port Douglas headland

4.10.1 Storm erosion

Storm erosion is caused by the exposure of the upper beach and dune to large waves and elevated water levels, typically resulting in the eroded sediment being deposited as a bar in the offshore zone. During calmer conditions this deposited sand is gradually transported back onshore to the intertidal zone where it is redistributed to the upper beach by aeolian processes. When other processes, such as an imbalance in longshore drift, interrupt this cycle, the beach can experience long-term recession.

Storm erosion at Newell and Four Mile Beach has been estimated using the post storm equilibrium approach developed in Vellinga (1982)[3]. This method uses an idealised eroded profile to balance the eroded and deposited sediment volume along a cross-shore transect. A landward and offshore slope are applied to the profile to account for slumping of the dune above the erosion line, and offshore deposited material, respectively, as shown in Figure 29. The erosion width is measured from a defined datum (e.g. HAT) to the landward extent of the dune slope.

[3] P. Vellinga (1982). "Beach and dune erosion during storm surges" Delft Hydraulics Laboratory

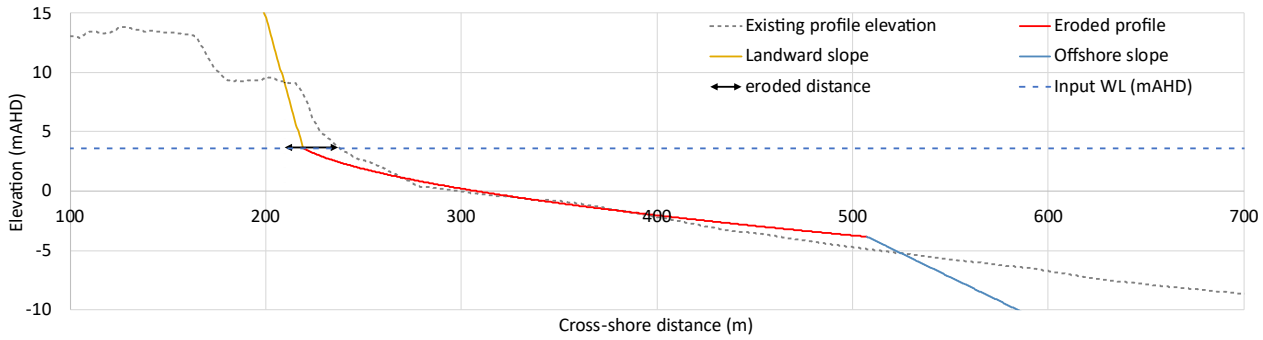


Figure 29. Example short-term erosion width calculation using Vellinga equilibrium method. Erosion distance is measured to the intersection of the landward slope (yellow) to the existing profile (grey dashed).

Cross-shore transects for erosion modelling have been developed from beach profile data of Newell and Four Mile Beach. Profile elevation data is derived from a combination of:

- 2010 1 m LiDAR,
- 2018 0.5 m LiDAR,
- Recent 2025 beach survey (Newell only)
- 30 m bathymetric data

An indicative profile has been defined for each of Four Mile Beach and Newell.

Input extreme wave and storm tide AEPs are sourced from the *Cairns Regional Storm Tide Inundation Study (CRSTIS)* (BMT WBM 2013). Storm tide levels are not inclusive of wave effects (setup and runup) as these processes are included in the empirical formulation of the Vellinga method.

Input conditions for storm-erosion modelling are coincident 5% AEP (1 in 20-year) wave conditions with a 1% AEP (1 in 100 year) storm tide. Input conditions for storm-term erosion assessment are shown in Table 10. The Vellinga method is sensitive to the applied sand grain size. Grain size classifications used in each location are shown in Table 10.

Table 10. Input conditions for coincident 1% AEP storm event

Location	Sand grain size classification	Offshore wave height (m) 5% AEP	Storm tide (exc. waves effects) (mAHD) 1% AEP
Newell Beach	Medium coarse sand (0.25-0.5 D50)	2.17	2.07
Four Mile Beach	Fine sand (0.125 -0.25 D50)	2.23	1.90

Storm erosion results

Results of storm erosion for present day 1% AEP storm event are shown in Table 11. Erosion width has been measured from the elevation of present day HAT (1.82 mAHD). It should be noted that the source elevation for cross-shore transects is from the most recent available LiDAR and survey data, however may not fully represent the current beach state. Short-term erosion profiles are provided in Appendix A.3.

These results estimate the short-term losses under a present day extreme storm event. The estimated erosion widths give an indication of the magnitude of beach erosion that could occur if a significant cyclone or storm event were to impact the study area. These results assume a fully erodible beach condition and do not include beach stabilisation or mitigation factors such as dune vegetation, soil compaction, coastal protection, or rocky substrate.

Table 11. Present day 1% AEP short-term erosion width

Location	Erosion width measured from HAT	Eroded volume above 0 mAHD
Newell Beach - South	20 m	35 m^3/m
Newell Beach - North	21 m	30 m^3/m
Four Mile Beach - South	13 m	20 m^3/m
Four Mile Beach - North	37 m	90 m^3/m

4.10.2 Underlying shoreline recession

In addition to storm erosion, key sections of beach in the study area are also experiencing on-going shoreline change and beach recession, associated with the broad-scale coastal process patterns described in previous sections.

This underlying shoreline recession has been included in the assessment to account for potential additional exposure to long-term recession if the shoreline continues to recede landward at the current rate over the near-term SEMP planning period.

The average annual shoreline trends described in Section 4.7 has been used to assess shoreline recession for Newell and Four Mile Beach. The additional underlying recession distance over the planning period has been determined by the equation:

$$R = r \times N$$

Where *R* is the total recession distance over *N* years, and *r* is the current average rate of shoreline recession. The average rate of shoreline recession (*r*) can vary spatially along a section of coastline. For this assessment the average value of *r* for the whole coastal section has been applied.

This method assumes a level of conservatism as the recent (1988 to present-day) trend is assumed to continue linearly over the planning period of the SEMP. In actuality, trends in beach recession and accretion are often cyclical, and beaches often go through extended or multi-decadal periods of fluctuation. No adjustment has been included for shorelines experiencing a trend of accretion. The SEMP has considered erosion hazard for a short-term planning horizon and as such has not included allowance for erosion due to future sea level rise.

Table 12 shows calculated recession rate for each location, as described in Section 4.10. The calculated shoreline recession distance should be included as an additional allowance for assessing potential exposure of landward assets to erosion for these key coastal sections over the SEMP planning period.

Table 12. Underlying shoreline recession for key beach sections

Location	Average recession rate (r)	Years (N)	Shoreline recession (R)
Newell Beach - South	1 m/year	15	15 m
Newell Beach - North	0.0 m/year (stable)	-	-
Four Mile Beach - South	0.4 m/year	15	6 m
Four Mile Beach - North	0.0 m/year (stable)	-	-

4.10.3 Short-term at-risk assets

The combined short-term erosion setback distances for the coastal sections of Newell and Four Mile Beach have been used to indicate coastal adjacent assets that are at risk under a short-term planning horizon.

Observations from the short-term potential erosion widths include:

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Newell Beach

- Erosion extent extends across the beach, foreshore areas and adjacent areas along Newell Beach.
- Public open space and park areas, including sections with mature palm trees, are located within or at the edge of the erosion extent.
- Park infrastructure and beach access areas are within or near the erosion extent, with some assets located close to but outside the immediate erosion extent.
- Private property is located within the erosion extent in several areas, primarily within the recession extent.
- The following assets are potentially prone to erosion (within or near the short term erosion setback distances):
    - Park infrastructure (basketball court, seating, bins)
    - Beach access areas
    - Public toilets (located near the erosion extent)
    - Private residential buildings and associated assets (including pools)

Four Mile Beach

- Erosion extent is present across the beach, foreshore, and adjacent areas along Four Mile Beach.
- Public infrastructure along the Esplanade is located within the erosion extent, including transport and recreational assets.
- Additional public infrastructure, including park and beach access facilities, are located within or at the edge of the erosion extent.
- Vegetated areas, including shrubs and mature palm trees, are present within the erosion extent along much of the shoreline.
- Sections of private property are located within the erosion extent in some areas.
- The following assets are potentially prone to erosion (within or near the short term erosion setback distances):
    - Car park and sections of the Esplanade road
    - Picnic areas, BBQ facilities, and seating
    - Beach access points
    - Accessible ramp (near the Surf Life Saving Tower)
    - Public park amenities (including playgrounds and shaded areas)
    - Private resort infrastructure and associated assets
    - Public toilets (located near the erosion extent)
    - Private residential buildings and associated assets (including pools)

4.11 Trajectory of change and management focus

The prevailing coastal processes will continue to drive erosion events along the Douglas shoreline over the coming decades, impacting public and private infrastructure and assets. Erosion will continue to have adverse impacts on shoreline amenity, recreation and other social and economic values for the towns and region. This SEMP has assessed erosion prone area for four coastal segments:

- **Newell Beach – South:** North of the Mossman River between Newell Road and Pacific St.
- **Newell Beach – North:** North of Pacific St. to Saltwater creek
- **Four Mile Beach – South:** South of Reef St. to Sagiba Ave.
- **Four Mile Beach – North:** North of Reef St. to the Port Douglas headland

The overall intent of actions associated with the four coastal segments of the SEMP is to develop viable erosion management strategies that maximise social, cultural, economic and environmental benefits for the community. The following section describes the development of management options for each coastal segment.

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5 Shoreline erosion management options

5.1 Overview of generic option considerations

When preparing the SEMP, a range of shoreline management options have been considered to mitigate the erosion threat on the local foreshore areas. However, preferred options vary depending on site context and stakeholder preferences. The appropriate options to mitigate erosion threats at specific locations depend on the nature and level of threat as well as the consequences of inaction. Erosion threats that require prioritisation are typically when erosion results in immediate risks to public infrastructure and loss of beach amenities in public spaces. Management options can generally be identified as two strategic approaches: "soft" (non-structural) options and "hard" (structural) options.

5.1.1 Soft erosion management options

"Soft" (non-structural) options are solutions to restore and/or preserve the natural character, behaviour and values of the existing coastal system. These management options allow the shoreline to adapt naturally to prevailing coastal processes. "Soft" options typically include those listed in Table 13.

Table 13. Generic "soft" erosion management options

Options	*Descriptions*
Do nothing	Allows prevailing coastal processes to take their natural course without threats to community or assets where foreshore land is undeveloped or there are assets of only limited value.
Maintain status quo	Allows the local coastal processes to take their natural course while actively monitoring and managing a stable or low-risk foreshore.
Avoid development	Implement planning and management controls to avoid development in erosion and flood-prone areas. This would also preserve the amenity, ecosystem and character of the foreshore.
Planned retreat	Remove any development under threat and allow the beach and dune system to behave naturally. Planning retreat must consider the ownership of the land and the responsibility of any structure removal.
Beach nourishment	Large-scale placement of sand directly along the coastal segment either by earthmoving equipment or by sand dumping to increase the volume of sand on the beach. Sand can be nourished utilising an external sand source (e.g., river mouth or offshore deposits). Sand can be shaped to provide a dune system that is stabilised with fencing and vegetation.
Beach scraping	Move sand from lower levels of the cross-shore beach profile up onto the beach slope or into the dune system. Provides an increased buffer of sand at the back of the beach to improve resilience against storm events.
Revegetation	Native coastal vegetation can be sourced and planted to provide stability to a newly established sand dune. This can be through direct seeding or planting established vegetation to diffuse wind and wave action and allow for sand retention. Revegetation species are dependent on the coastal environment, level of protection and salinity.

5.1.2 Hard erosion management options

"Hard" (structural) options involve engineering works to mitigate the threat of coastal erosion by altering natural processes or creating a barrier to maintain the existing shoreline. "Hard" options typically include options listed in Table 14.

Considering the variability of local coastal processes along the Douglas Shire shoreline, foreshore amenity, cultural significance and recreational values, the most appropriate shoreline management options may vary from site to site. Likely, combinations of options or "hybrid" management strategy, including both "soft "and "hard" options might be appropriate for any particular location.

Table 14. Generic "hard" erosion management options

Revetments and seawalls Typically made of rock, concrete, geo-fabric bags or wood, seawalls provide an artificial barrier to erosive processes and protect the coastal assets behind them. A seawall also has a limited ability to dissipate energy and generally results in an accelerated scour of sand from the base of the wall. Less formal revetments can also be implemented through the placement of rock or geo-bags.	
Buried seawall Similar to an exposed seawall, except they are buried and generally require extensive excavation. It acts as the last line of defence structure. As they are buried, they allow the natural beach cycle to occur in most cases, except extreme events, maintaining a more natural beach most of the time.	
Groyne Built perpendicular to the coast, groynes can be constructed from a variety of materials, including rock, geo-bags, concrete or wood. Groynes assist with sand retention in areas prone to longshore drift. Sediment is captured on the updrift side, while erosion generally occurs on the downdrift side. Groynes can be formally engineered with excavation or less formally constructed. They can vary in length, dependent on the sediment transport environment at the site and the level of protection required. In some cases, groynes can also be oriented to provide a barrier to wave energy.	

Offshore breakwater

An offshore structure that is not connected to the beach. Offshore breakwaters function by sheltering the shoreline in its lee side by providing a "wave shadow". Reducing the wave energy landward of the breakwater helps to minimise waves from moving sand along the shoreline.



Offshore submerged reef

Similar to a breakwater, an artificial reef also reduces the wave energy impacting the beach. Artificial reefs often have greater habitat value and encourage marine life to establish, mimicking natural reef systems.



Offshore solutions, including offshore breakwaters and submerged artificial reefs, have not been considered further for Four Mile Beach and Newell Beach due to the following factors:

- High construction costs: Offshore protection structures are typically expensive to construct and maintain, particularly when compared to the level of coastal protection they would provide at these locations.

- Existing wave sheltering: The Great Barrier Reef (GBR) already provides significant sheltering from offshore wave energy, limiting exposure to extreme wave conditions. As a result, additional offshore protection would provide relatively limited benefits. To achieve meaningful reductions in wave energy, an emergent structure such as an offshore breakwater would likely be required, rather than a submerged artificial reef. Given the high visual amenity and tourism values of both beaches, and the relatively limited high-value assets at risk, such structures are unlikely to represent a cost-effective or appropriate management solution.

- Environmental sensitivities: Both beaches are located adjacent to the Great Barrier Reef Marine Park, which presents significant environmental sensitivities and potential regulatory constraints associated with the construction of offshore structures.

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6 Options assessment approach

There is a range of management options that can be considered to help manage and enhance coastal and foreshore areas for each site, in line with the Council's desired outcomes. The multi-criteria analysis (MCA) approach is adopted to assess all the potential coastal management options across the two sites. The MCA evaluates the management options by assessing each option against a defined set of decision criteria that represent the range of values and interests at each site. The degree to which the option achieves the above criteria is scored out of 5 according to Table 15, and each criterion is weighted based on Council priorities (refer to Section 6.1). The decision criteria are as follows:

Table 15. MCA assessment criteria scoring

Criteria	1	2	3	4	5
Asset Protection and Durability *Design life and level of protection to foreshore and assets. Longevity of the solution, in relation to potential future sea level rise.*	Limited to no risk reduction.No ability to be adapted for future needs.	Minimal protection – moderate risk reduction. Very difficult to be adapted for future needs.	No change in level of protection. Limited adaptability to future needs.	Moderate protection. Can be adaptable to future needs, with some challenges.	Significant protection. Readily adaptable to future needs.
Accessibility and Amenity *Ability to increase usage and access the foreshore or surrounding areas, including by people with disability and reduced mobility. Conservation of the existing vistas and recreational activities.*	Significant reduction of usage and access to foreshore. Significant reduction to visual amenity and recreational use of the foreshore .	May restrict foreshore usage and access – more difficult to walk along foreshore. Moderate reduction to visual amenity and recreational use of the foreshore.	No change to foreshore usage and access. No impact on visual amenity and recreational use of the foreshore.	Moderate increase in usage and access to foreshore. Moderate improvement to visual amenity and use of the foreshore.	Increase usage and access to foreshore. Fully DDA compliant. Significantly improve to visual amenity and use of the foreshore.
Environmental and Cultural *Impact on coastal processes regime, environmental and marine values. Conservation of cultural heritage values*	Significant adverse impact on natural processes, environmental and marine values. Unacceptable ground disturbance. Likely to disturb culturally significant items or areas.	Notable adverse impact on natural processes, environmental and marine values. Disturbance and excavation of large footprint. Likely to disturb cultural heritage if present at site.	No adverse impact on natural processes, environmental and marine values. Minimal disturbance or excavation of ground. Likely to disturb cultural items if directly in location of works.	Minimal adverse impact on natural processes, enhance environmental and marine values. Minimal disturbance or excavation of ground. Unlikely to disturb any cultural significant items even if present at site.	No impact on natural processes, enhance environmental and marine values. No new ground disturbance.
Value (cost) *Whole of life costs, including capital costs and ongoing maintenance requirements.*	High capital costs and high ongoing maintenance costs.	High capital costs and low ongoing maintenance costs.	Low capital costs and high ongoing maintenance costs.	Low capital costs and low ongoing maintenance costs.	No additional costs or within Council's annual budget.
Approvals *Levels of approvals and permits required, and the likelihood obtaining approvals.*	Significant approvals risk – against development codes and guidelines.	Moderate approval risks – not in clear alignment with codes or guidelines.	Approvals required – in accordance with planning policy or legislative requirements.	Readily approved – consistent with current planning policy or legislative requirements.	Readily approved – limited approvals required – exempt works or accepted development.

6.1 Weightings

The pairwise matrix (presented in Figure 30) generates a series of weightings for each criterion. It involves comparing and prioritising each of the selected criteria against each other sequentially. The weightings were determined in consultation with Douglas Shire Council, reflecting Council's priorities and the relative importance of each criterion in assessing coastal management options. The pairwise ranking provides decisionmakers with oversight into the relative degree of importance of each criterion relative to the others.

Criteria		Asset Protection and Durability	Accessibility and Amenity	Environmental and Cultural	Cost	Approvals	Total	Weighting (%)	Rank
		a	b	c	d	e			
Asset Protection and Durability	1	1	2	2	2	2	9	36.0%	1
Accessibility and Amenity	2	0	1	2	2	2	7	28.0%	2
Environmental and Cultural	3	0	0	1	2	2	5	20.0%	3
Cost	4	0	0	0	1	2	3	12.0%	4
Approvals	5	0	0	0	0	1	1	4.0%	5

Figure 30. Pairwise matrix weightings

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7 Assessment of shoreline erosion management options

To support the development of management actions which are appropriate for site context and stakeholder preference, four coastal segments are defined for this SEMP (Figure 31):

- Newell Beach North
- Newell Beach South
- Four Mile Beach North
- Four Mile Beach South

The overall intent of actions associated with four coastal management segments of this SEMP is to manage erosion in a way to maximise social, economic and environmental benefits for the community.

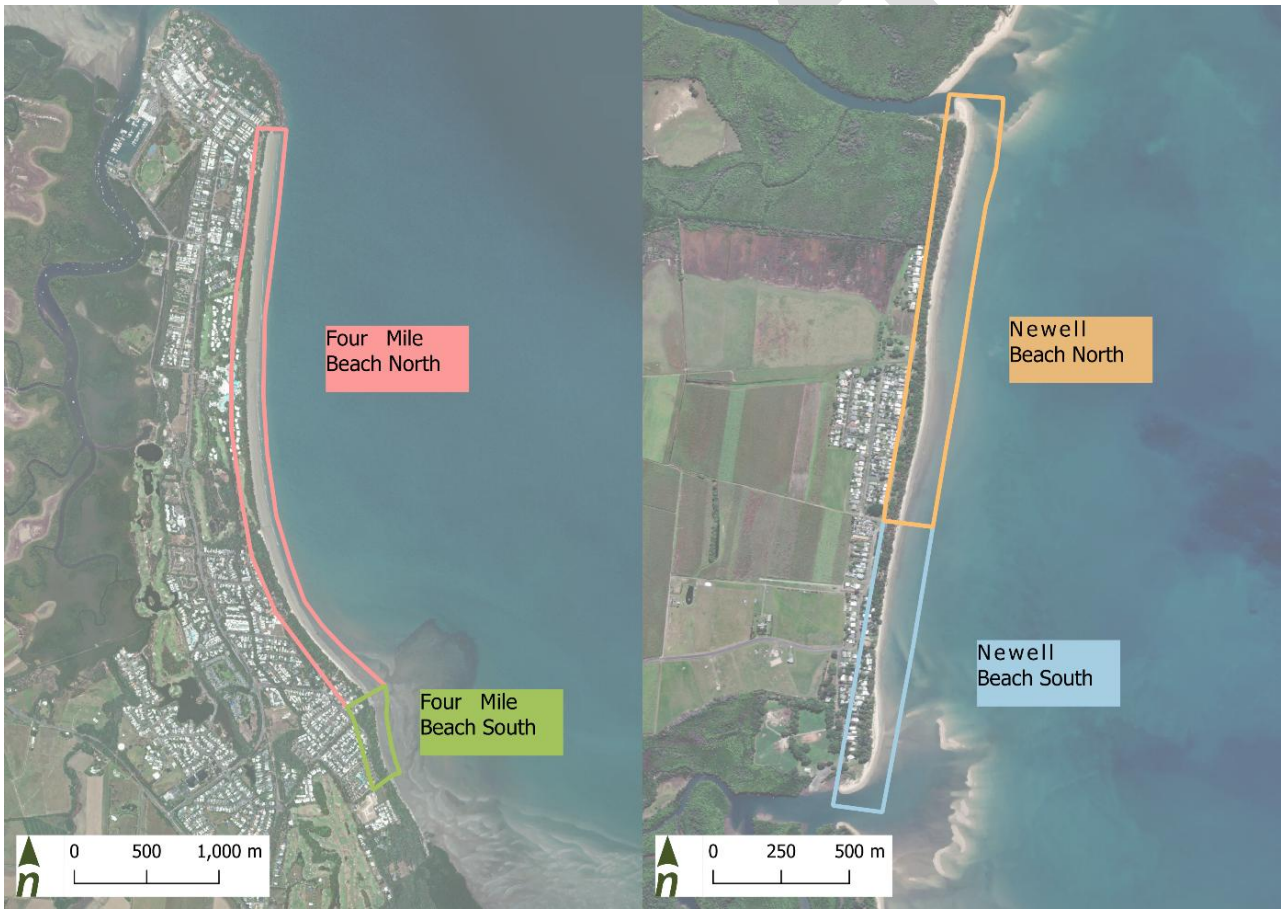


Figure 31. Management segments of Four Mile Beach and Newell Beach SEMP.

7.1 Newell Beach North

Present day shoreline and key coastal issues

Newell Beach North extends from approximately Pacific Street at the southern end to the Saltwater Creek estuary at the northern end. The beach is generally backed by a vegetated foreshore buffer, with Marine Parade separating the foreshore from residential properties along much of the coastal segment. Towards the northern end, the foreshore is predominantly backed by vegetation, with no significant tangible assets immediately behind the beach.

Minor erosion scarps were observed along sections of Newell Beach North, with some trees observed to have fallen onto the beach. The beach is also relatively narrow compared with the southern section of Newell Beach. The existing vegetation buffer remains an important natural buffer of the foreshore, providing some protection against coastal processes and contributing to the ecological and amenity values of the area.

More recently, a substantial sandbar has been observed forming at the mouth of Saltwater Creek, with the main channel appearing to have migrated towards the southern side of the estuary mouth. The persistence and longer-term significance of these changes would need to be confirmed through ongoing monitoring and comparison with historical aerial imagery and shoreline data.



Figure 32. Newell Beach North

Given the absence of built assets at risk from coastal erosion at Newell Beach North, a largely natural approach to shoreline management is considered appropriate, allowing natural coastal processes to continue with minimal intervention. As such, management options for this section of the shoreline focus on limited or no intervention.

The following management options are considered for Newell Beach North:

1. Do nothing
2. Active sand management and monitoring

The options assessment approach, including the descriptions of assessment criteria and weightings, is outlined in Section 6. Table 16 provides an overview of the scores for each option against the weighted assessment criteria for Newell Beach North. Further detail on the options and assessment against the criteria is provided below.

Table 16. Criteria weighting and scores (unweighted and weighted) for Newell Beach North options

		Unweighted		**Weighted**	
		Do nothing	*Active sand management and monitor*	**Do nothing**	**Active sand management and monitor**
Criteria	**Criteria weighting**	*Option 1*	*Option 2*	**Option 1**	**Option 2**
Asset Protection and Durability	36%	*3*	*4*	**1.08**	**1.44**
Accessibility and Amenity	28%	*3*	*4*	**0.84**	**1.12**
Environmental and Cultural	20%	*5*	*4*	**1.00**	**0.80**
Cost	12%	*5*	*4*	**0.60**	**0.48**
Approvals	4%	*5*	*4*	**0.20**	**0.16**
Total	100%	*21*	*20*	**3.72**	**4.00**
Rank				**2**	**1**

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Option 1 – Do nothing

The do-nothing option would involve no additional coastal management, erosion mitigation or maintenance works at Newell Beach North. The beach and foreshore would be allowed to continue responding naturally to coastal processes, including seasonal fluctuations, storm events, alongshore sediment transport and changes associated with the Saltwater Creek entrance.

The existing healthy vegetation buffer along Marine Parade and the northern section of the beach provides a natural buffer against storm events and coastal processes. However, ongoing erosion could result in further beach narrowing, development of larger erosion scarps and progressive loss of the existing vegetation buffer. Changes in the position and configuration of the Saltwater Creek entrance could also continue to influence sediment availability and shoreline conditions at the northern end of Newell Beach.

Key considerations

- Provides no direct response to existing erosion or future shoreline recession.
- Continued erosion could result in further beach narrowing and loss of the existing vegetation buffer.
- Changes in the Saltwater Creek mouth may continue to alter shoreline conditions.
- Ongoing monitoring would be required to identify whether erosion is becoming more widespread or persistent and whether a future intervention is warranted.

Table 17. Newell Beach North – Option 1 criteria scores

Criteria	Score	Comment
Asset Protection and Durability	3	Provides no direct response to localised erosion or potential future shoreline recession. However, the existing vegetation buffer provides a natural buffer.
Accessibility and Amenity	3	Maintains the existing beach and foreshore without disturbance to accessibility. However, continued erosion could result in further beach narrowing and potentially affect beach amenity and access over time.
Environmental and Cultural	5	The existing healthy vegetation buffer is retained, although ongoing erosion could eventually result in vegetation loss.
Cost	5	No additional cost to Council's budget as no active erosion management works are required.
Approvals	5	With no new coastal works proposed, approval requirements are anticipated to be minimised.

Option 2 – Active sand management and monitoring

The active sand management and monitoring option would involve retaining the existing 1.5 km natural foreshore while introducing targeted, low-intervention measures to manage localised erosion where required. Management would focus on routine monitoring and opportunistic sand scraping rather than permanent coastal protection or large-scale nourishment.

Sand scraping could be undertaken where localised erosion scarps worsen, with suitable sand redistributed within the beach profile to reinstate a more gradual beach profile. The works would be targeted to areas where erosion is beginning to affect the vegetation buffer or foreshore amenity, rather than attempting to maintain a fixed shoreline position along the entire coastal segment. Management would therefore prioritise protecting and maintaining the existing vegetation and dune system, with intervention triggered where monitoring identifies a need for additional short-term support.

Given the dynamic nature of the Saltwater Creek mouth, ongoing monitoring would be particularly important under this option. Monitoring could include changes in shoreline position, beach width and levels, vegetation condition, erosion scarp development and the location and configuration of the creek entrance. This would help determine whether observed changes represent short-term variability or a persistent erosion trend requiring future management.

Key considerations

- Sand scraping provides a temporary response and does not address the underlying causes of shoreline recession.
- Repeat intervention may be required following significant storm events or periods of erosion.
- Appropriate approvals would need to be confirmed before undertaking sand scraping.
- A clear monitoring and trigger framework would be useful to define when intervention is required and when natural recovery should be allowed to occur.



Figure 33. Concept plan for Option 2.

Option 2 – Active sand management and monitoring

Table 18. Newell Beach North – Option 2 criteria scores

Criteria	Score	Comment
Asset Protection and Durability	4	Provides a localised response by reducing erosion scarps and temporarily restoring beach levels. However, the regraded profile may erode again following storm events, so the option provides limited long-term durability and may require periodic maintenance.
Accessibility and Amenity	4	Can improve the beach profile and remove steep erosion scarps, potentially improving access and beach amenity. Works may result in temporary disturbance during construction and could require periodic regrading.
Environmental and Cultural	4	Avoids permanent structures and can maintain a natural sandy beach profile. However, disturbance of the foreshore may impact vegetation, tree roots and potential cultural heritage values if not carefully managed.
Cost[1]	4	Relatively low-cost option. However, repeat works may be required as the beach profile erodes. Capital cost = Approximately $50,000 if done in conjunction with southern sand management campaigns. Whole of life cost = $580,000
Approvals	4	Under Part B.4 of the tidal works accepted development code (AO48), beach reprofiling is not to exceed the movement of 5m^3 per lineal metre of beach. The depth of excavation for beach re-profiling will not exceed 0.5 metres below the original beach profile elevation to comply with AO49 of the code (noting that these approvals are current as of 2026 and may change if the code is reviewed) For redistributing sand within a beach compartment or reconstructing a dune the volume of sand placed per year shall not exceed 1000 m^3. Where marine plants are limited to fallen trees and floating timber, materials can be removed in accordance with Section 5.1.22 of the *Accepted development requirements for operational work that is the removal, destruction or damage of marine plants* which permits the removal, destruction or damage of marine plants where the activity is limited to the removal of unattached marine plants on sandy shorelines under Local Government management and direction. Section 5.1.24 of the *Accepted development requirements for operational work that is the removal, destruction or damage of marine plants* allows for the removal, destruction or damage of marine plants for the removal or smothering of unattached marine plants on sandy shorelines under Local Government management and direction for beach nourishment or reprofiling required to reduce beach scarps for public safety following storms or erosion events for a public purpose. Works involving excavation of material below mean highwater springs cannot exceed 1,000 tonnes/year without triggering the requirement for a material change of use for an environmentally relevant activity (ERA) for dredging (ER 16). A marine park permit will also be required where works occur within the Great Barrier Reef Coast Marine Park.

1. Costings are for comparative purposes only and should not be used for budgetary purposes unless a suitable contingence is applied. Whole of life costs are based on a 30-year period.

Recommended option

The preferred management approach for Newell Beach North is targeted active sand management and monitoring, with intervention kept to a minimum. Works would focus on retaining established vegetation threatened by erosion and would be undertaken in conjunction with active sand management at Newell Beach South to reduce costs, streamline approvals and coordinate delivery.

Access to Newell Beach North may be limited. If suitable access is unavailable during the coordinated works program, active sand management may be deferred where little established vegetation is at risk and there are no unacceptable risks to public safety or infrastructure. In these circumstances, natural coastal processes would be allowed to continue, supported by monitoring.

With limited built assets immediately at risk and an established vegetation buffer providing natural protection, significant coastal protection works are not considered necessary at this stage.

Recommended management approach

- Option 2 – Active sand management and monitoring, undertaken in conjunction with works at Newell Beach South, where access permits and intervention is warranted.

Description

Active sand management would target established vegetation threatened by erosion following storm events. Where appropriate, beach scraping would redistribute suitable sand from the lower beach to the upper beach or dune system to support natural recovery and vegetation retention.

The beach and dune system would otherwise remain largely unchanged. Localised erosion, minor scarping and shoreline movement would generally be allowed to occur naturally, provided they do not present unacceptable risks to public safety or infrastructure.

Access to Newell Beach North may be limited at times due to beach width. If suitable access is unavailable when coordinated works are undertaken at Newell Beach South, works at Newell Beach North may be deferred where little established vegetation is at risk and there are no unacceptable risks to public safety or infrastructure. Natural coastal processes would then be allowed to continue, supported by monitoring.

Council would monitor beach conditions and vegetation health to determine whether intervention is warranted. Monitoring would also consider changes at the Saltwater Creek entrance, including sandbar formation and movement and channel alignment, which may influence sediment movement and shoreline conditions.

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7.2 Newell Beach South

Present day shoreline and key coastal issues

The Newell Beach South coastal segment has undergone ongoing morphological change, with more significant changes observed following TC Jasper. Further details are provided in Section 4.8. The private properties are located in close proximity to the active beach system, with the property boundary within 5-10 m of the high tide mark. The private properties along Newell Beach South are separated from the beach by a road reserve, narrowed foreshore in front that is susceptible to erosion during extreme events and high tides (Figure 34).

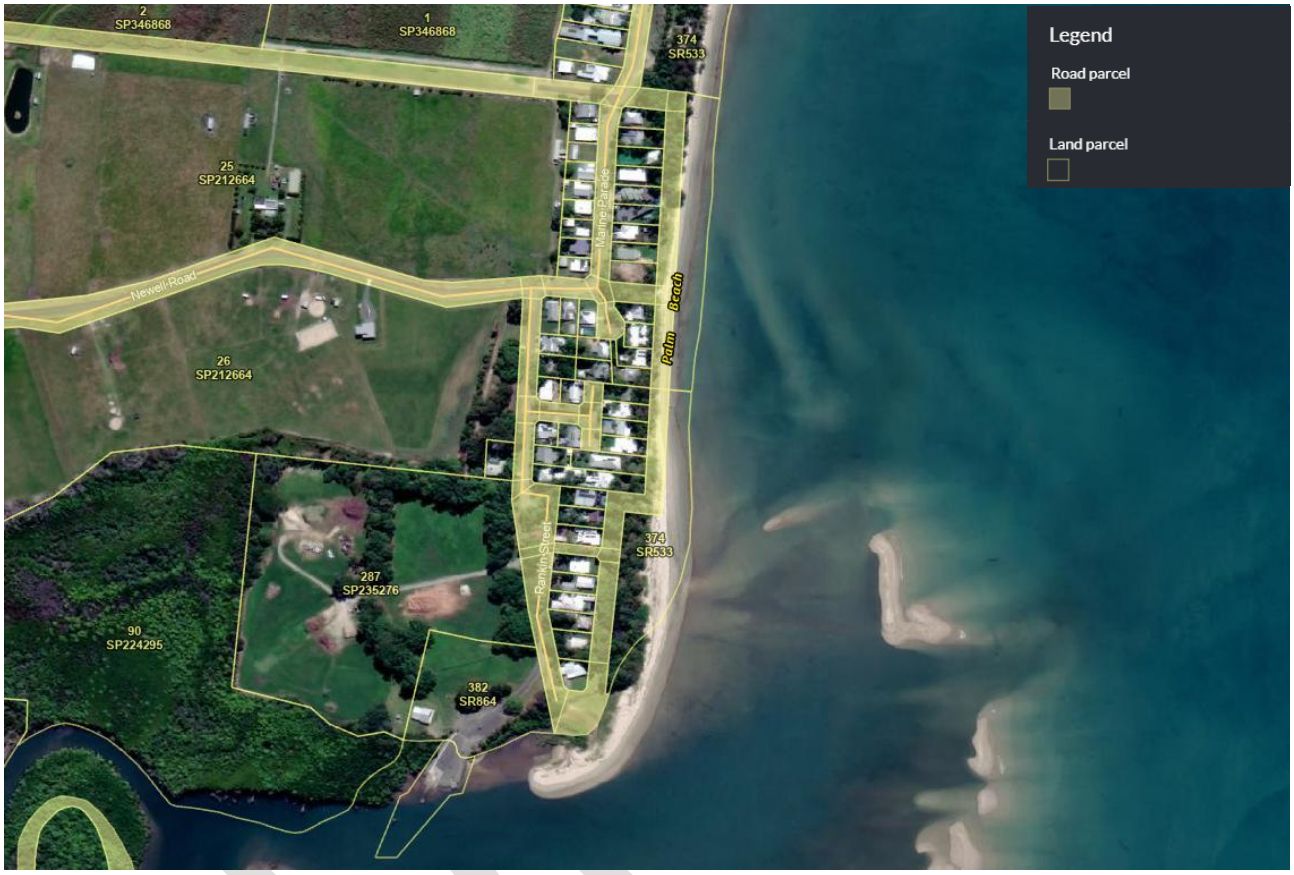


Figure 34. Newell Beach South Road Reserve *(source: Queensland Globe)*

As discussed in Section 2.2, significant beach nourishment works were undertaken by Maritime Safety Queensland (MSQ) at the southern end of Newell Beach in September 2025. These works involved the placement of over 20,000 m³ of sand, including nourishment along the beachfront adjacent to residential properties and the establishment of a large sand stockpile further south (Figure 35).



Figure 35. Marine Safety Queensland Newell Beach Nourishment (September 2025) ***(source: Marine Safety Queensland)***

Following large tidal events in late 2025, erosion was observed along Newell Beach South. Site investigations undertaken in December 2025 identified severe erosion and significant beach lowering along the beachfront adjacent to residential properties. However, substantial volumes of sand remained within the stockpile at the southern end of the beach. These changes highlight the dynamic nature of the southern end of Newell Beach and the influence of sediment movement in the vicinity of the Mossman River mouth. Community feedback received during this period also raised concerns regarding ongoing erosion in front of residential properties and the effectiveness of the recent nourishment works, particularly given the significant volume of sand remaining in the southern stockpile.

In late 2025, Council successfully secured funding through the Disaster Recovery Funding Arrangements (DRFA) to undertake coastal recovery works at Newell Beach. The first stage of works was completed in January 2026 and involved relocating sand from the southern stockpile to the eroded beachfront further north. As the sand originated from the September 2025 MSQ nourishment works, these activities represent a combination of beach scraping and beach nourishment. The works have demonstrated positive results, with the relocated sand remaining largely in place and helping to maintain the upper beach profile since completion. Since these works were completed, Council has not received further negative community feedback regarding the effectiveness of the beach scraping and nourishment activities.

Further beach scraping and nourishment activities are planned for late 2026, involving the relocation of additional sand from the southern stockpile to the eroded beachfront further north. These works aim to maintain beach levels and improve the resilience of the foreshore to future erosion events.

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Figure 36. Erosion at Newell Beach - December 2025



Figure 37. Newell Beach after beach scraping (February 2026)

The following management options are considered for Newell Beach South:

1. Do nothing
2. Active sand management and monitoring
3. Seawall
4. Groynes (removal and replacement)

The options assessment approach, including the descriptions of assessment criteria and weightings, is outlined in Section 6. Table 19 provides an overview of the scores for each option against the weighted assessment criteria for Newell Beach South.

Table 19. Criteria weighting and scores (unweighted and weighted) for Newell Beach South options

		Unweighted				**Weighted**			
		Do nothing	*Active sand management and monitoring*	*Seawall*	*Groynes (removal and replacement)*	**Do nothing**	**Active sand management and monitoring**	**Seawall**	**Groynes (removal and replacement)**
Criteria	**Criteria weighting**	*Option 1*	*Option 2*	*Option 3*	*Option 4*	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Asset Protection and Durability	36%	*3*	*4*	*5*	*4*	1.08	1.44	1.80	1.44
Accessibility and Amenity	28%	*3*	*4*	*3*	*3*	0.84	1.12	0.84	0.84
Environmental and Cultural	20%	*4*	*3*	*3*	*2*	0.80	0.60	0.60	0.40
Cost	12%	*4*	*3*	*2*	*3*	0.48	0.36	0.24	0.36
Approvals	4%	*5*	*4*	*2*	*3*	0.20	0.16	0.08	0.12
Total	100%	*19*	*18*	*15*	*15*	3.40	3.68	3.56	3.16
Rank						3	1	2	4

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Option 1 – Do-nothing

The do-nothing option would involve Council allowing nature to take its course, with only minimal intervention to maintain existing access points and undertake routine monitoring.

Given the ongoing morphological change and significant erosion observed along Newell Beach South, this option would rely on the beach continuing to respond naturally to coastal processes, with some ongoing benefits from the works undertaken in 2024 and 2026. Slow northward longshore transport is expected to gradually redistribute sand from the 2024 stockpile to sections of beach further north. However, the shoreline would remain highly susceptible to erosion during extreme events.

Continued monitoring would be important to track changes in beach levels and shoreline position around the southern end of the beach and the Mossman River mouth. This would provide an opportunity to assess the effectiveness and longevity of existing recovery works and improve understanding of the interaction between beach nourishment, natural sediment redistribution and changes at the river mouth.

Key considerations:

- Does not directly address the underlying causes of ongoing erosion at Newell Beach South.
- Continued erosion and beach lowering may occur, particularly during storm events or periods of shoreline recession.
- The effectiveness and longevity of previous nourishment and recovery works may be limited by natural sediment redistribution.
- Changes at the Mossman River mouth may continue to influence sediment supply, transport pathways and beach response.

Table 20. Newell Beach South – Option 1 criteria scores

Criteria	Score	Comment
Asset Protection and Durability	3	This approach does not provide a durable response to ongoing erosion, and continued beach lowering or future storm impacts could affect the foreshore and assets behind the beach.
Accessibility and Amenity	3	Minimal management can help maintain beach access and recreational amenity in the short to medium term. However, continued erosion and beach narrowing could reduce accessibility and amenity, particularly following significant storm events.
Environmental and Cultural	4	Maintains a predominantly nature-based approach. However, repeated erosion from extreme events may cause disturbance that risks loss of vegetation and assets that may result in adverse environmental and cultural outcomes.
Cost[2]	4	Ongoing monitoring and very minor maintenance to access points. Whole of life cost = $130,000
Approvals	5	No approval requirements would relate to Do-nothing approach.

2. Whole of life costs is based on 30 years of monitoring

Option 2 – Active sand management and monitoring

This option would involve actively redistributing sand within the beach system, moving it from large deposits at the southern end of Newell Beach to areas further north where additional protection is required.

This would be considered a hybrid beach scraping/nourishment approach, using existing sand without importing additional material. MSQ's nourishment works in late 2024 introduced more than 20,000 m³ of sand into the beach system. Based on the relatively slow longshore sediment transport rates, this volume is estimated to provide approximately 10 years of additional sand buffer, supporting ongoing redistribution to areas requiring protection. Its longevity will depend on storm events and changes in local coastal processes.

This approach would not further increase the overall sediment budget of the beach. Instead, it would redistribute existing sand to areas where it provides greater protection to the foreshore.

If the beach no longer contains sufficient suitable sand to achieve the required profile, imported sand could be considered to supplement the existing sediment volume. However, given the substantial volume of sand previously placed at Newell Beach (approximately 20,000 m³), Council's current management approach is to prioritise the redistribution and management of existing sand resources rather than importing additional material. The need for future imported nourishment would be assessed based on ongoing monitoring, the availability of suitable sand and changes in shoreline conditions, particularly following significant erosion events. Such events may provide opportunities for Council to access external disaster recovery funding, subject to eligibility and funding approval.

Key considerations:

- Sand scraping does not increase the overall sediment budget and may provide only temporary benefits where there is an ongoing net sediment deficit. However, the relatively large volume of sand placed in 2024, together with sediment supplied by the Mossman River, may allow active redistribution of sand within the system to provide ongoing protection. The duration and extent of this benefit would depend on sediment availability and coastal processes.
- Changes in sediment movement around the Mossman River mouth may influence the longevity and effectiveness of active sand management at the southern end of Newell Beach.
- Ongoing monitoring would be required to assess beach response, the persistence of redistributed sand and potential impacts on adjacent sections of Newell Beach.



Figure 38. Active sand management. Collection areas in Blue and Nourishment areas in Orange

Option 2 – Active sand management and monitoring

Table 21. Newell Beach South – Option 2 criteria scores

Criteria	Score	Comment
Asset Protection and Durability	4	Active sand management maintains a buffer against erosion and storm events. However, this may not be a permanent solution, as sand may be redistributed alongshore or offshore, particularly given the dynamic sediment environment around the Mossman River mouth.
Accessibility and Amenity	4	Increasing beach width can improve public access, recreational amenity and the overall condition of the foreshore. Temporary construction impacts and potential changes to the beach profile would need to be managed.
Environmental and Cultural	3	Sand scraping can cause ground disturbance. Community feedback has also raised concerns about potential environmental impacts associated with nourishment.
Cost[1]	3	Cost for material, transport and construction requirements. Repeat nourishment or scraping may be required where sand is redistributed or erosion recurs Capital cost = $590,000 Whole of life cost = $880,000
Approvals	4	Council currently holds a Marine Park Permit so can continue to do beach scraping and nourishment within the accepted development code limits while complying with the accepted development code's acceptable outcomes and marine park permit requirements. Beach nourishment may occur through a number of means – beach reprofiling, redistribution of sand from adjacent areas, and the importation of sand. Under Part B.4 of the tidal works accepted development code (AO48), beach reprofiling is not to exceed the movement of 5m^3 per lineal metre of beach. The depth of excavation for beach re-profiling will not exceed 0.5 metres below the original beach profile elevation to comply with AO49 of the code. For redistributing sand within a beach compartment or reconstructing a dune the volume of sand placed per year shall not exceed 1000 m^3. For beach nourishment the volume of sand placed per year shall not exceed 5000 m^3 per kilometre of beach. Where marine plants are limited to fallen trees and floating timber, materials can be removed in accordance with Section 5.1.22 of the A*ccepted development requirements for operational work that is the removal, destruction or damage of marine plants* which permits the removal, destruction or damage of marine plants where the activity is limited to the removal of unattached marine plants on sandy shorelines under Local Government management and direction. Section 5.1.24 of the *Accepted development requirements for operational work that is the removal, destruction or damage of marine plants* allows for the removal, destruction or damage of marine plants for the removal or smothering of unattached marine plants on sandy shorelines under Local Government management and direction for beach nourishment or reprofiling required to reduce beach scarps for public safety following storms or erosion events for a public purpose. Works involving excavation of material below mean highwater springs cannot exceed 1,000 tonnes/year without triggering the requirement for a material change of use for an environmentally relevant activity (ERA) for dredging (ER 16).

1. Costings are for comparative purposes only and should not be used for budgetary purposes unless a suitable contingence is applied. Whole of life costs are based on a 30-year period.

Option 3 – Seawall

A seawall would provide a defined landward limit to erosion and a last line of defence for properties and infrastructure at Newell Beach South. It could comprise a buried rock revetment or another suitable engineered structure, positioned as far landward as practicable along the property boundaries and road easement boundary. Its alignment, dimensions and materials would be determined through detailed design, accounting for beach lowering, wave loading, scour and future sea level rise.

Sand excavated during construction would be placed over and in front of the wall to provide initial cover and a sand buffer. Ongoing nourishment is not proposed. Consequently, the wall could remain exposed following erosion, potentially increasing wave reflection and local scour and reducing beach amenity.

The seawall would provide greater protection to landward assets than active sand management, but would not prevent erosion or lowering of the beach itself.

Due to the road easement this would require a coordinated approach between Council and affected property owners. Council would support the approvals process and development of a standard design, while private property owners would fund construction of the seawall protecting their properties. Council would seek to obtain future grant funding to fund the design and approvals process.

Key considerations:

- Protects landward assets but does not prevent erosion of the beach seaward of the wall.
- May remain exposed following erosion because ongoing nourishment is not proposed.
- May increase local scour and affect adjacent beach sections.
- Requires coordinated design, approvals and private funding.



Figure 39. Concept plan for Option 3 (Seawall alignment in orange).

Option 3 – Seawall

Table 22. Newell Beach South – Option 3 criteria scores

Criteria	Score	Comment
Asset Protection and Durability	5	Provides a robust, long-term line of defence against continued coastal recession and erosion. The alignment would be located landward of the active beach, providing protection to the private properties if significant erosion continues.
Accessibility and Amenity	3	When adequately buried, the seawall can retain a natural sandy beach and avoid the visual impacts of an exposed structure. However, continued beach lowering could expose the wall, reducing beach width and amenity.
Environmental and Cultural	3	Involves substantial construction within the coastal environment. A seawall can alter natural sediment processes and potentially contribute to beach narrowing or changes in adjacent areas if not appropriately designed and managed.
Cost[1]	1	Likely to have a relatively high upfront cost due to detailed design, materials, construction and access requirements. Ongoing inspection and maintenance would also be required, with potential for additional nourishment if the beach erodes towards the structure. Capital cost = $5,900,000 Whole of life cost = $6,800,000 Cost to Council for Design and Approvals - approximately $150,000 (aimed to be grant funded). Cost to private residents = approximately $250,000 to $300,000 based on 20m frontage and $12,500 to $15,000/m.
Approvals	2	Council will be required to help facilitate a coordinated approach to obtain approvals due to the road easement and residents not directly adjoining the unallocated state land. The works would require land owner consent, prescribed tidal works and may include impacts on marine plants. In addition, there may also be requirements for a relevant purpose determination to be made by the State government for the works to impact mapped vegetation and a response to State code 16 required. Further to the development assessment process, a marine park permit would also be required for the construction and maintenance of the revetment wall where it is located within the marine park.

1. Costings are for comparative purposes only and should not be used for budgetary purposes unless a suitable contingence is applied. Whole of life costs are based on a 30-year period.

Option 4 – Groynes (removal and replacement)

This option would involve removing the existing groynes at Newell Beach South and replacing them with appropriately designed structures, supported by beach nourishment, to improve sand retention and maintain a wider beach profile.

The groynes would be designed using the current understanding of coastal processes, sediment transport and observed shoreline changes. Their length, crest level, orientation, permeability and materials would be determined through detailed design.

The replacement groynes would promote localised sand accumulation on their updrift side. However, their potential to interrupt sediment supply and increase erosion on adjacent downdrift sections of beach would need to be assessed.

As with the existing groynes, beach nourishment would be an integral part of this option, establishing an initial sand buffer for the structures to retain. Given the low longshore sediment transport rate, the groynes would be unlikely to deliver meaningful beach widening through natural sand accumulation alone. Ongoing monitoring would inform whether further nourishment or sand redistribution is required.

Key considerations:

- Groynes do not create additional sediment and rely on an adequate supply of sediment within the coastal system or ongoing beach nourishment.
- The structure will interrupt alongshore sediment transport and may result in increased erosion on the downdrift side (to north).
- Beach nourishment may still be required to provide sufficient sediment for the groyne to operate effectively.
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Figure 40. Concept plan for Option 4 - New Groynes (red) and Nourishment (yellow).

Option 4 – Groynes (removal and replacement)

Table 23. Newell Beach South – Option 4 criteria scores

Criteria	Score	Comment
Asset Protection and Durability	4	Replacement groynes could improve retention of sand within the southern section of Newell Beach, increasing beach width and providing a greater sediment buffer in front of the private properties. However, the effectiveness depends on sediment supply and the structure could increase erosion downdrift if not appropriately designed and managed.
Accessibility and Amenity	3	Improved sand retention and beach width could provide a tangible benefit to beach amenity and access. However, the groynes themselves would introduce a permanent structure into the beach environment and could affect beach morphology and access during construction.
Environmental and Cultural	2	The option involves substantial intervention in the coastal and nearshore environment and would modify natural longshore sediment transport. There is potential for adverse impacts to adjacent beach sections, particularly downdrift of the groyne.
Cost[1]	3	Removal and reconstruction of a groyne would have a relatively high capital cost, including demolition, construction, coastal processes assessment and detailed design. Ongoing monitoring and potentially maintenance nourishment or sand bypassing would also be required. Capital cost = $460,000 (for groynes) + $300,00 for nourishment Whole of life cost = $750,000 + $600,00 for nourishment
Approvals	3	Where the works involve an upgrade to the existing groyne structures, it is anticipated that the application will require land owner consent, prescribed tidal works and may include impacts on marine plants. In addition, there may also be requirements for a relevant purpose determination to be made by the State government for the works to impact mapped vegetation and a response to State code 16 required. Further to the development assessment process, a marine park permit would also be required for the construction and maintenance of the new groyne structures.

1. Costings are for comparative purposes only and should not be used for budgetary purposes unless a suitable contingence is applied. Whole of life costs are based on a 30-year period.

Recommended option

Council recognises the ongoing threat of coastal erosion to private properties along Newell Beach South, particularly at Cyril Close. The preferred management approach identified through this SEMP is active sand management and monitoring, which received the highest score through the options assessment process. Council has undertaken beach scraping activities in 2026, with further works planned to maintain beach volumes and provide additional resilience to coastal erosion. Ongoing monitoring will inform the need for future beach scraping and sand management activities.

As a secondary management option, Council will investigate the feasibility of approvals and standard seawall design as a potential longer-term management measure to protect private properties at Cyril Close, Olive Street and Marine Parade Sth. Due to the presence of the Road Esplanade between private properties and the foreshore, Council recognises that individual property owners may face challenges in obtaining the necessary approvals. Subject to Council endorsement, Council may assist affected property owners by facilitating the approvals process, including acting as the applicant and developing a standard design. However, the costs associated with the construction and implementation of the seawall would remain the responsibility of the benefiting private property owners. Further assessment and engagement with affected property owners will be required before progressing this option. Council is also likely to seek grant funding to undertake the future design and approvals process.

Recommended management approach

- Option 2 – Active sand management and monitoring (preferred option)

Continued active sand management and monitoring is the preferred management approach for Newell Beach South, with council to investigate the feasibility of approvals and standard seawall design as a secondary, longer-term protection measure for private properties at Cyril Close Cyril Close, Olive Street and Marine Parade Sth, should erosion risks warrant further intervention.

Description

This SEMP identifies active sand management as the recommended management approach for Newell Beach South, alongside further investigation of approval requirements and the feasibility of a standard seawall design. This would enable residents to construct self-funded seawalls to provide longer-term protection for private properties at Cyril Close. The ongoing threat of coastal erosion to residential properties is a key consideration in identifying these management options.

Active sand management would involve targeted beach scraping to increase beach and dune volumes and provide additional protection against coastal erosion and storm events. Council has undertaken beach scraping activities in 2026, with further works planned later in the year. While these measures can improve foreshore resilience, their effectiveness will depend on local coastal processes, particularly sediment movement around the Mossman River mouth. Ongoing monitoring would be required to assess beach conditions and determine the need for future sand management activities.

Tier 2 action –Seawall (if triggered) – privately funded

If triggered, the seawall option would involve constructing an engineered coastal protection structure, such as a rock revetment, positioned as far landward as practicable to provide a longer-term line of defence against coastal erosion. The proposed alignment would need to consider the Road Esplanade between private properties and the foreshore. The final alignment, materials and design requirements would be subject to further investigation and relevant approvals.

This option would require a coordinated approach, with Council working collaboratively with private property owners to support design development and facilitate the statutory approvals process. Construction and implementation costs would remain the responsibility of the benefiting private property owners. As the seawall would be a private asset, these owners would also be responsible for its ongoing maintenance. Further assessment and engagement with affected property owners would be required before progressing this option.

Locating the seawall as far landward as practicable along the property boundary would minimise interference with natural coastal processes and provide the best opportunity for natural beach recovery. However, beach loss in front of the seawall would ultimately occur and should be considered when determining its alignment.

An alternative would be to locate the seawall further seaward, provided residents were willing to establish an access easement in front of their property boundaries to maintain public access along the foreshore. The simplest solution from a legislative and management perspective would be to align the seawall crest along the property boundary, with the wall extending into the road easement.

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7.3 Four Mile Beach North

Present day shoreline and key coastal issues

The shoreline at Four Mile Beach North is considered generally stable, with a relatively flat beach profile. The foreshore has a range of recreational facilities, including BBQ tables and seating, formalised beach access points and an accessible beach access ramp. A Surf Life Saving tower is also present, together with a swimming enclosure that provides safer swimming conditions during the marine stinger season.

No significant or widespread erosion was observed along the northern section of the beach. However, localised erosion scarps were observed towards the northern end of the beach, with some scour also evident around the toes of formalised access ramps and walkways, likely associated with high-tide events and wave action.

The foreshore has a well-established vegetation buffer. The formalised beach access points help to concentrate foot traffic and minimise disturbance to the surrounding vegetation. This has supported the establishment and retention of vegetation across much of the foreshore.

Overall, there are no immediate or significant erosion concerns identified for Four Mile Beach – North based on the observed condition. However, the localised erosion around access infrastructure and erosion scarps at the northern end should continue to be monitored, particularly following periods of high tides, storm activity and elevated wave conditions.





The following management options are considered for Four Mile Beach North:

1. Maintain status quo
2. Active sand management and monitoring

The options assessment approach, including the descriptions of assessment criteria and weightings, is outlined in Section 6. Table 22 provides an overview of the scores for each option against the weighted assessment criteria for Four Mile Beach North.

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Table 24. Criteria weighting and scores (unweighted and weighted) for Four Mile Beach North options

		Unweighted		**Weighted**	
		Maintain status quo (reactive management)	*Active sand management and monitoring (active management)*	**Maintain status quo (reactive management)**	**Active sand management and monitoring (active management)**
Criteria	**Criteria weighting**	**Option 1**	**Option 2**	**Option 1**	**Option 2**
Asset Protection and Durability	36%	*3*	*3*	1.08	1.08
Accessibility and Amenity	28%	*4*	*4*	1.12	1.12
Environmental and Cultural	20%	*5*	*4*	1.00	0.80
Cost	12%	*4.5*	*4*	0.54	0.48
Approvals	4%	*5*	*3*	0.20	0.12
Total	100%	*21.5*	*18*	3.9	3.6
Rank				1	2

Option 1 – Maintain status quo

The maintain status quo option would involve continuing the existing approach to management of Four Mile Beach North, including routine monitoring and maintenance of existing foreshore areas and beach access points. Council would continue routine monitoring of the foreshore and existing coastal assets, with maintenance undertaken as required in response to observed damage, erosion or changes in beach conditions.

The existing beach, vegetation buffer and foreshore infrastructure would remain largely unchanged. Any localised erosion or minor scarping would be allowed to respond naturally, provided it does not result in an immediate risk to public safety or critical infrastructure. Reactive maintenance or repairs may be undertaken where necessary to address damage to existing access infrastructure or other Council assets.

Council will seek to improve beach access management, initially at Four Mile Beach and progressively across the region. Routine maintenance and replacement works will provide opportunities to adopt designs better suited to erosion and changing beach conditions. Options include replacing seaward concrete sections with more natural and adaptable alternatives, such as sand-based access, sand ladders and other innovative designs. This approach would aim to better integrate access infrastructure with the natural dune environment and reduce the need for reactive maintenance following erosion events.

Key considerations:

- The foreshore is currently relatively stable/flat, with a healthy vegetation buffer and no immediate evidence of significant erosion risk.
- Minor localised scarps and toe scour are present but do not currently appear to pose a significant threat to assets.
- Council may need to undertake localised repairs or maintenance if erosion, storm events or coastal hazards affect existing infrastructure.

Option 1 – Maintain status quo

Table 25. Four Mile Beach North – Option 1 criteria scores

Criteria	Score	Comment
Asset Protection and Durability	3	Existing assets remain exposed to natural coastal processes, with no additional protection provided. Current risk appears manageable, but future erosion or storm events could increase exposure and require reactive maintenance.
Accessibility and Amenity	4	Existing beach access and recreational amenity are retained, with no construction impacts. However, future changes in beach levels or erosion could affect access and amenity over time.
Environmental and Cultural	5	No new coastal protection works are proposed, minimising disturbance to the existing beach, vegetation and coastal environment and allowing natural processes to continue.
Cost[2]	4.5	No new capital works are required. Ongoing monitoring and potentially reactive maintenance would still be required, with future costs uncertain. Whole of life cost = $130,000
Approvals	5	Routine maintenance should be able to be progressed under the accepted development requirements for tidal works and removal, destruction or damage of marine plants. Maintenance works are to be progressed in accordance with a marine park permit.

2. Whole of life costs is based on 30 years of monitoring

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Option 2 – Active sand management and monitor

The active sand management and monitor option involves continued monitoring of the Four Mile Beach North foreshore, supported by targeted beach scraping where required to maintain the existing beach profile and provide additional sand buffer in areas experiencing localised erosion.

Beach scraping would involve the localised redistribution of sand within the existing beach system, moving sand from the lower beach or areas of accumulation towards the upper beach to reinstate the beach profile following erosion or storm events. Scraping would be undertaken only where monitoring identifies a need and would be subject to appropriate environmental and operational constraints.

Routine monitoring would be undertaken to track changes in beach width and levels, erosion scarps, vegetation condition and the exposure of existing infrastructure, including the DDA access ramp and SLS tower. Monitoring results would inform when and where beach scraping is required, with the aim of maintaining an adequate beach buffer and avoiding unnecessary intervention.

This option provides a low-intervention and adaptive management approach, retaining the natural character and function of the beach while providing Council with a mechanism to respond to localised erosion. However, beach scraping does not increase the overall sediment volume within the beach system and therefore would provide limited long-term protection where there is a persistent sediment deficit or progressive recession.

Key considerations:

- Beach scraping provides a relatively low-impact means of responding to localised erosion without introducing permanent coastal protection structures.
- Scraping may need to be repeated following significant storm events or periods of erosion. The frequency of intervention would depend on the rate of beach response and available sediment.

Table 26. Four Mile Beach North – Option 2 criteria scores

Criteria	Score	Comment
Asset Protection and Durability	3	Provides some short-term protection by restoring the beach buffer in front of existing assets. However, protection is temporary and dependent on the frequency of erosion events.
Accessibility and Amenity	4	Maintains the existing beach and recreational amenity, with scraping able to restore beach width following erosion. Temporary disturbance may occur during works, and repeated erosion could affect access between scraping events.
Environmental and Cultural	4	Localised disturbance to beach and upper foreshore habitats would occur during scraping and would need to be appropriately managed.
Cost[1]	4	Relatively low capital cost. However, ongoing monitoring, mobilisation and repeat scraping could result in recurring maintenance costs over time. Capital cost = $43,000 Whole of life cost = $210,000
Approvals	3	As long as there is no significant increase in volume of sand moved than what currently is likely to only require same approvals as currently utilised. However active management may trigger some of the following;

Option 2 – Active sand management and monitor		
		Beach nourishment is proposed to occur through a number of means – beach reprofiling and redistribution of sand from adjacent areas. Under Part B.4 of the tidal works accepted development code (AO48), beach reprofiling is not to exceed the movement of 5m^3 per lineal metre of beach. The depth of excavation for beach re-profiling will not exceed 0.5 metres below the original beach profile elevation to comply with AO49 of the code. For redistributing sand within a beach compartment or reconstructing a dune the volume of sand placed per year shall not exceed 1000 m^3. Volumes of material greater than the above exceed the thresholds considered to fall within the gamut of accepted development and would be required to obtain approval for prescribed tidal works. In such an instance, land owner consent would also be required. Where marine plants are limited to fallen trees and floating timber, materials can be removed in accordance with Section 5.1.22 of the *Accepted development requirements for operational work that is the removal, destruction or damage of marine plants* which permits the removal, destruction or damage of marine plants where the activity is limited to the removal of unattached marine plants on sandy shorelines under Local Government management and direction. Section 5.1.24 of the *Accepted development requirements for operational work that is the removal, destruction or damage of marine plants* allows for the removal, destruction or damage of marine plants for the removal or smothering of unattached marine plants on sandy shorelines under Local Government management and direction for beach nourishment or reprofiling required to reduce beach scarps for public safety following storms or erosion events for a public purpose. Additional approvals may be required where works impact mangroves, seagrass or other marine plants beyond what is permitted in the *Accepted development requirements for operational work that is the removal, destruction or damage of marine plants* Works involving excavation of material below mean highwater springs cannot exceed 1,000 tonnes/year without triggering the requirement for a material change of use for an environmentally relevant activity (ERA) for dredging (ER 16). A marine park permit will also be required where works occur within the Great Barrier Reef Coast Marine Park, noting that the northern section of Four Mile Beach is not included in the Great Barrier Reef Coast Marine Park.

1. Costings are for comparative purposes only and should not be used for budgetary purposes unless a suitable contingence is applied. Whole of life costs are based on a 30-year period.

Recommended option

The preferred management approach identified through this SEMP for Four Mile Beach North is to maintain the existing management arrangements, including routine monitoring and maintenance of the foreshore and existing beach access infrastructure. The northern section of Four Mile Beach is considered relatively stable, with no significant or widespread erosion concerns identified under current conditions. However, localised erosion has been observed around formalised beach access points and towards the northern end of the beach, particularly following elevated tides and storm events.

Council will seek to improve beach access management, initially at Four Mile Beach and progressively across the region. Routine maintenance and replacement works will provide opportunities to adopt designs better suited to erosion and changing beach conditions. Options include replacing seaward concrete sections with more natural and adaptable alternatives, such as sand-based access, sand ladders and other innovative designs.

Given the generally stable shoreline conditions and established vegetation buffer, active sand management is not considered necessary under current conditions. However, this option may be reconsidered should monitoring identify an increase in erosion risks or a deterioration in beach conditions.

Recommended management approach

Maintain the existing management arrangements through routine monitoring and maintenance of the foreshore and beach access infrastructure, with consideration of more natural and adaptable beach access solutions to reduce the need for ongoing reactive maintenance.

- Option 1 – Maintain status quo (preferred option)

Description

This SEMP identifies that the recommended management approach for Four Mile Beach North is to maintain the status quo, with continued monitoring and maintenance of existing foreshore areas and beach access infrastructure. The relatively stable shoreline, established vegetation buffer and limited extent of ongoing erosion are key considerations in identifying this approach.

Under this option, the existing beach, vegetation buffer and foreshore infrastructure would remain largely unchanged. Localised erosion and minor scarping would generally be allowed to respond naturally, provided they do not result in an immediate risk to public safety or critical infrastructure. Council would continue routine inspections and monitoring, particularly following significant storm events, elevated tides and periods of increased wave activity.

Reactive maintenance or repairs may be undertaken where necessary to address damage to existing beach access infrastructure or other Council assets. Where beach access infrastructure requires repair or replacement, Council will consider opportunities to adopt more natural and adaptable solutions, such as replacing concrete sections with sand-based access or sand ladders, particularly along the seaward

sections of existing access points. This approach would aim to better integrate access infrastructure with the natural dune environment and reduce the need for reactive maintenance following erosion events.

The existing vegetation buffer would continue to be maintained, recognising its importance in supporting dune stability, protecting the foreshore and maintaining the natural character of Four Mile Beach.

The northern end of Four Mile Beach is relatively stable and only typically experiences any problematic erosion during extreme events. Under current management procedures it maintains suitable function and does not place excessive burden on council. There would be limited benefit in moving to a higher level of service through active sand management.

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7.4 Four Mile Beach South

Present day shoreline and key coastal issues

The Four Mile Beach – South coastal segment is experiencing localised erosion, with erosion scarps evident along sections of the beach. Exposed tree roots and several fallen trees were observed, indicating ongoing shoreline recession in this area, however shoreline tend analysis showed recession to be minor. The beach profile is relatively flat and shows signs of beach lowering, with erosion scarps of up to approximately 1m in height. The beach is also narrower compared with the Four Mile Beach – North coastal segment.

This coastal segment has been identified as having high cultural significance and may be a potential cultural heritage site. There are no tangible assets located directly behind the foreshore. Despite the observed erosion, the foreshore retains a healthy vegetation buffer, which provides some protection and stability to the backshore.





The following management options are considered for Four Mile Beach South:

1. Do nothing
2. Active sand management and monitor

The options assessment approach, including the descriptions of assessment criteria and weightings, is outlined in Section 6. Table 25 provides an overview of the scores for each option against the weighted assessment criteria for Four Mile Beach South.

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Table 27. Criteria weighting and scores (unweighted and weighted) for Four Mile Beach - South options

		Unweighted		**Weighted**	
		Do nothing	*Active sand management and monitor*	**Do nothing**	**Active sand management and monitor**
Criteria	**Criteria weighting**	**Option 1**	**Option 2**	**Option 1**	**Option 2**
Asset Protection and Durability	36%	*2*	*3*	0.72	1.08
Accessibility and Amenity	28%	*3*	*3*	0.84	0.84
Environmental and Cultural	20%	*4*	*3*	0.80	0.60
Cost	12%	*5*	*4*	0.60	0.48
Approvals	4%	*5*	*3*	0.20	0.12
Total	100%	*19*	*17*	3.16	3.12
Rank				2	1

Option 1 – Do nothing

The do nothing option would involve no new coastal management or erosion mitigation works at Four Mile Beach – South, beyond routine monitoring and maintenance of existing foreshore infrastructure and access. The shoreline would be allowed to continue responding naturally to coastal processes, including seasonal fluctuations, wave activity, storm events and longer-term changes in sediment supply.

Natural coastal processes would be expected to continue, with the potential for further shoreline recession and narrowing of the beach over time, particularly following significant storm events.

The foreshore currently retains a healthy vegetation buffer, which provides some natural protection and contributes to the ecological and amenity values of the area. However, continued recession could progressively encroach into this vegetation buffer and potentially result in further vegetation loss.

The segment has also been identified as having high cultural significance and potential cultural heritage values. While there are currently no tangible assets located directly behind the foreshore, ongoing erosion could increase the potential for disturbance or exposure of cultural heritage values. Continued monitoring would therefore be important under this option.

Key considerations

- Does not address the existing erosional trend or prevent further beach lowering and shoreline recession.
- Potential for further loss of the existing vegetation buffer, including additional tree exposure and loss.
- Potential for increased exposure or disturbance of cultural heritage values as the shoreline retreats.
- May result in increasing management challenges in the future if erosion progresses to a point where intervention is required.
- Requires ongoing monitoring to identify changes in shoreline position and determine whether the consequences of continued erosion remain acceptable.

Option 1 – Do nothing

Table 28. Four Mile Beach South – Option 1 criteria scores

Criteria	Score	Comment
Asset Protection and Durability	2	Provides no active response to ongoing erosion or beach lowering. Continued recession may result in further loss of vegetation and increased exposure of the foreshore over time. There are currently no significant tangible assets immediately behind the foreshore, reducing the immediate consequence of erosion.
Accessibility and Amenity	3	Maintains the existing beach and foreshore without construction impacts. However, continued erosion and beach lowering may progressively reduce beach width and potentially affect amenity and access in the longer term.
Environmental and Cultural	4	Allows natural coastal processes to continue and avoids construction disturbance. However, continued erosion may result in loss of vegetation and potentially increase the risk of exposure or disturbance of cultural heritage values.
Cost[2]	5	No capital expenditure is required for erosion mitigation works. Costs would be limited primarily to routine monitoring and maintenance. Whole of life cost = $130,000
Approvals	5	No new coastal works are proposed, so additional approvals associated with construction are generally avoided, subject to any requirements for ongoing monitoring or maintenance.

2. Whole of life costs is based on 30 years of monitoring

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Option 2 – Active sand management and monitor

Sand scraping involves mechanically regrading the beach and eroded foreshore to remove steep erosion scarps and redistribute sand across the beach profile. The approach would typically involve using locally available sand from the beach or adjacent areas to reshape the foreshore and establish a more stable, gently sloping profile.

At Four Mile Beach South, sand scarping could be considered where erosion scarps of up to approximately 1m are observed and are exposing tree roots and contributing to the loss of vegetation.

The works would need to be carefully designed to avoid unnecessarily removing or damaging established vegetation. In particular, areas where tree roots are already exposed should be assessed to determine whether regrading would provide protection or whether the trees are already at risk of being lost due to ongoing shoreline recession.

Sand scraping does not address the underlying causes of shoreline recession and the regraded profile may erode again following subsequent storm events or periods of elevated wave activity. As such, the approach would likely require periodic monitoring and potentially repeated maintenance.

A key constraint to implementing this option is access to the beach for machinery and equipment. Limited suitable access points along Four Mile Beach South may present significant challenges for undertaking beach scraping activities. The feasibility of this option would therefore depend on identifying suitable access arrangements that minimise disturbance to existing vegetation and the surrounding coastal environment.

Key considerations

- Does not address the underlying cause of erosion and should therefore be considered a short- to medium-term management measure rather than a permanent solution.
- Regrading may be temporary, with the beach potentially returning to its previous profile following subsequent storms.
- Potential impacts to cultural heritage values would need to be considered before undertaking excavation or mechanical disturbance of the foreshore.
- Monitoring should be undertaken following works to assess the persistence of the regraded profile and whether the approach is effectively reducing erosion impacts.

Table 29. Four Mile Beach South – Option 2 criteria scores

Criteria	Score	Comment
Asset Protection and Durability	3	Provides a localised response by reducing erosion scarps and temporarily restoring beach levels. However, the regraded profile may erode again following storm events, so the option provides limited long-term durability and may require periodic maintenance.
Accessibility and Amenity	4	Can improve the beach profile and remove steep erosion scarps, potentially improving access and beach amenity. Works may result in temporary disturbance during construction and could require periodic regrading.
Environmental and Cultural	3	Avoids permanent structures and can maintain a natural sandy beach profile. However, mechanical disturbance of the foreshore may impact vegetation, tree roots and potential cultural heritage values if not carefully managed.
Cost[1]	4	Relatively low-cost compared with structural erosion protection options, particularly where suitable sand is available locally. However, repeat works may be required as the beach profile re-erodes. Capital cost = $83,000 Whole of life cost = $310,000

Option 2 – Active sand management and monitor		
Approvals	3	Beach nourishment is prosed to occur through a number of means – beach reprofiling and redistribution of sand from adjacent areas. Under Part B.4 of the tidal works accepted development code (AO48), beach reprofiling is not to exceed the movement of 5m^3 per lineal metre of beach. The depth of excavation for beach re-profiling will not exceed 0.5 metres below the original beach profile elevation to comply with AO49 of the code. For redistributing sand within a beach compartment or reconstructing a dune the volume of sand placed per year shall not exceed 1000 m^3. Volumes of material greater than the above exceed the thresholds considered to fall within the gamut of accepted development and would be required to obtain approval for prescribed tidal works. In such an instance, land owner consent would also be required. Where marine plants are limited to fallen trees and floating timber, materials can be removed in accordance with Section 5.1.22 of the *Accepted development requirements for operational work that is the removal, destruction or damage of marine plants* which permits the removal, destruction or damage of marine plants where the activity is limited to the removal of unattached marine plants on sandy shorelines under Local Government management and direction. Section 5.1.24 of the *Accepted development requirements for operational work that is the removal, destruction or damage of marine plants* allows for the removal, destruction or damage of marine plants for the removal or smothering of unattached marine plants on sandy shorelines under Local Government management and direction for beach nourishment or reprofiling required to reduce beach scarps for public safety following storms or erosion events for a public purpose. Additional approvals may be required where works impact mangroves, seagrass or other marine plants beyond what is permitted in the *Accepted development requirements for operational work that is the removal, destruction or damage of marine plants* Works involving excavation of material below mean highwater springs cannot exceed 1,000 tonnes/year without triggering the requirement for a material change of use for an environmentally relevant activity (ERA) for dredging (ER 16). A marine park permit will also be required where works occur within the Great Barrier Reef Coast Marine Park. Note that the conservation park zone is a highly protected zone in the marine park and offsetting may be required where material is imported to the site from an external source and is not consistent with material endemically occurring on the beach.

1. Costings are for comparative purposes only and should not be used for budgetary purposes unless a suitable contingence is applied. Whole of life costs are based on a 30-year period.

Recommended option

The preferred management approach identified through this SEMP for Four Mile Beach South is to allow natural coastal processes to continue with minimal intervention. While localised erosion has been observed along sections of the foreshore, including erosion scarps, exposed tree roots and fallen vegetation, the shoreline remains supported by an established vegetation buffer, with limited built assets immediately at risk from coastal erosion.

The southern section of Four Mile Beach also holds significant cultural values, which have been identified through engagement with Traditional Owners. While active sand management could potentially provide benefits in areas experiencing erosion, the limited availability of suitable machinery access and potential need to disturb existing vegetation are important considerations in assessing the feasibility of intervention.

Based on the current information available, the preferred approach is to allow the shoreline to respond naturally, supported by ongoing monitoring. Should further information from Traditional Owners identify a need to protect specific cultural values or areas of significance, Council may reconsider targeted management measures in consultation with the relevant Traditional Owners.

Recommended management approach

- **Option 1 – Do nothing (preferred option)**
    - Option 2 – Active sand management and monitoring (secondary option, subject to further assessment)

Allow natural coastal processes to continue with minimal intervention, supported by ongoing monitoring and further engagement with Traditional Owners where required. Targeted active sand management may be reconsidered should additional information identify a need for intervention to protect cultural values or address increased erosion risks.

Description

This SEMP identifies that the recommended management approach for Four Mile Beach South is to allow natural coastal processes to continue, with minimal intervention along the foreshore. The absence of significant built assets immediately behind the beach, the presence of an established vegetation buffer and the cultural significance of the area are key considerations in identifying this approach.

Under this option, the existing beach and dune system would remain largely unchanged, allowing natural erosion, accretion and seasonal fluctuations in beach conditions to continue. Localised erosion scarps, exposed vegetation roots and changes in shoreline position would generally be allowed to respond naturally, provided they do not present an unacceptable risk to public safety or existing infrastructure.

Council would continue to monitor shoreline conditions, particularly in areas where erosion scarps of up to approximately 1 m have been observed and where vegetation loss is occurring. The existing vegetation buffer would be retained where possible, recognising its importance in maintaining dune stability and supporting the environmental and cultural values of the foreshore.

Engagement undertaken with Traditional Owners has identified the cultural significance of this section of Four Mile Beach. However, the potential disturbance to existing vegetation and the difficulties associated with establishing machinery access may outweigh the benefits of undertaking active erosion management works under current conditions.

Should further information become available from Traditional Owners identifying specific cultural values requiring protection, Council would undertake further assessment and engagement to determine whether targeted management intervention is appropriate.

Tier 2 action- Active sand management and monitoring (if triggered)

Should further assessment identify a need for intervention, targeted active sand management may be considered in areas experiencing localised erosion, particularly where erosion scarps and exposed vegetation roots are contributing to the loss of established foreshore vegetation.

This could involve carefully controlled beach scraping or regrading to reduce steep erosion scarps and redistribute suitable sand across the beach profile. Any works would need to be designed to minimise disturbance to existing vegetation and avoid unnecessary clearing or damage to established trees and their root systems.

The feasibility of this option would depend on identifying suitable machinery access arrangements, the availability of sand, potential environmental impacts and the protection of cultural heritage values. Further engagement with Traditional Owners would be required before progressing any works, together with relevant approvals and funding.

At this stage, active sand management is not recommended for implementation, with the preferred approach remaining to allow natural coastal processes to continue while monitoring changes in shoreline conditions and cultural values.

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8 SEMP implementation plan

The recommended management actions for this SEMP for implementation, monitoring and review are summarised in Prioritisation of the management actions has been assigned as immediate, medium-term or future.

1. **Immediate (recommend implementation within 2 years)** & ongoing for relevant actions
2. **Medium-term** (recommend implementation within next 2 – 4 years)
3. **Future** (recommend implementation within 5 – 10 years)

Table 30. Actions summary

Location	Recommended action	Timing	Description	Costs	Approvals
All sites	Shoreline monitoring and review	1	Undertake regular visual inspections and periodic beach profile surveys to assess shoreline change, dune condition, vegetation loss and erosion risks. Complete additional inspections following significant storm and cyclone events. Use monitoring results to inform future management actions. Council staff should undertake visual and photographic monitoring at least twice a year, before and after the cyclone season, preferably quarterly where resources permit. Drone or topographic surveys should supplement this monitoring every 2–5 years, subject to available budget and resources.		N/A
	Traditional Owner engagement	1	Continue engagement with relevant Traditional Owners regarding coastal management activities, cultural heritage values and potential impacts of proposed works. Incorporate cultural heritage considerations into the planning and implementation of management actions.		Cultural heritage requirements and other relevant obligations to be confirmed for proposed works
Newell Beach North	Monitoring – site survey	1	Annual and event-based review of shoreline profile change.	Council	N/A
	Active sand management	2 & 3	Consider targeted beach scraping or sand redistribution if monitoring identifies erosion requiring intervention. The need for works should be assessed against the limited risk to built assets and potential disturbance to the natural foreshore. Undertake works in conjuntion with Newell Beach South works.	Inconjuntion with Newell Beach South Works	• Depending on extent of works, potential ammendment to GBR Marine Park Permit MP2015/GBRC0041- • Tidal Works Approval, including landowner's consent if volumes exceed those permisable under Code for accepted development - Tidal Work • Marine plant disturbance approvals, where required.
Newell Beach South	Monitoring – site survey	1	Annual and event-based review of shoreline profile change.	Council (cost subject to survey costs)	N/A
	Active sand management	1 & 2 & 3	Initial beach scraping and revegetation works to be undertaken in late 2026 /early 2027 Consider targeted beach scraping or sand redistribution if monitoring identifies erosion requiring intervention.	$300K for capital, $800-900K lifecycle to maintain	• Council currently holds a GBR Marine Park Permit MP2015/GBRC0041 • Tidal Works Approval, including landowner's consent if volumes exceed those permisable under Code for accepted development - Tidal Work • Marine plant disturbance approvals, where required.
	Investigate seawall approvals & design.	3	Investigate the feasibility of a standard seawall design and approval along the Cyril Close, Olive Street and Marine Parade Sth foreshore. Subject to Council endorsement – council with consultant support develop a standard seawall design and gain state approvals in advance. Allowing private property owners can construct walls to protect their properties in the future.	$150K for design & approvals. Council to seek grant funding.	• Great Barrier Reef Coast Marine Park Permit, where required. • Tidal Works Approval, including landowner's consent where applicable. • Marine plant disturbance approvals, where required.
	Tier 2 action –Seawall (if triggered)	3	If erosion threatens residential properties and active sand management is no longer sufficient, residents may consider construction of an engineered seawall. The structure would be positioned as far landward as practicable. Construction and implementation costs would be borne by private property owners.	Privately funded $200-$300K per property	• Aim is for approvals and standard design to be in place as per above.

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Location	Recommended action	Timing	Description	Costs	Approvals
Four Mile Beach North	Monitoring – site survey	1	Annual and event-based review of shoreline profile change.	Council (cost subject to survey costs)	N/A
	Maintain status quo	1	Continue to undertake access point maintenace and small scale beach scraping reactively post weather events.	Current budget	• Utlising current approvals
	Improvement to access points	2 3	Council will seek to improve beach access management, initially at Four Mile Beach and progressively across the region. Routine maintenance and replacement works will provide opportunities to adopt designs better suited to erosion and changing beach conditions. Options include replacing seaward concrete sections with more natural and adaptable alternatives, such as sand-based access, sand ladders and other innovative designs.	TBC – aim to reduce ongoing maintenace costs.	
Four Mile Beach South	Monitor	1	Let natural processes take place and monitor site.	Council to monitor	
	Tier 2 action (if applicable and triggered by an erosion event and Traditional Owners highlight significance for area to be protected)	3	If further assessment identifies a need for intervention, consider localised beach scraping to regrade erosion scarps and provide additional protection to exposed vegetation. Works would be subject to suitable machinery access, available sand and consideration of potential environmental and cultural heritage impacts.		• Great Barrier Reef Coast Marine Park Permit, where required. • Tidal Works Approval, including landowner's consent where applicable. • Marine plant disturbance approvals, where required.
All sites	**HOLD POINT** **review of SEMP actions and effectiveness**	3	**Review of SEMP actions and effectiveness within 10 years. SEMP update if required.**		

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A.1 Native Title mapping



Figure 41. Register of Native Title Claims



Figure 42. Native Title Determinations near Newell Beach



Indigenous Land Use Agreements

- ILUA registered
- ILUA in notification
- ILUA notification ended
- ILUA subject to objection
- Population centres

alluvium consulting

0 300 m

Source: National Native Title Tribunal, © Commonwealth of Australia,© State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development)

Figure 43. Indigenous Land Use Agreements at Newell Beach

A.2 Environmental mapping



Figure 44. State environmental values for Newell and Four Mile Beach

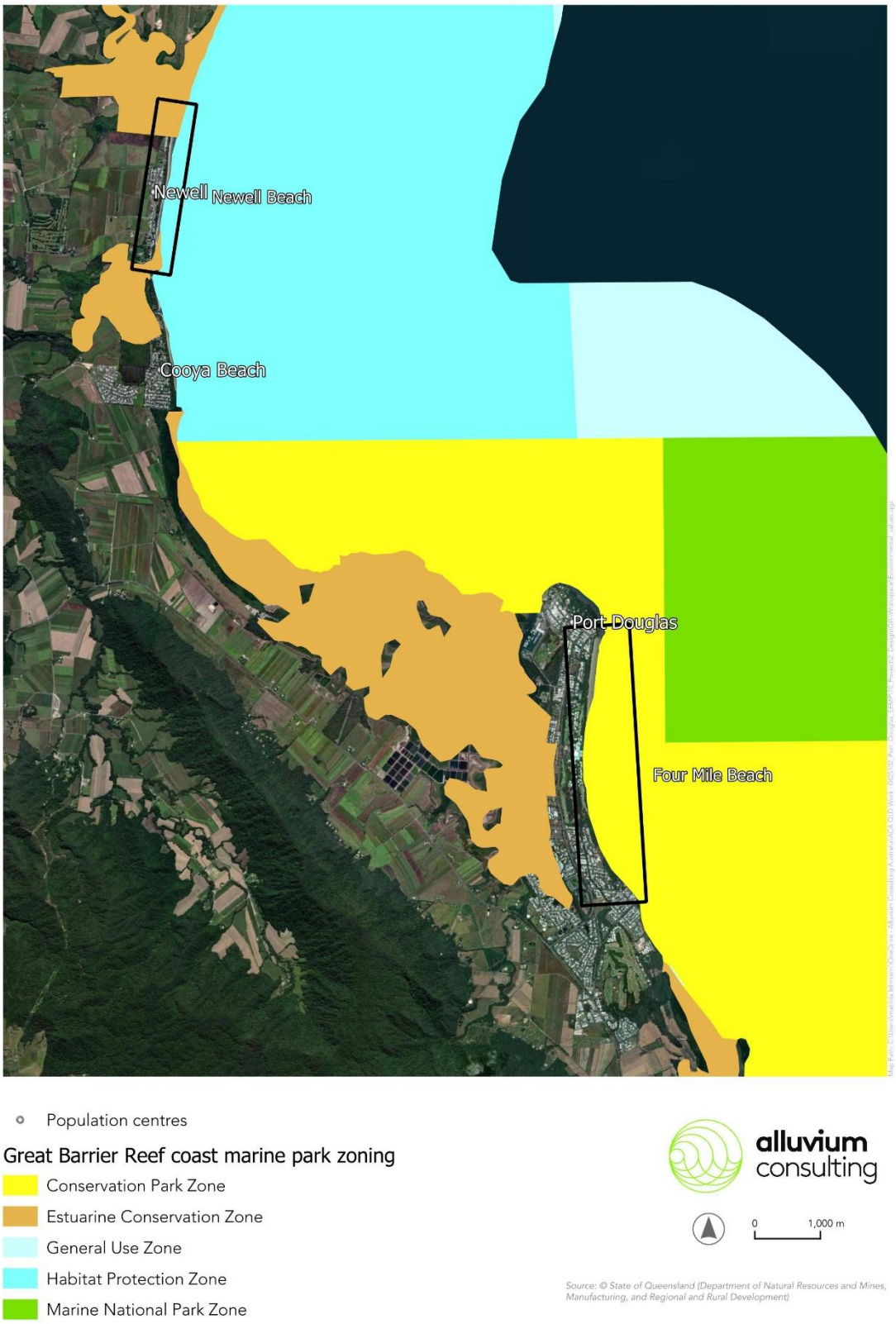
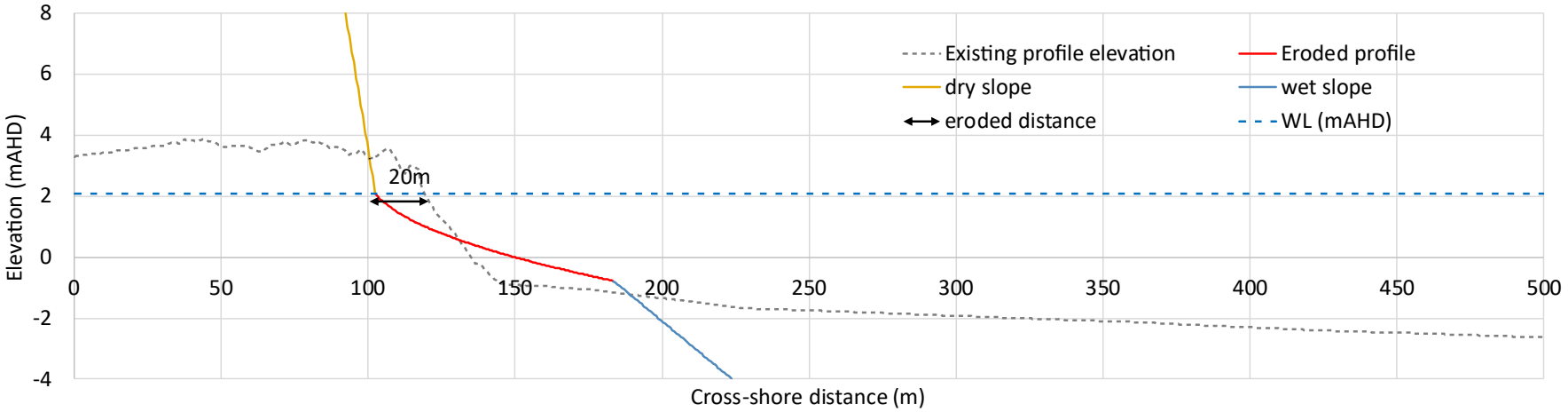


Figure 45. Great Barrier Reef marine park zoning for Newell Beach and Four Mile Beach

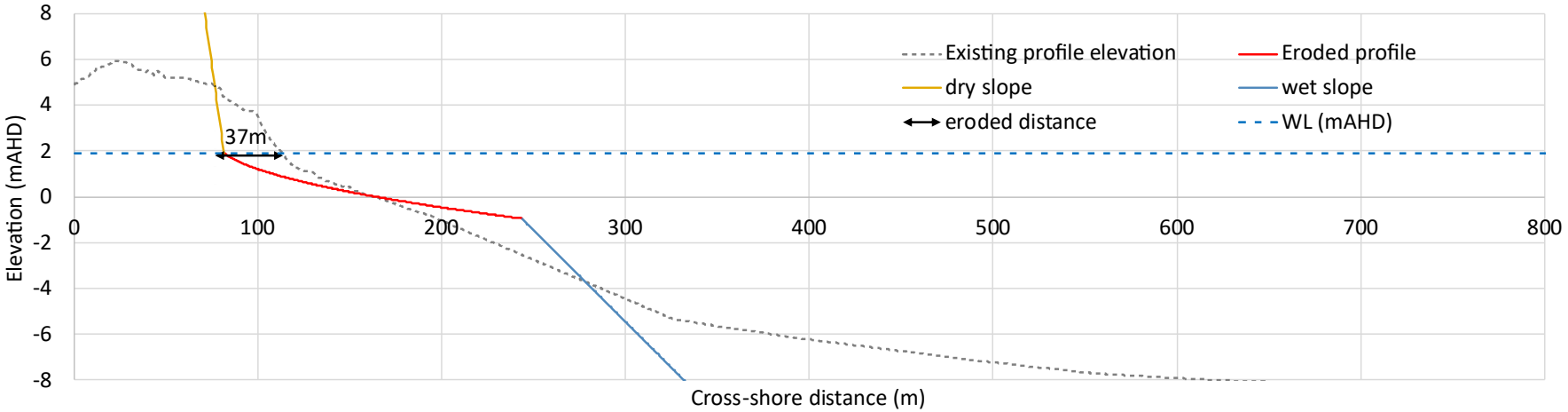
A.3 Short-term erosion profiles

Newell Beach



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Four Mile Beach

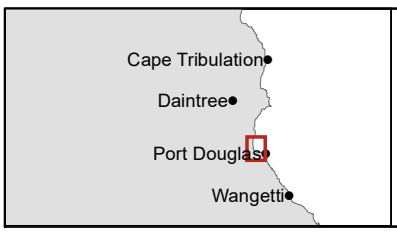


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A.4 CHAS Erosion Prone Area mapping

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8. Cooya Beach

Areas prone to coastal erosion processes

- 2100 Likely
- 2100 Possible
- 2100 Rare
- 2100 Tidal area (likely)
- Rocky coast zone (possible)

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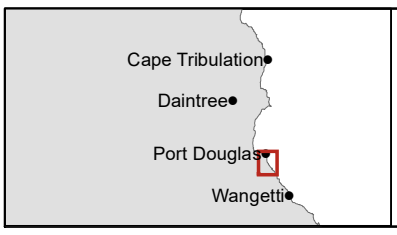
0 0.25 0.5 1 km

n

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Produced by: Alluvium Consulting Australia and Jeremy Benn Pacific





9. Port Douglas

Areas prone to coastal erosion processes

- 2100 Likely
- 2100 Possible
- 2100 Rare
- 2100 Tidal area (likely)
- Rocky coast zone (possible)

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0 0.2 0.4 0.8 km

n

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