



District Council of

Grant

Adaptation Strategy

Limestone Coast Adaptation Strategies

District Council of Grant

Reference 210205

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1 INTRODUCTION

1.1 The Project

Wattle Range Council, Robe District Council, and the District Council of Grant are undertaking a process to develop coastal adaptation strategies for 11 townships located in the Limestone Coast region. The Limestone Coast Local Government Association (LCLGA), Coastal Protection Board, and Kingston District Council are also key stakeholders in this project. The overall objective, to which this project contributes, is to develop a consistent coastal adaptation strategy for the region. The coastline in this region of South Australia has experienced coastal erosion and inundation, and it is expected that these hazards are likely to intensify in future years.

The aim of this project is to identify for the 11 coastal settlements the coastal hazards and risks associated up to 2100 and evaluate potential adaptation options and pathways for implementation. This project specifically focused on the towns within the District Council of Grant and the hazards of coastal erosion and inundation (permanent and temporary). The towns included in this adaptation strategy are:

- Carpenter Rocks
- Pelican Point
- Blackfellows Caves
- Nene Valley
- Cape Douglas
- Port MacDonnell
- Racecourse Bay
- Eight Mile Creek

Donovans was also assessed however it was determined that the hazards that impact this community are principally driven by overland and riverine processes and not by coastal processes.

2 THE ADAPTATION PLANNING PROCESS

2.1 Level of Assessment and General Approach

The approach used in this assessment is based on the Local Government Association of South Australia's Coastal Adaptation Guidelines (LGASA, 2020). Three levels of assessment for adaptation studies are defined in the LGASA Guidelines (2020) as First, Second and Third Pass assessments, essentially building up from a rapid to detailed level of risk assessment. Based upon the data available at this location as well as the aims of this assessment, this assessment can be classified as a "Second Pass" assessment.

Purpose of Coastal Process Assessment	Spatial Scale	Complexity of Assessment	Applicable Sediment Compartment	LGASA Guidelines (2020) Pass Equivalence
- National trends (or State comparison) - Sensitivity or broad scale assessments to indicate general areas of higher exposure using limited processes	10 - 100 km	Low	Primary	First Pass
- Regional or state-wide scoping studies - Indicative estimates of broad-scale change to identify trends and future focus areas - Regional coastal hazard assessments	1 - 10 km	Low - Medium	Primary / Secondary	First Pass
- Local coastal hazard assessments - Hotspot studies - Adaptation planning - Informing planning scheme updates	10 - 1000 m	Medium – High (Medium Adopted)	Tertiary	Second Pass
- Site-specific hazard assessment - On-ground design and construct of works - Informing development consent	<10 m	High – Very High	Tertiary	Third Pass
Low: Captures the processes in a way that allows for long timescale duration of analysis (forecasting) and/or large spatial scales. Typically, reduced physics or parameterised approaches with lower data requirements. Medium: Balances the need for specific process detail with spatial resolution (and thus computational and data needs). Typical empirical methods or transect based analysis. High: Includes key physical processes with higher data requirement usually for validation and seeks to describe these at spatial and temporal scales that are efficient but informative such as by employing scaling approaches. Very High: Includes the greatest number of physical processes and seeks to describe as much of the physical process as possible in high spatial and temporal resolution. These approaches typically have the highest data requirements for both process resolution and validation.				

This document is a summary document that outlines the coastal adaptation strategy and therefore presents an overview of the outcome of the overall assessment. Details on the data used, analysis approach, risk assessment and adaptation options for each community are documented in a separate report:

FSC Range (2025). *Limestone Coast Adaptation Strategies - Technical Report for District Council of Grant – Carpenter Rocks*

FSC Range (2025). *Limestone Coast Adaptation Strategies - Technical Report for District Council of Grant – Pelican Point*

FSC Range (2025). *Limestone Coast Adaptation Strategies - Technical Report for District Council of Grant – Blackfellows Caves*

FSC Range (2025). *Limestone Coast Adaptation Strategies - Technical Report for District Council of Grant – Cape Douglas*

FSC Range (2025). *Limestone Coast Adaptation Strategies - Technical Report for District Council of Grant – Port MacDonnell & Racecourse Bay*

FSC Range (2025). *Limestone Coast Adaptation Strategies - Technical Report for District Council of Grant – Eight Mile Creek*

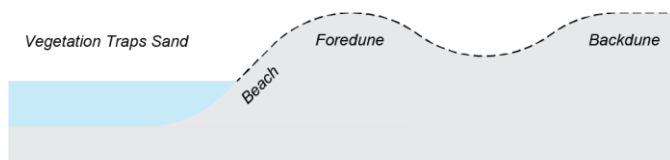
FSC Range (2025). *Limestone Coast Adaptation Strategies - Technical Report for District Council of Grant – Donovans*

2.2 How our coasts change

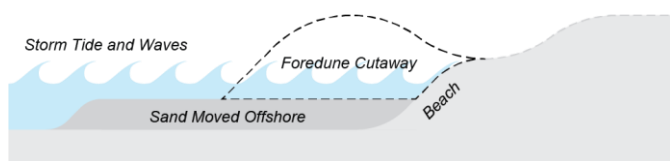
Across the region, the coastal landscape continually changes. This can occur over long timescales or at times of rapid change such as during storms. Actions we take may have substantial implications for environmental, cultural and economic values within our coastal areas and in some cases can also extend inland. Understanding the key drivers of landscape change is the first step to developing a plan to balance values and land use in our region, both now and into the future. This component of the assessment is referred to as a coastal processes (or hazards) assessment, which seeks to understand the processes affecting our coasts.

Sandy coast erosion and accretion

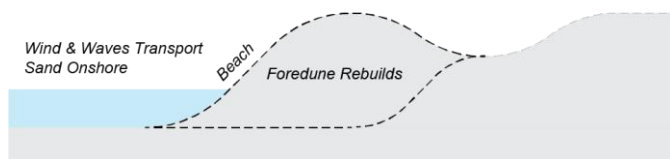
Natural sandy dune systems go through periods of erosion and accretion. Dune vegetation has a key role in assisting dune growth and preservation by helping to trap sand.



Erosion can occur when winds, waves and coastal currents shift sediment away from or along the shoreline, sometimes just offshore. Short term erosion (storm bite) is often associated with big storms.

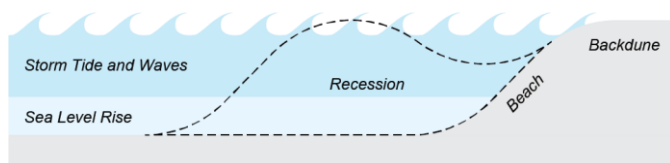


During calm conditions, wind and waves transport sand onshore, building up the dune. For a stable beach, a lot of the sand moved offshore in a storm will eventually move back onto the beach.



In some cases, changes in sediment supply or climate conditions (such as bigger or more frequent storms), means the beach may not rebuild fully between storm events.

With less sand retained on the beach over time, long-term erosion (recession) may occur. The shoreline position then tends to move landward.

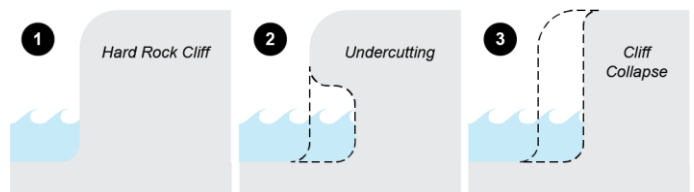


Rocky coast erosion

Over geological timescales (thousands of years), softer sediments are eroded away, exposing hard rocky coasts. These coasts are common throughout the region.

Hard rock

Hard rock cliff slopes are susceptible movements such as cliff falls that may be initiated by a combination of surface processes (rain, surface runoff) and/or due to marine influences at the base of the cliff (e.g. toe undercutting). Hard rock erosion can occur with little or no warning.



Where a sandy beach is 'perched' on a rock platform at the base of a cliff, increasing sea levels and wave energy often result in sand loss, due to limited sand volumes and little to no sand supply, as well as increased wave reflection off the rocky coast.

Soft rock

Some rocky coastal areas have softer, more erodible rock. These coasts can be more vulnerable to erosion from both surface processes and cliff toe undercutting.

Erosion of soft, rocky coasts can occur as both cliff falls and slumping (material movement down its slope).

Unlike sandy coast, rocky coasts do not 'recover' after erosion. However, they also tend to erode at a slower rate.

Temporary inundation

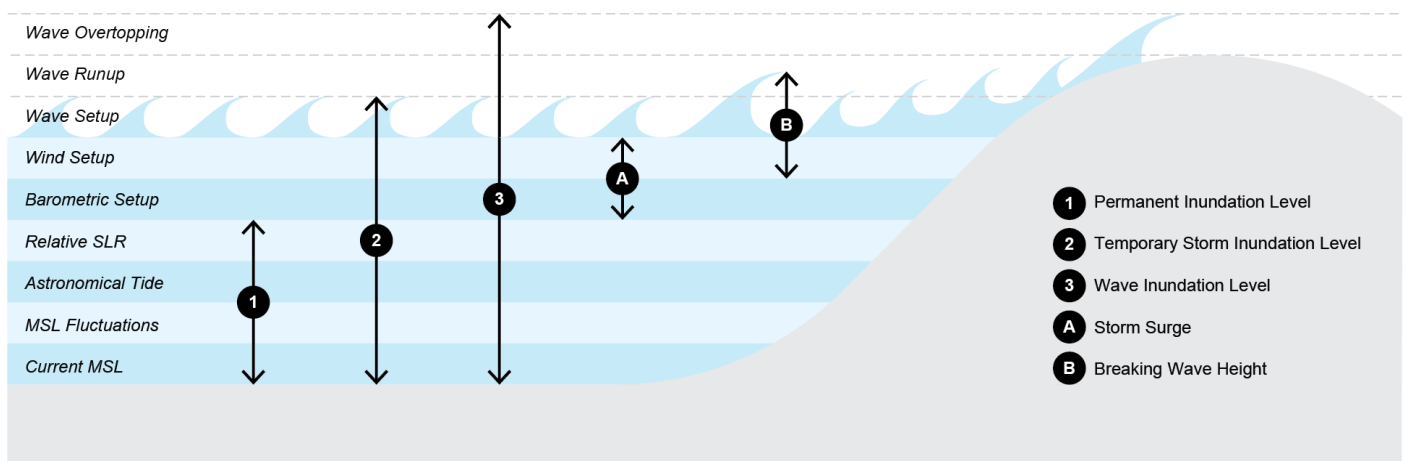
Temporary inundation is the flooding of low-lying coastal land due to a locally elevated sea level (storm tide) combined with waves impacting the coast. This temporary storm inundation level can impact low-lying land for periods of time that range from hours to days. It is caused by the combined influence of:

- Current and future mean sea level
- The predicted tide
- Low pressure air systems causing increases in sea level (barometric setup)
- Wind setup caused by high winds
- Wave setup caused by waves approaching the shoreline

In addition to these storm effects, waves can travel over the top of this elevated water and impact the coast (runup, overtopping). These wave components tend to be shorter in duration and are often greatest during the peak of the storm.

Permanent inundation

Permanent inundation occurs when low-lying areas become regularly inundated as part of the regular tidal cycle, up to and including the Highest Astronomical Tide (HAT). Increases in mean sea level over time will influence the extent of permanently inundated areas.



2.3 Mapping hazards

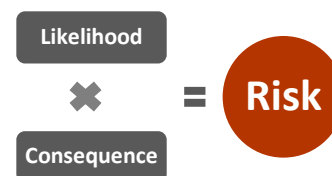
Parts of our coastline may be more vulnerable to coastal hazards than others. We have assessed the potential impact of coastal hazards, including erosion (sand loss) and inundation (flooding) – both temporary and permanent. These impacts were determined using numerical models as well as existing data and considered both present day conditions and predicted future changes.

We have then estimated the “coastal hazard extent”, which is mapped to identify areas that are exposed to inundation, erosion or sea level rise. This has been done for several scenarios in order to understand the uncertainty in the assessment. In this adaptation strategy only the likely inundation extent and the erosion hazard zone that has a 95% likelihood of occurrence are presented. Other scenarios are presented in the supporting technical reports (see section 2.1).

2.4 Assessing risk

Coastal hazard risk is the potential for coastal hazards to impact on things we value, where the outcome is uncertain. To assess risk, we undertake a Risk Assessment.

A Risk Assessment is a systematic process of evaluating the potential risks (likelihood and consequence) of coastal hazards, helping to inform a risk management response and adaptation actions.



Likelihood

The likelihood of exposure to coastal hazards is determined by the probability (chance) of an event occurring. An 'event' is a storm or weather event that may cause inundation (flooding) or erosion along the coast. An event might include high winds, high tides and/or large waves. For this assessment, various scenarios from more frequent to rarer events, and multiple sea level rise scenarios have been considered. To quantify likelihood of these hazard events, statistical methods, which combine each of the different components of a hazard to produce a statistical probability of spatial extent of impact.

Consequence

The consequence (impact/outcome) of a value or use being exposed to coastal hazard/s are tailored based on local stakeholder and community feedback. Consequence ratings can also vary for hazard types (erosion and inundation) and consider short and long term impacts. A consequence matrix can be used to assign individual ratings for each value and use. This may range from *low* where little to no impact is felt, to *high* where there are severe, widespread impacts, damage or loss of life.

Evaluating risk

Risk can be assessed at various scales – from a regional level to individual sites and assets. Once consequence and likelihood ratings have been determined, the risk matrix can be used to assess the overall level of risk for each value or use, under different scenarios. Quantifying risk provides a standardised basis to strategically prioritise and manage risk. It may be the case that we can accept or 'live with' a certain level of risk. However, after some time, we may reach a 'trigger' point where the risk reaches unacceptable levels. An example may be a sea level that becomes too high and causes regular flooding during storms.

Adaptation planning considers a range of options to effectively manage coastal hazard risk, from present day to longer-term (2100). Effective risk management may involve multiple actions, with their sequence typically determined by the evolving risk profile over time and for different locations. When the risk profile reaches a 'trigger point', the action is usually implemented.

It may be several decades before a trigger for action occurs, and over that time we may have new information (e.g., better climate data) or changes that need to be considered (e.g., changes in policy) that may affect how we manage risk. Therefore, these adaptation plans are regularly reviewed and updated. However, what is most important is that we have an achievable and realistic plan that spans many decades and provides us with a vision of how our communities will evolve over time.

The risk matrix used in this assessment as well as the full spatial results are described in more detail in the technical report for each community (see section 2.1).

Likelihood	Consequence					
		Negligible	Minor	Moderate	Major	Extreme
	Likely	Medium	Medium	Significant	High	High
	Possible	Low	Medium	Significant	Significant	High
	Unlikely	Low	Medium	Medium	Significant	Significant
	Rare	Low	Low	Medium	Medium	Significant

Risk	Risk tolerance	Action required
High	High risk: a risk that, following an understanding of likelihood and consequence, is so high that it requires actions to avoid or reduce the risk.	Immediate and/or ongoing action is needed to treat, eliminate, or reduce risk to acceptable levels
Significant	Medium to significant risk: a risk that, following an understanding of likelihood and consequence, is low enough to allow the exposure to continue, and at the same time high enough to require new treatments or actions to reduce the risk. Society can live with this risk but believe that as much as is reasonably practical should be done to reduce the risks further.	Short term action is needed to treat, eliminate, or reduce risk to acceptable levels
Medium		Short to longer term action is needed to treat, eliminate or reduce risk to acceptable levels
Low	Low risk: a risk that, following an understanding of likelihood and consequence, is sufficiently low to require no new treatments or actions to reduce the risk further. Individuals and society can live with this risk without feeling the necessity to reduce the risks any further.	Manage and monitor the risk as part of current operations, provide for periodic maintenance/review.

2.5 What is adaptation?

Across the Limestone Coast, as well as Australia more generally, coastal land managers are taking a strategic approach to managing the risk of coastal hazards. By understanding coastal zone values, vulnerabilities and risk, we can develop a strategic plan that is effective and practical. Most importantly, it provides a clear direction for the future of our coastal communities. Adaptation seeks to proactively manage or avoid harm as well as to make use of beneficial opportunities. This process recognises that careful planning combined with a forward looking approach can reduce economic losses and response costs, preserve biodiversity, and provide a strategy to maintain the long-term viability of coastal communities.

There are many different options that are considered during the adaptation planning phase and not all are appropriate for each location or context.

2.6 Developing an adaptation strategy

To develop our adaptation approach, we bring together what we know from technical, strategic and engagement work to begin developing potential options for managing coastal hazards, as well as the pathway needed to implement these adaptation options effectively.

The strategy has been informed by:

- consultation with land managers, traditional owners, local communities, and other interested stakeholders
- the values and objectives for different locations
- an understanding of the risk of coastal hazards at different localities
- a regional-scale perspective of the range of values, uses and pressures in the coastal zone
- State guidance and legislation

Once “at risk” coastal areas have been identified, different adaptation options are considered. Each option has a different strategic approach to manage coastal hazard risk and form a hierarchical framework. This framework focuses on first avoiding the risk, then explores opportunities for nature-based methods and working with natural coastal processes to reduce coastal hazard risk and increase biodiversity. Where

these options are not expected to be effective, accommodating the risk or in some cases retreating from the risk is considered. Finally, protection options are considered but these are often expensive and come with ongoing management requirements. Adaptation actions are not mutually exclusive, and often a suite of measures is required to effectively manage coastal hazard risk.

Adaptation options	Approach
1. Non-Intervention	Allow marine and coastal processes, and the hazards they may pose, to occur.
2. Avoid	Locate new uses, development and redevelopment away from areas that are or will be negatively impacted by coastal hazards.
3. Nature-Based Strategies	Enhancing or restoring natural features to mitigate coastal hazard risk.
4. Accommodate	Structures are designed to reduce the exposure to, or decrease the impact of, coastal hazard risk.
5. Retreat	Existing structures, assets or uses may be decommissioned or relocated away from areas that are, or will be, negatively impacted by coastal hazards.
6. Protect	Existing physical barriers are enhanced, or new ones constructed. Protect is an option of last resort as it is often expensive, its benefits tend to be very localised, and it frequently transfers problems to nearby areas.

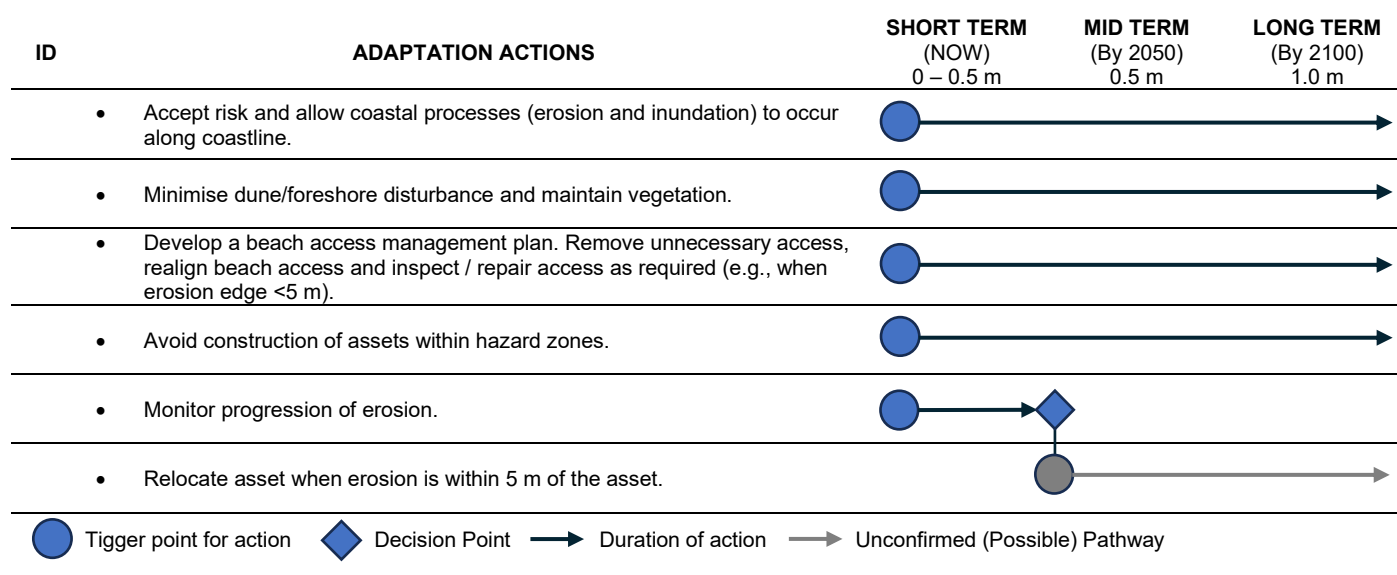
All adaptation actions can be broadly classified under three key types

- land management and planning
- nature-based strategies
- engineering solutions.

Adaptation Actions	
Land management and planning Use policy, planning instruments, guidance materials, communication, capacity building and strategic processes to enact change.	Land use Access, planning overlays and schemes, land acquisition
	Resilient development Design standards, setbacks
Nature-based Strategies Use the creation or restoration of coastal habitats as a strategy or as part of a combined strategy for hazard risk reduction.	Coastal ecosystems Mangroves, seagrass, saltmarsh
	Dune ecosystems Dune protection / vegetation, beach nourishment / scraping
	Hybrid actions Sand fencing, buried revetments
Engineering Solutions Use engineering and design to develop coastal structures, engineered changes to landform, or modify existing infrastructure.	Beach nourishment
	Seawalls, Revetments
	Groynes
	Breakwaters
	Changes to drainage network
	Changes to road network

2.7 Adaptation pathways

A “pathways approach” is used to help determine what combinations of adaptation actions might be feasible where and when. This allows us to plan our adaptation from present day to longer-term (usually 2100). This approach often incorporates multiple actions in response to the risks and these actions change over time as different triggers occur. This approach enables a range of different pathways to be identified, along with their relative sequencing, dependencies (actions that rely on each other) and triggers for implementation. These adaptation pathways are usually summarised as a map such as that shown below.



It is important to recognise that a pathways approach:

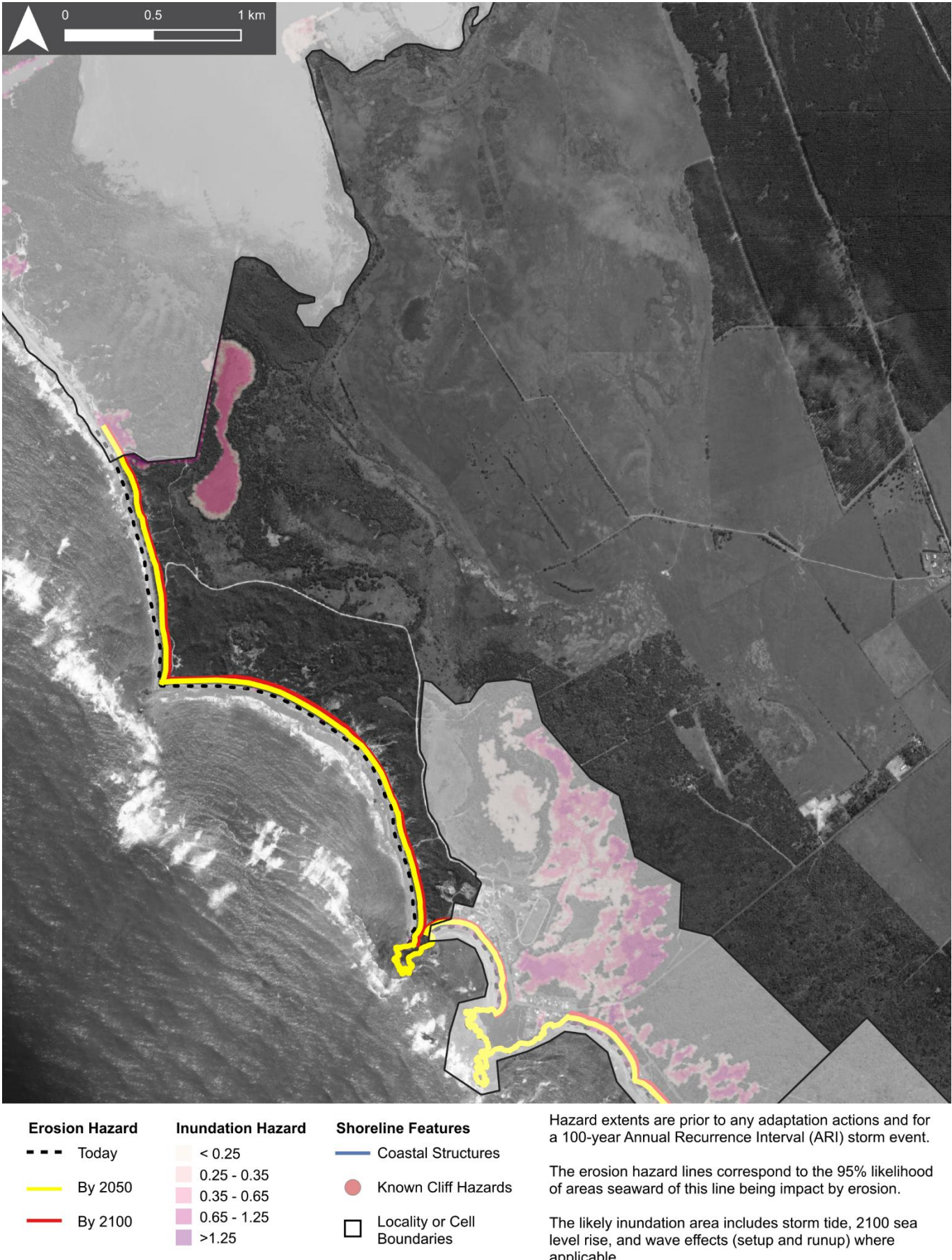
- Is a decision making process
- Is made up of a sequence of steps or decision points over time
- Uses thresholds and triggers for when new decisions need to be made
- Is forward looking
- Recognises the changing nature of climate change impacts
- Aims to ensure the most effective tools are being used at the most effective time.
- Can change over time

In this adaptation strategy, each town has been separated into adaptation areas. These areas should not be considered to be isolated regions, they are simply areas for the purposes of communication, planning and implementation; the boundaries are artificial and for convenience.

3 CARPENTER ROCKS



3.1 Area 1



Assets at risk

The assets at risk in this area are principally natural public amenity assets such as the rugged ocean exposed coastline, which is characterised by sand beaches, dunes and rocky cliffs. Some inland areas have been identified as being exposed to inundation hazards.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
White Bridge Track	Transport	Low	Low	Medium*	Medium*	3.1, 3.3, 3.5, 3.6
Cape Banks Lighthouse Road (along coast)	Transport	Significant*	Low	High*	Low	3.1, 3.3, 3.5, 3.6
Cape Banks Lighthouse Campground	Public Amenity	Low	Low	Significant	Low	3.1, 3.3, 3.5, 3.6
Cape Banks Lighthouse	Navigation	Medium	Low	Significant	Low	3.1, 3.3, 3.5, 3.6
Coastal Reserve	Environmental	High	Low	High	Significant*	3.1, 3.2, 3.3, 3.4, 3.5

* Some assets within this category have a lower risk rating

Adaptation Actions

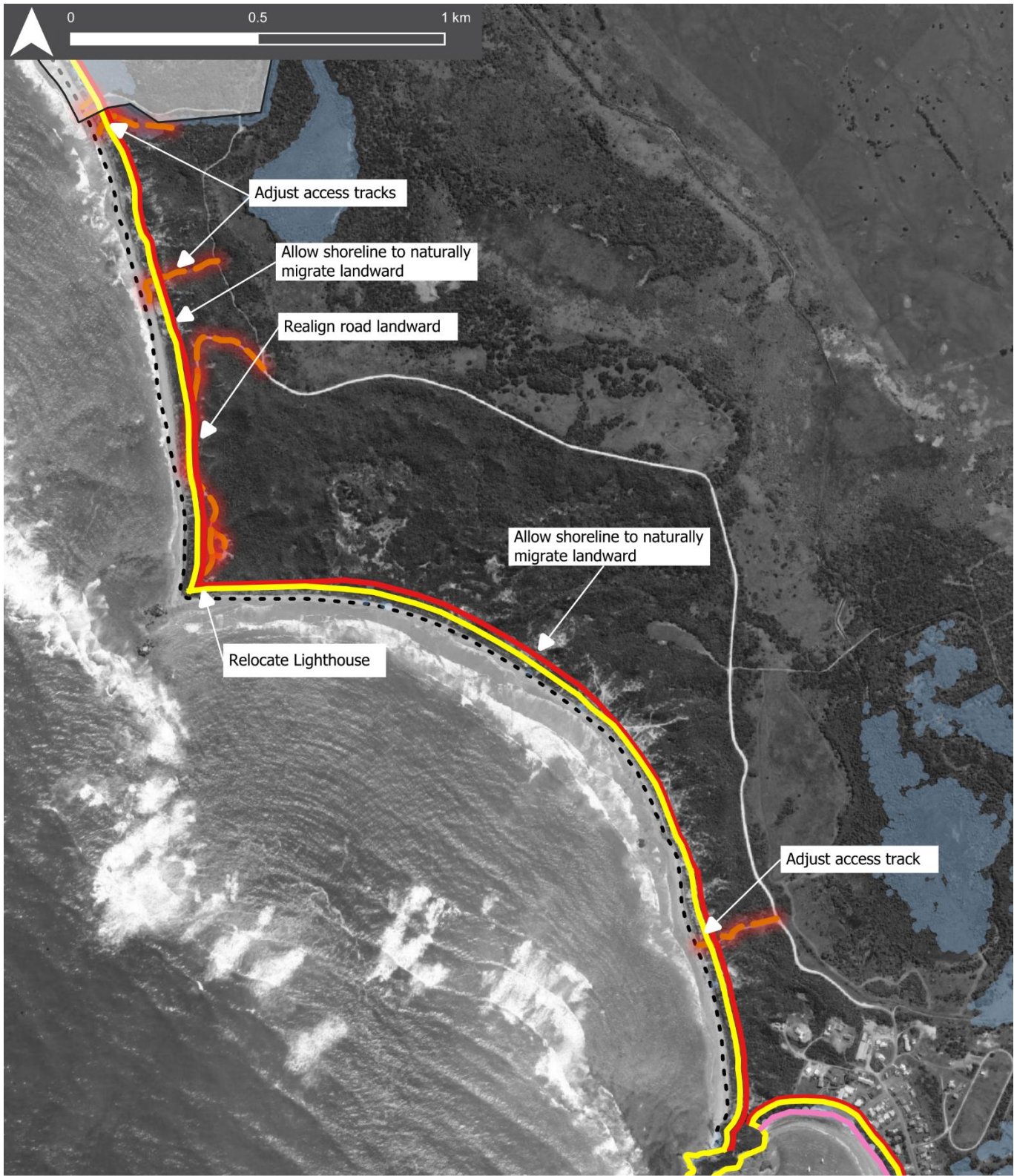
The principal adaptation approach is non-intervention with some isolated accommodate actions.

ID	ADAPTATION ACTIONS	SHORT TERM (NOW) 0 – 0.5 m	MID TERM (By 2050) 0.5 m	LONG TERM (By 2100) 1.0 m
3.1	Accept risk and allow coastal processes (erosion and inundation) to occur along coastline.			
3.2	Minimise dune/foreshore disturbance and maintain vegetation.			
3.3	Develop a beach access management plan. Remove unnecessary access, realign beach access and inspect / repair access as required (e.g., when erosion edge <5 m).			
3.4	Avoid construction of assets within hazard zones.			
3.5	Monitor progression of erosion.			
3.6	Relocate asset when erosion is within 5 m of the asset.			

 Trigger point for action
  Decision Point
  Duration of action
  Unconfirmed (Possible) Pathway

Why adopt these actions?

- This area is relatively remote, rugged and natural landscape. The absence of assets of substantial value warrants, over the adaptation planning horizon, allowing coastal processes to occur with only minor interventions for public safety.
- Relocation of some parts of White Bridge Track, Cape Banks Lighthouse Road and the Cape Banks Lighthouse Campground as coastal erosion approaches these assets, was identified as being the preferred options to accommodate coastal processes in this area.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

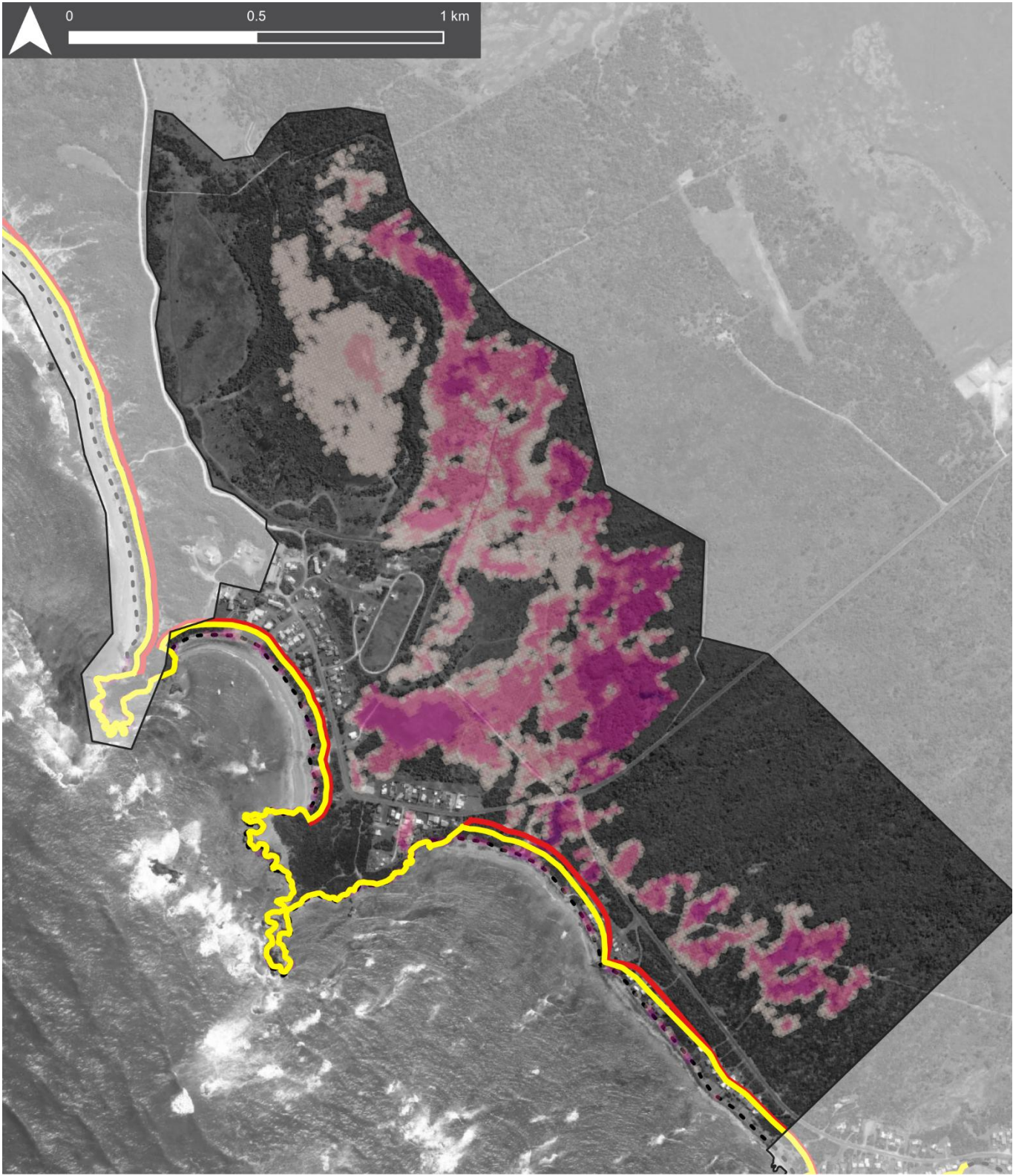
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

3.2 Area 2



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- < 0.25
- 0.25 - 0.35
- 0.35 - 0.65
- 0.65 - 1.25
- >1.25

Shoreline Features

- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, 2100 sea level rise, and wave effects (setup and runup) where applicable.

Assets at risk

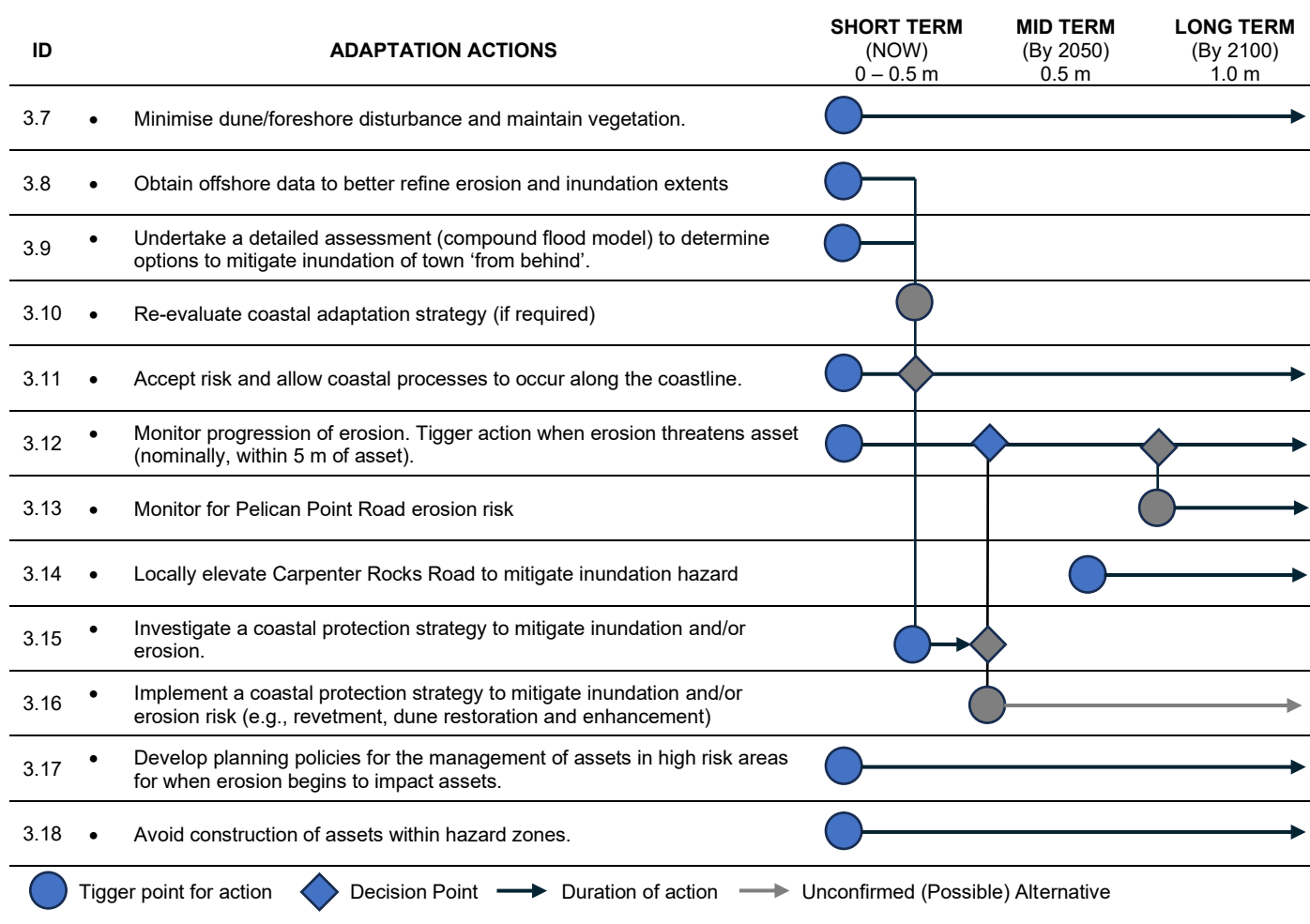
Shoreline erosion and temporary inundation hazards impact several public assets this area. The greatest erosion is predicted to occur along sections of coastline where the underlying sediments are soft, although some rocky coast erosion is also expected. Inundation in this area predominantly originates from over wash that is expected to occur in several locations. These over wash flows then travel overland to areas of lower elevation. Inundation pathways were identified at Hercules Street, near the intersection of Carpenter Rocks Road and Pelican Point Road, and around the private properties on the southern side of Carpenter Rocks Road (near The Rocks Tavern).

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Pelican Point Road	Transport	Low	Low	Medium	Medium	3.7, 3.12, 3.13
Carpenter Rocks Conservation Park	Environment	Low	High*	Low	High*	3.7, 3.8, 3.9, 3.12
Lake Bonney Outlet Bridge	Public Amenity	Low	Significant	Low	High	3.7
Tanderra Way	Transport	Medium	Low	Significant	Significant*	3.7, 3.8, 3.9, 3.18
Gerloff Ct	Transport	Medium	Low	Significant	Medium*	3.7, 3.8, 3.9, 3.18
Carpenter Rocks Rd	Transport	Low	Low	Medium	Medium	3.14
Community Area & Hall	Public Amenity	Low	Low	Medium	Medium	3.10, 3.11, 3.14
Bucks Lake	Environment	Low	Medium	Low	Significant	3.10, 3.11, 3.14
Hercules Street	Transport	Medium	Low	High	Medium	3.12, 3.15, 3.16, 3.17
Public facilities and parking lot (Hercules Street)	Public Amenity	High	Low	High	Medium	3.12, 3.15, 3.16, 3.17
Carpenter Rocks Memorial	Cultural Heritage	High	Low	High	Medium	3.12, 3.15, 3.16, 3.17

* Some assets within this category have a lower risk rating

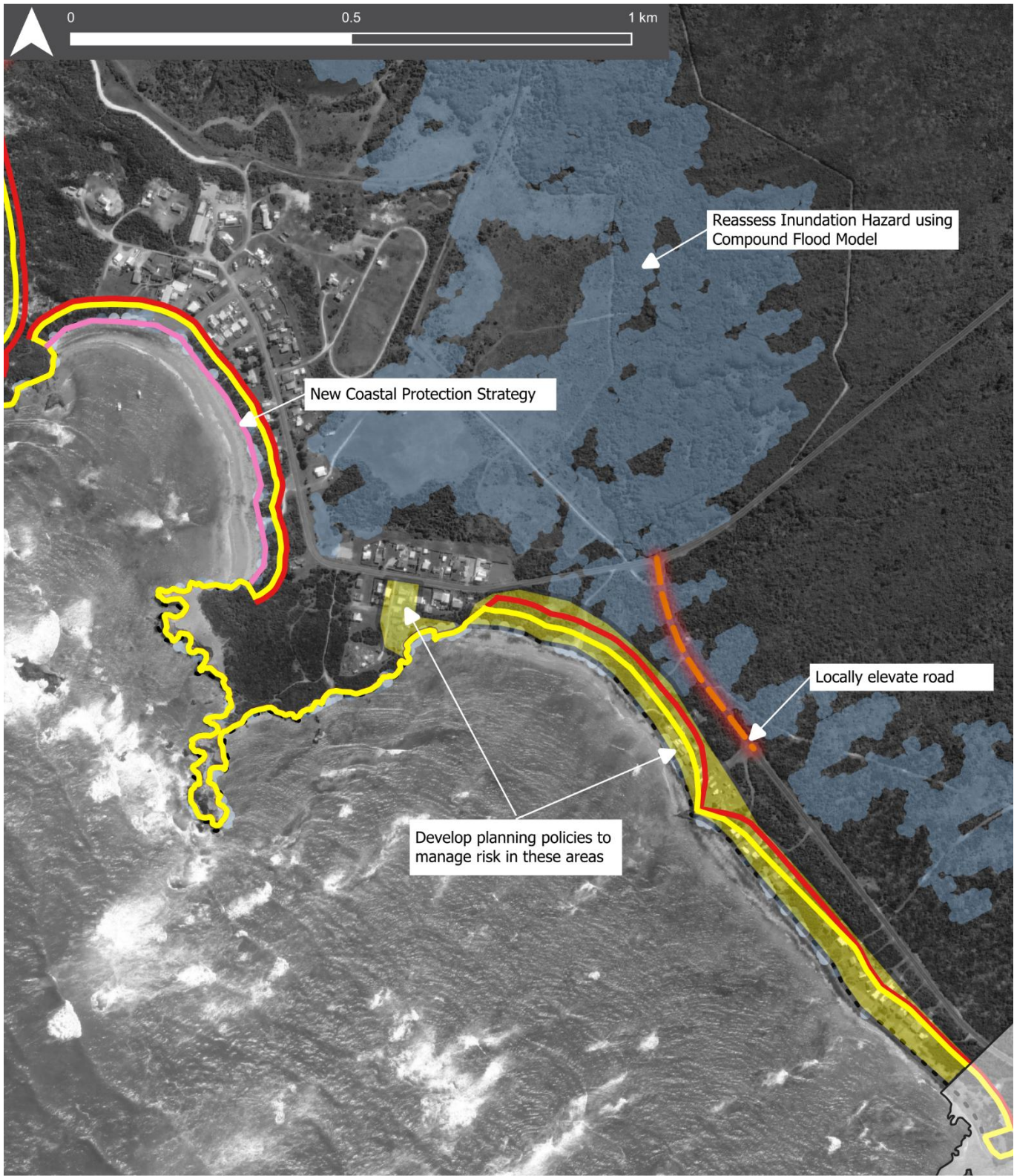
Adaptation Actions

Several adaptation actions have been identified to address the risks identified in this area. These include a combination of non-intervention and accommodate, retreat and protect.



Why adopt these actions?

- Central to town, the presence of rocky coastal features enable a coastal protection strategy to be implemented to limit migration of the shoreline landward between these features without causing substantial end effects.
- Shoreline erosion to the south of the town is expected to impact some public assets in the long term. Monitoring the progress of erosion is deemed the most appropriate action to better understand the rate of shoreline erosion. During this time, planning policies should be prepared to determine how impacted private assets will be managed and to prepare for the relocation of some public assets.
- Some temporary inundation of this area originates from overland flow from the south of the town. This hazard can be reduced by elevating Carpenter Rocks Road to protect public assets in town. Private assets on the seaward side of this road would be unprotected and planning policies should be developed to manage the impacts of this hazard.
- There remains uncertainty about the rate of shoreline recession due to the presence of offshore reef structures and poor bathymetry data in this area. This requires further investigation and may require re-evaluation of the coastal hazards.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

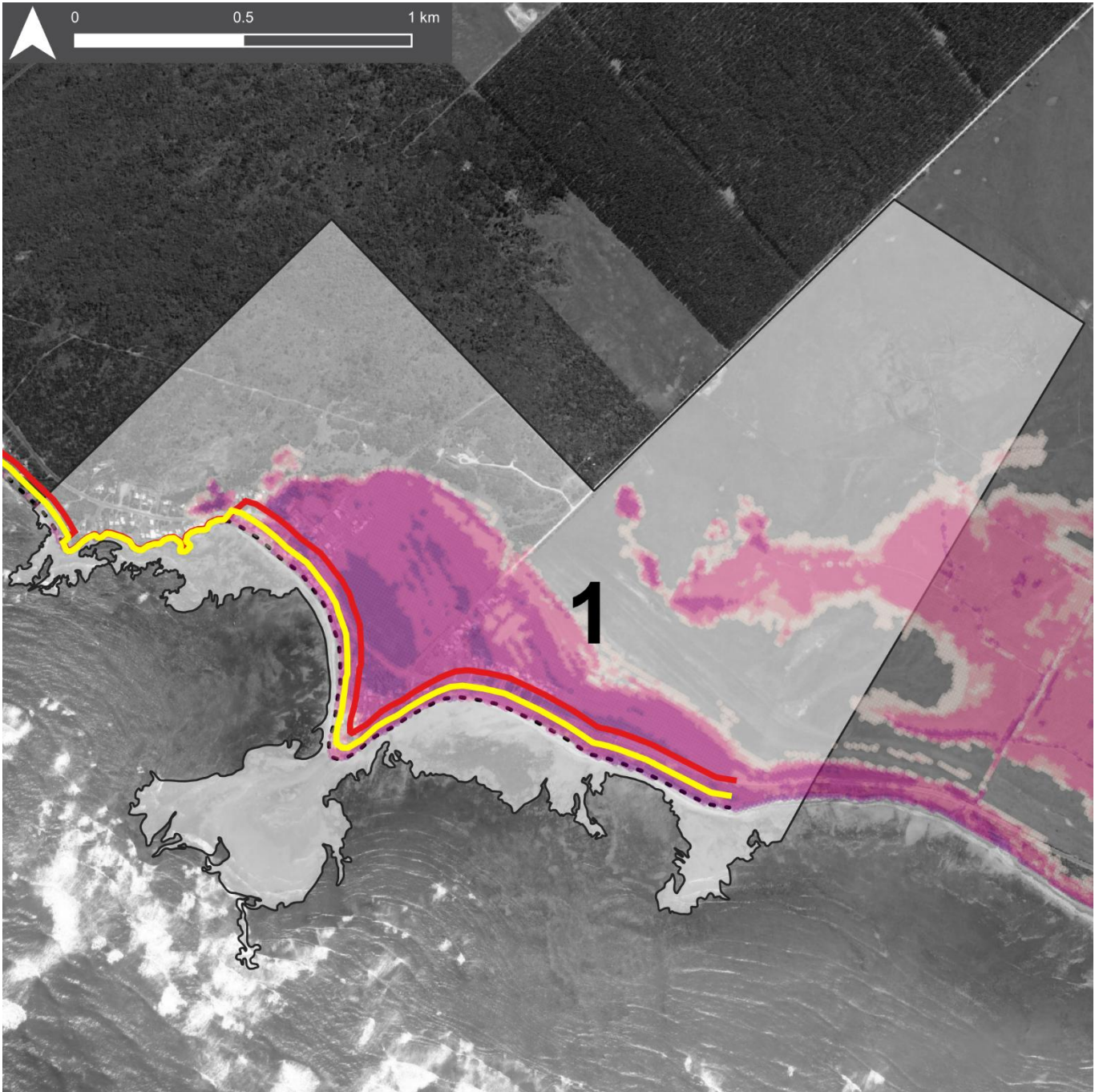
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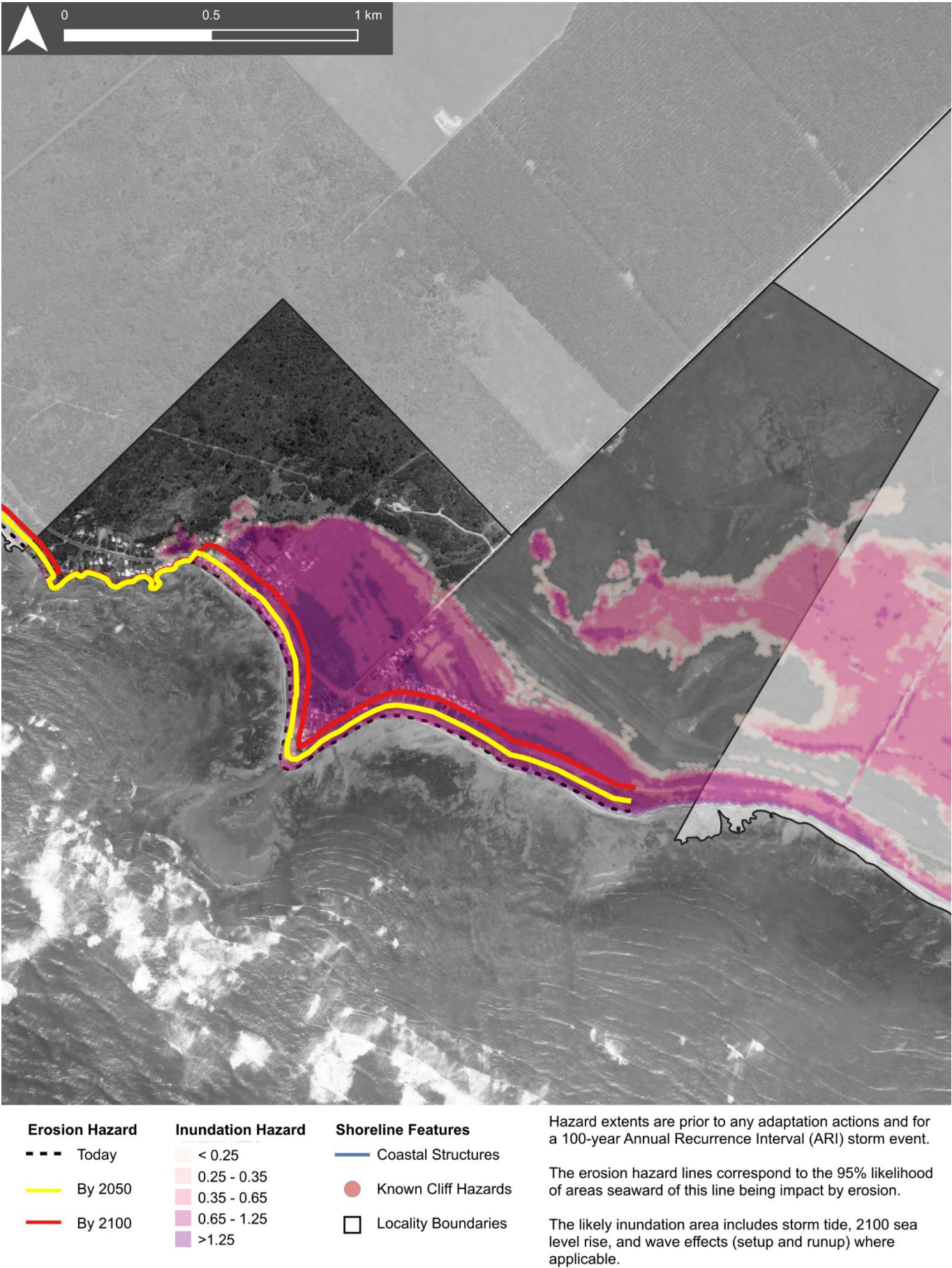
The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runoff) where applicable.

4 PELICAN POINT



4.1 Area 1



Assets at risk

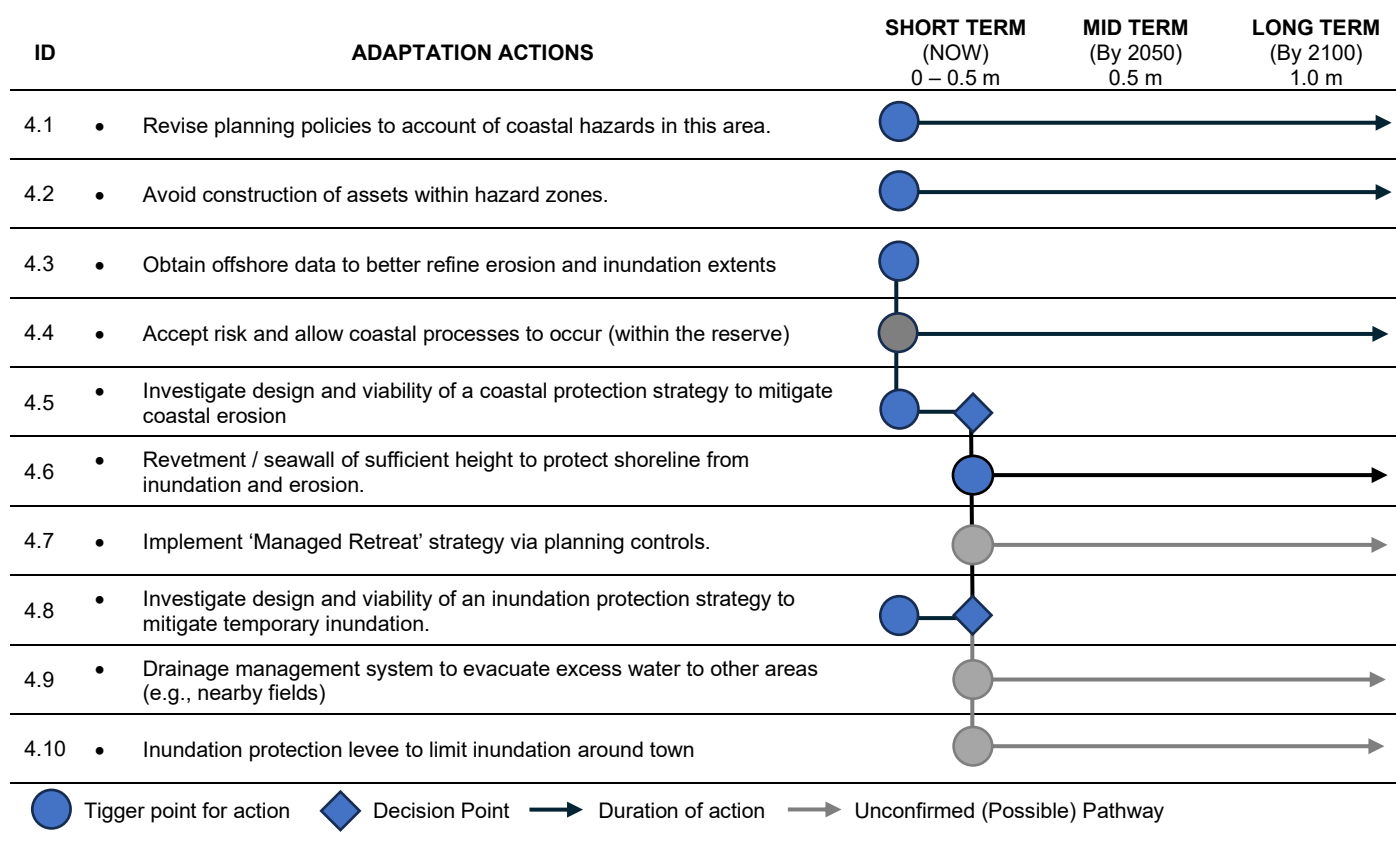
The assets at risk in this area are principally private assets and the public assets that facilitate these assets (e.g., roads, pump station). Natural public amenity assets such as the ocean exposed coastline, which is characterised by sand beaches and rocky coastal features are expected to be impacted by erosion.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Pelican Point Road	Transport	High	Significant*	High	High*	4.1 – 4.8
Newton Road	Transport	High	Medium*	High	High*	4.1 – 4.8
Racketts Road	Transport	Low	Significant*	Low	High*	4.1 – 4.8
Shellsea Ct.	Transport	Low	Significant*	Significant	High	4.1 – 4.8
Boat Launch Area	Infrastructure	High	Medium	High	Significant	4.1 – 4.8
Wastewater Treatment Pump (CWMS) near boat launch	Infrastructure	High	Significant	High	High	4.1 – 4.8

* Some assets within this category have a lower risk rating

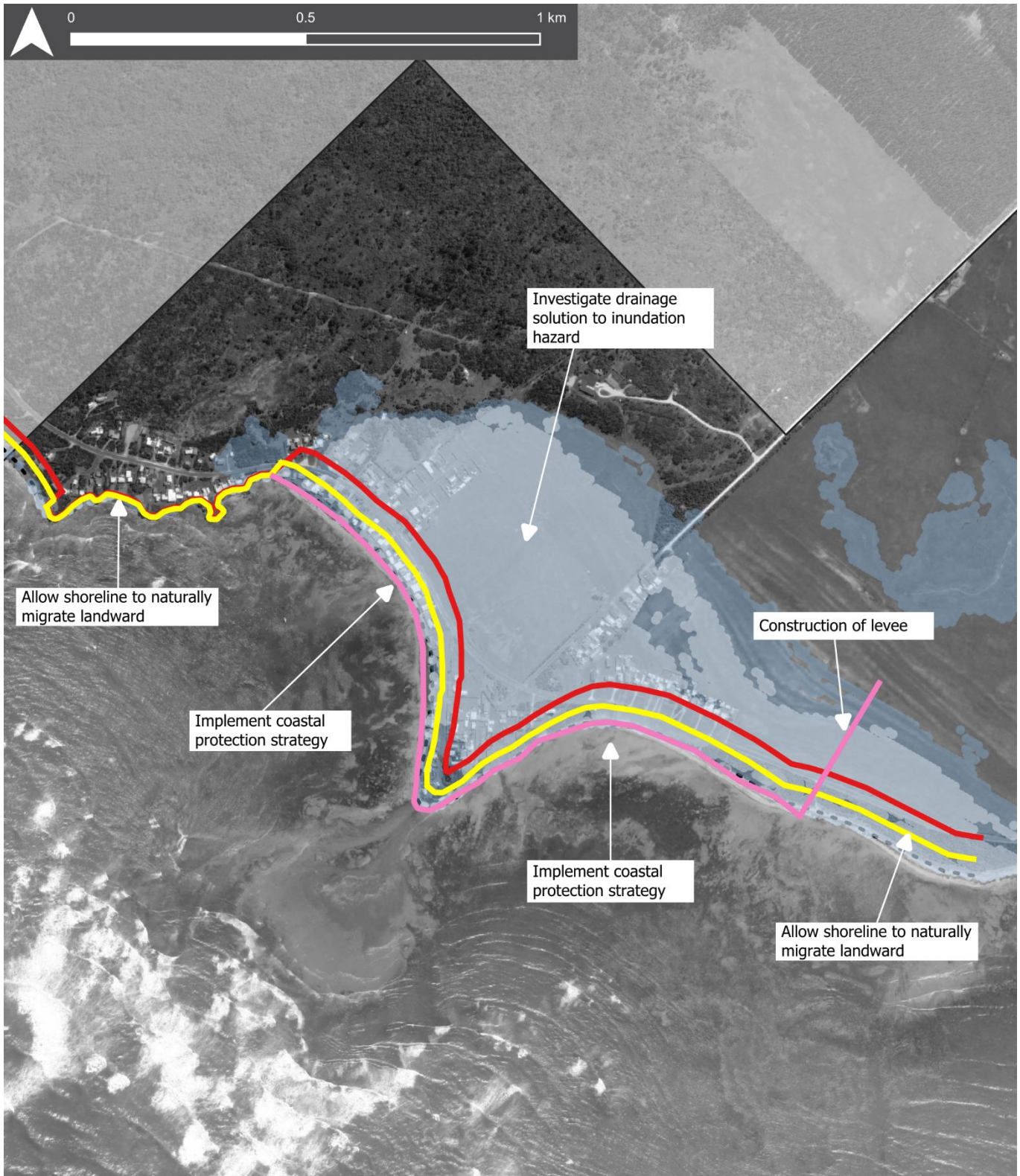
Adaptation Actions

The principal adaptation approach is based on an intervention approach with active strategies to defend assets from both erosion and inundation.



Why adopt these actions?

- Pelican Point is very exposed to both inundation and erosion hazards. The town's low elevation makes it highly vulnerable to inundation during storm events, which is likely to cause damage to both public and private assets.
- The relatively low elevation of the surrounding areas provides pathways for inundation flows to impact the town and/or isolate the town during emergencies. This increases the town's vulnerability during emergencies.
- An assessment of the viability of a protect strategy is required given the extent of protection and inundation management works that may be required. However, previously a seawall was investigated and a design prepared.
- There remains uncertainty about the rate of shoreline recession due to the presence of offshore reef structures and poor bathymetry data in this area. This requires further investigation and may require re-evaluation of the coastal hazards.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

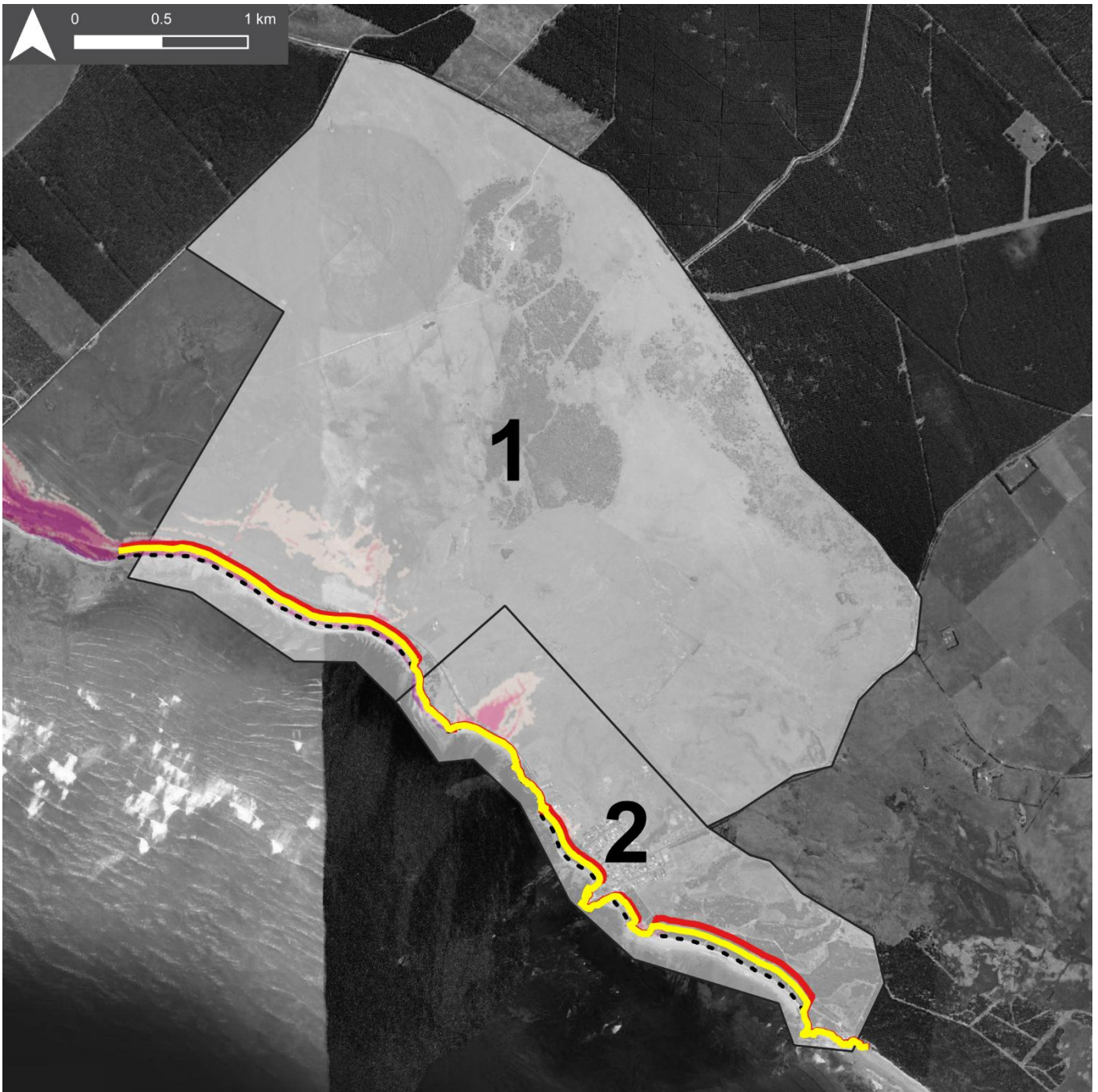
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

5 BLACKFELLOWS CAVES



5.1 Area 1



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- < 0.25
- 0.25 - 0.35
- 0.35 - 0.65
- 0.65 - 1.25
- >1.25

Shoreline Features

- Coastal Structures
- Known Cliff Hazards
- Locality Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, 2100 sea level rise, and wave effects (setup and runup) where applicable.

Assets at risk

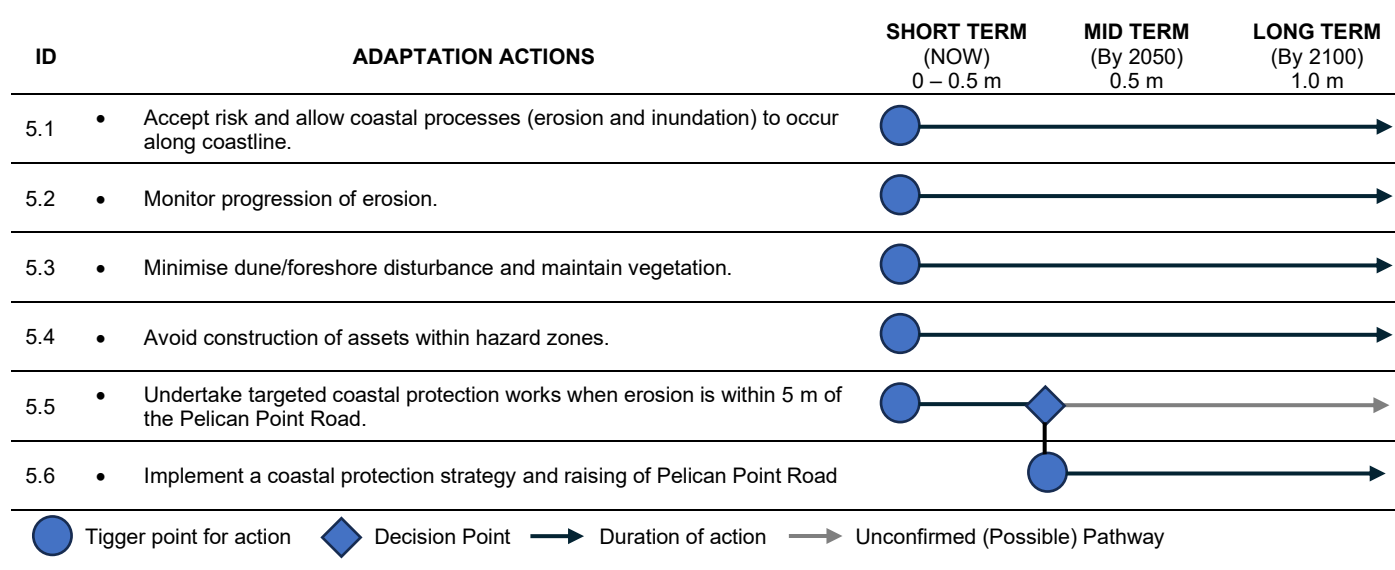
The assets at risk in this area are principally natural public amenity assets and transport infrastructure (Pelican Point Road). These assets are at high risk of erosion now and into the future. The low elevation of this area facilitates shoreline inundation, which places public assets at medium to significant inundation risk over the assessment horizon. Inundation is also expected to occur landward of Pelican Point Road, facilitated by drains that have been installed in this area.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Pelican Point Road	Transport	High*	Medium	High	Significant	5.2, 5.3, 5.5-5.6
Beach Access Paths	Amenity	High	Medium*	High	Significant*	5.1-5.4
Coastal Crown Land and foreshore vegetation	Environmental	High	Medium*	High	Significant*	5.1-5.4

* Some assets within this category have a lower risk rating

Adaptation Actions

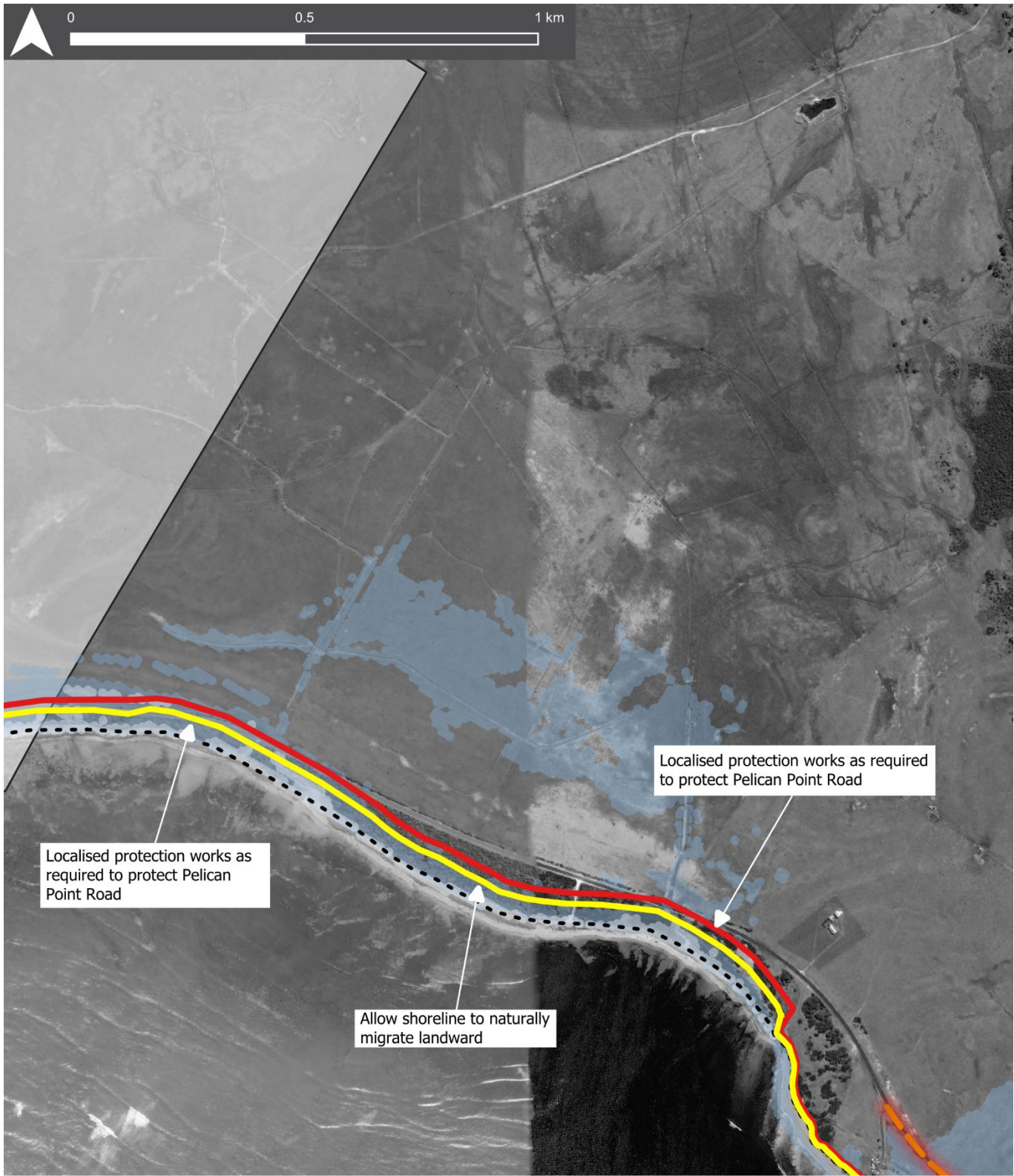
There are several adaptation options that could be considered in this area but these require further assessment to determine the viability and cost of these options. Whilst these options are further investigated, the proposed action is to accept the risk of erosion in the Coastal Foreshore Reserve and to undertake temporary protection works as required.



Why adopt these actions?

- The elevation of this area is low and the assets in this area are highly exposed to shoreline recession and inundation during storm events. Given the key public asset in this area is Pelican Point Road, further investigation is required to determine the future of this asset relative to other options that could be considered.

- The options analysis undertaken in this assessment suggests that closing or relocating the road in the future is the preferred option. However, we note that the viability of this option relative to local protection of the road may require further examination depending on the rate of erosion observed. At this time, protection of the road is the adopted pathway.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

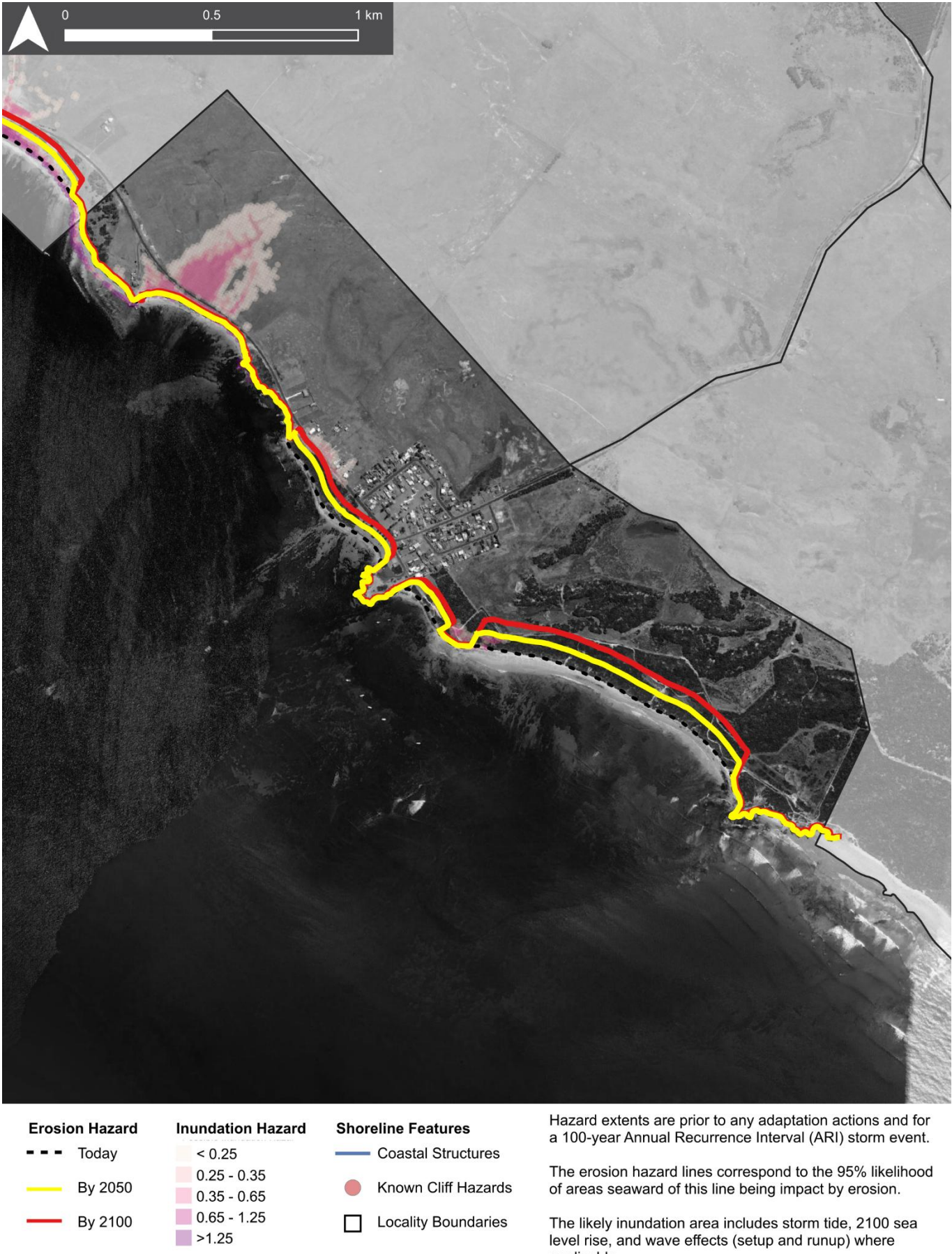
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

5.2 Area 2



Assets at risk

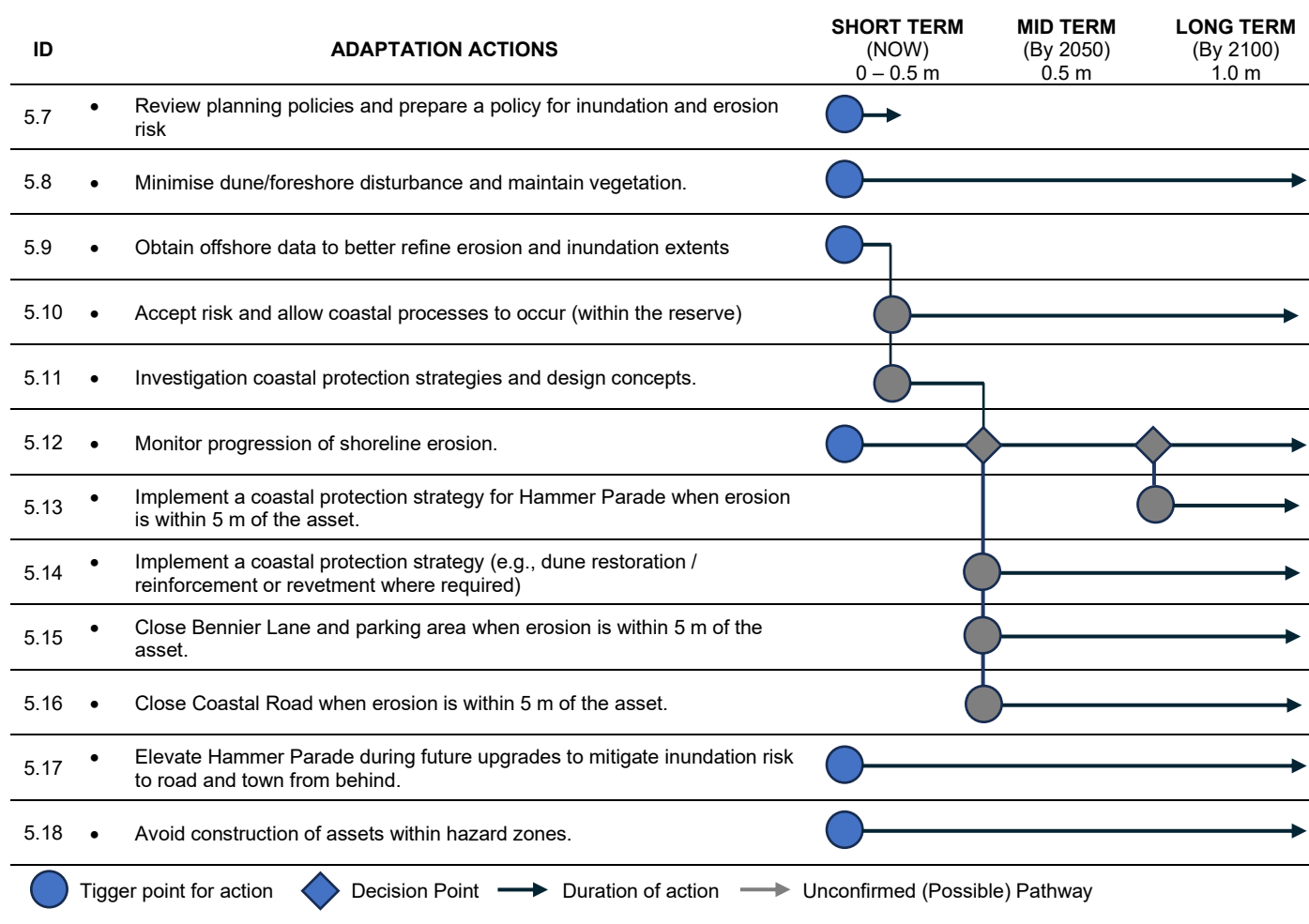
The public assets at risk in this area consists mostly of transport infrastructure. Some coastal erosion is expected to impact the coastal reserve and/or some sections of transport infrastructure. In addition, temporary inundation is expected to impact key transport infrastructure by 2100, which may require modification to these assets or other inundation management strategies to be considered.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Coastal Road	Transport	High*	Low	High*	Medium*	5.9, 5.12
Blackfellows Caves Boat Ramp	Public Facilities	Low	Low	Low	Low	5.7
Public Toilet	Public Facilities	Low	Low	Low	Low	5.7
Playground/Park	Public Facilities	Low	Low	Medium	Medium	5.7
Bennier Lane and parking area	Public Facilities	High	Low	High	Medium	5.9, 5.11
Saunders Rd.	Transport	Low*	Low	Medium*	Low	5.9, 5.10, 5.13
Livingston Street	Transport		Low		Low	5.13
Hammer Pde.	Transport	High*	Medium*	High*	Significant*	5.9, 5.10, 5.13
Jackway Street	Transport		Low		Low	5.13
Unger Street	Transport		Low		Low	5.13
Pelican Point Road.	Transport		Low		Low	5.7
Coastal Crown Land and foreshore vegetation	Environmental	High	Low	High	Medium*	5.7-5.9
Blackfellows CFS	Public Infrastructure		Low		Low	5.7
Blackfellows Caves Road	Transport		Low		Low	5.7

* Some assets within this category have a lower risk rating

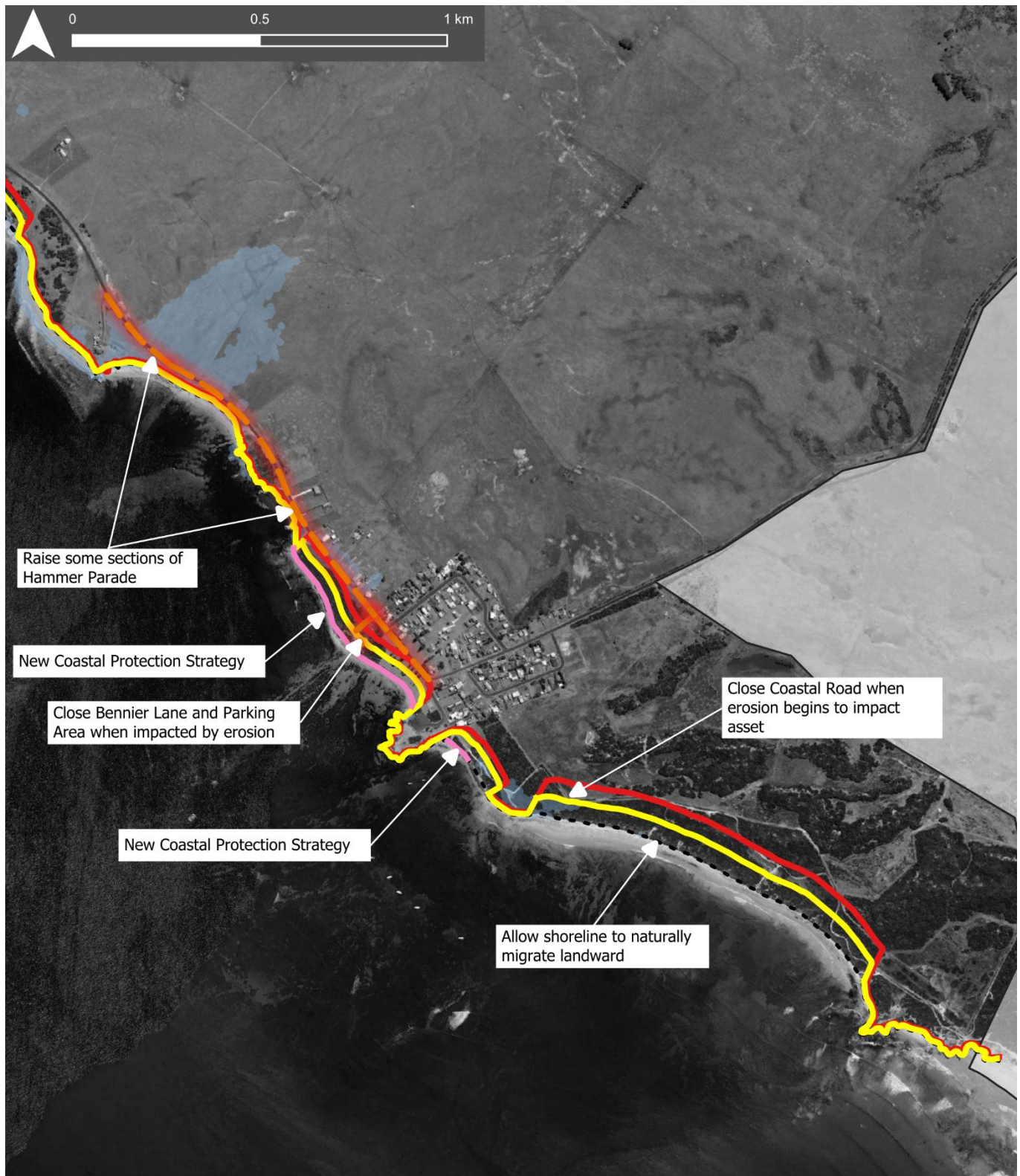
Adaptation Actions

The principal adaptation approach is to protect these assets and to avoid construction of new assets in the hazard zones.



Why adopt these actions?

- There remains uncertainty about the rate of shoreline recession due to the presence of offshore reef structures and poor bathymetry data in this area. This requires further investigation and may require re-evaluation of the coastal hazards.
- Erosion along the shoreline in this area is expected to initially occur within the coastal reserve, however as time progresses this erosion is expected to impact key transport assets. Given the time taken for these impacts to be realised, monitoring the erosion progression is proposed until this erosion extent begins to threaten public assets. When this erosion begins to impact these assets, retreat options and protect options are proposed (depending on the location of the asset).
- Inundation in this area impacts Hammer Parade. To mitigate this hazard, it is proposed to elevate Hammer Parade during regular maintenance activities, which will protect the road access as well as limit inundation into town 'from behind'.

**Erosion Hazard**

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

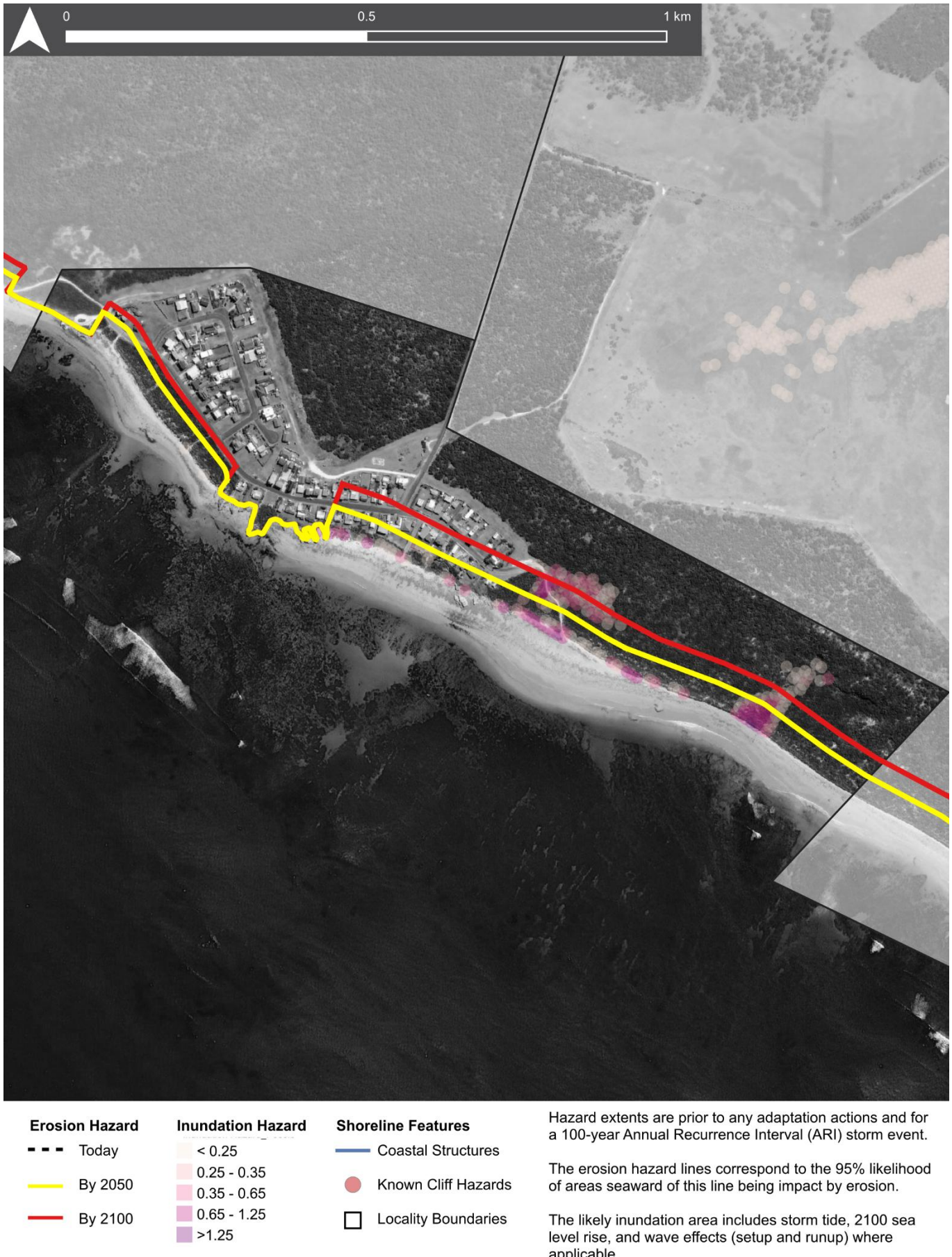
The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

6 NENE VALLEY



6.1 Area 1



Assets at risk

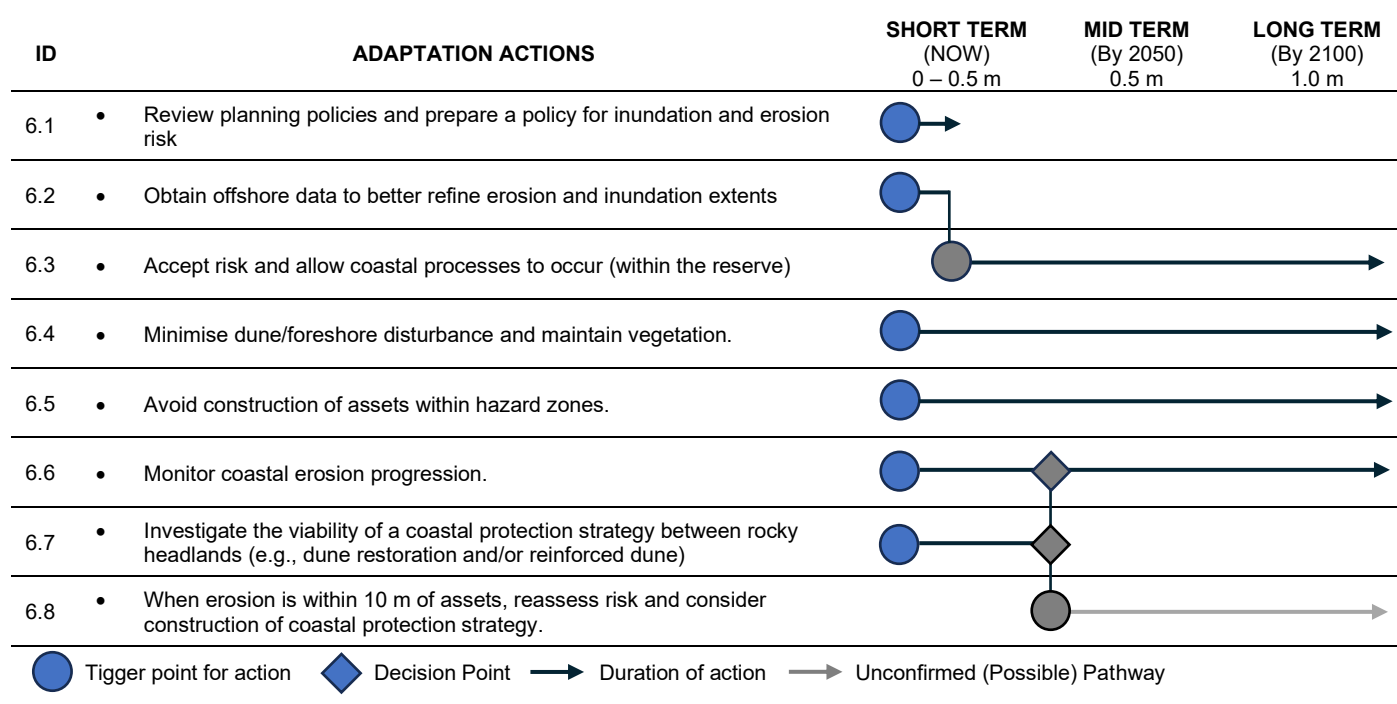
The majority of assets at risk in this area are exposed to erosion due to recession of the shoreline between rocky headland features. Areas in the south east of town are expected to be impacted by temporary inundation during storm events by around 2100.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Glynn Drive	Transport	High	Low	High	Low	6.1-6.7
Lila Crescent	Transport	Significant*	Low	Significant*	Low	6.1-6.7
Neville Avenue	Transport	Significant	Low	High	Low	6.1-6.7
Ashby Drive	Transport	Significant	Low	High	Significant*	6.1-6.7
Memorial Park and Playground	Public Amenity	Low	Low	High	Low	6.1-6.7
Nene Valley Shacks Road	Transport	Low	Low	Low	Significant*	6.1-6.7
Beach Boardwalk	Public Amenity	High	Low	High	Low	6.1, 6.4
Public Toilet and Carpark	Public Amenity	Low	Low	Low	Low	6.1-6.7
Coastal Conservation Land	Environmental	High	Low	High	High*	6.1, 6.2
Fishermans Lane	Transport	Significant*	Low	High*	Low	6.1-6.7
Coastal Road	Transport	Low	Low	Low	Low	6.1-6.7

* Some assets within this category have a lower risk rating

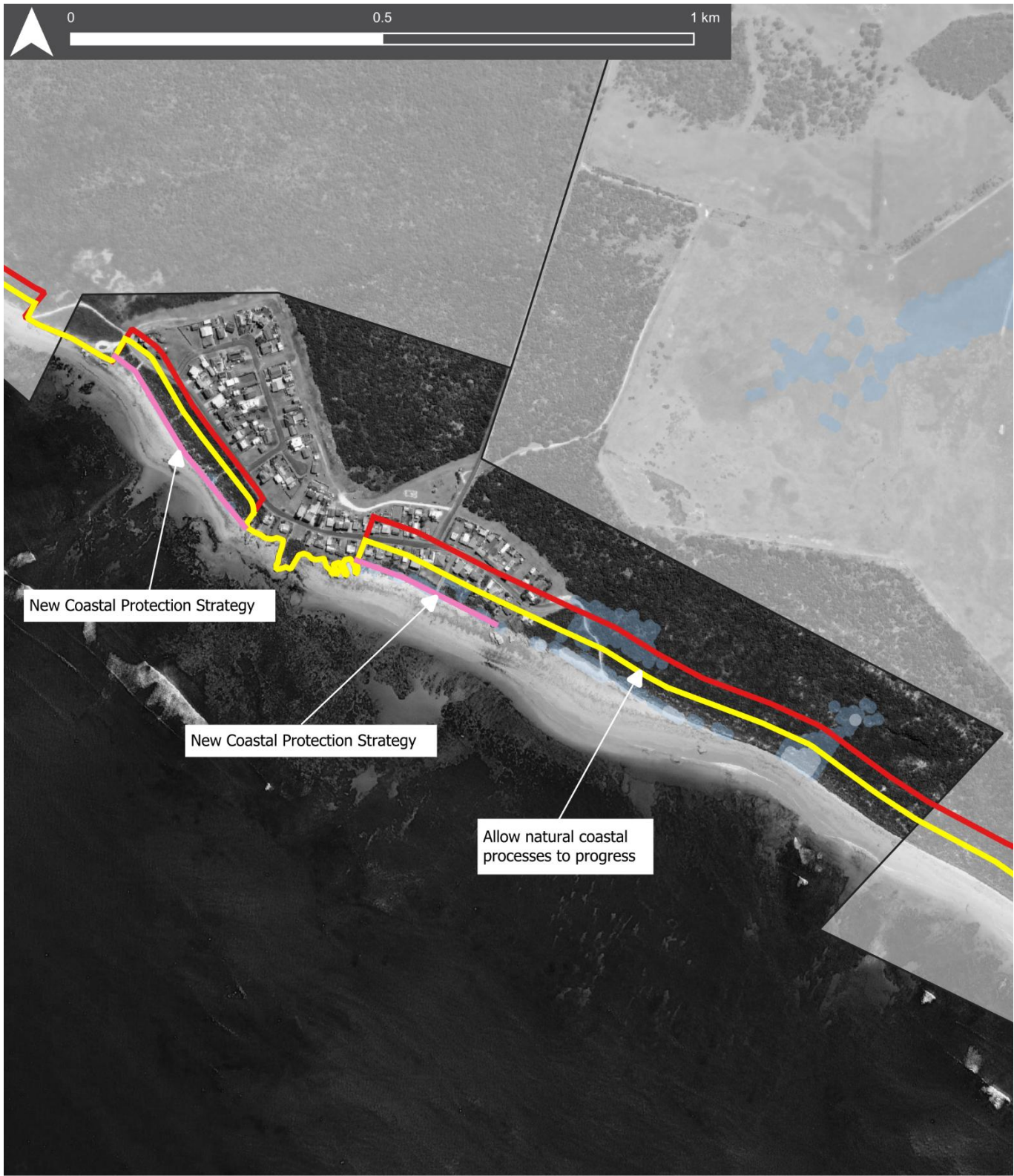
Adaptation Actions

The proposed adaptation approach is to monitor the progression of coastal erosion along this section of coastline and to actively maintain and reinforce the coastal dunes in this area where these remain. Over the short term, it is proposed to investigate the viability and possible designs of a coastal protection strategy between adjacent rocky headlands and the natural landscape to the south east.



Why adopt these actions?

- Due to the relatively small size of the town, the presence of rocky landscapes in the area as well as the substantial amount of coastal reserve nearby, erosion protection strategies are likely to be achievable and sustainable. Furthermore, there is limited / negligible inundation risk to this town.
- The presence of offshore reefs that are poorly mapped at this time may affect the actual rate of erosion observed when compared to the rate and extent predicted in this assessment. Thus it is proposed to monitor the rate of erosion and trigger protection strategy implementation when erosion approaches public assets or other defined trigger.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

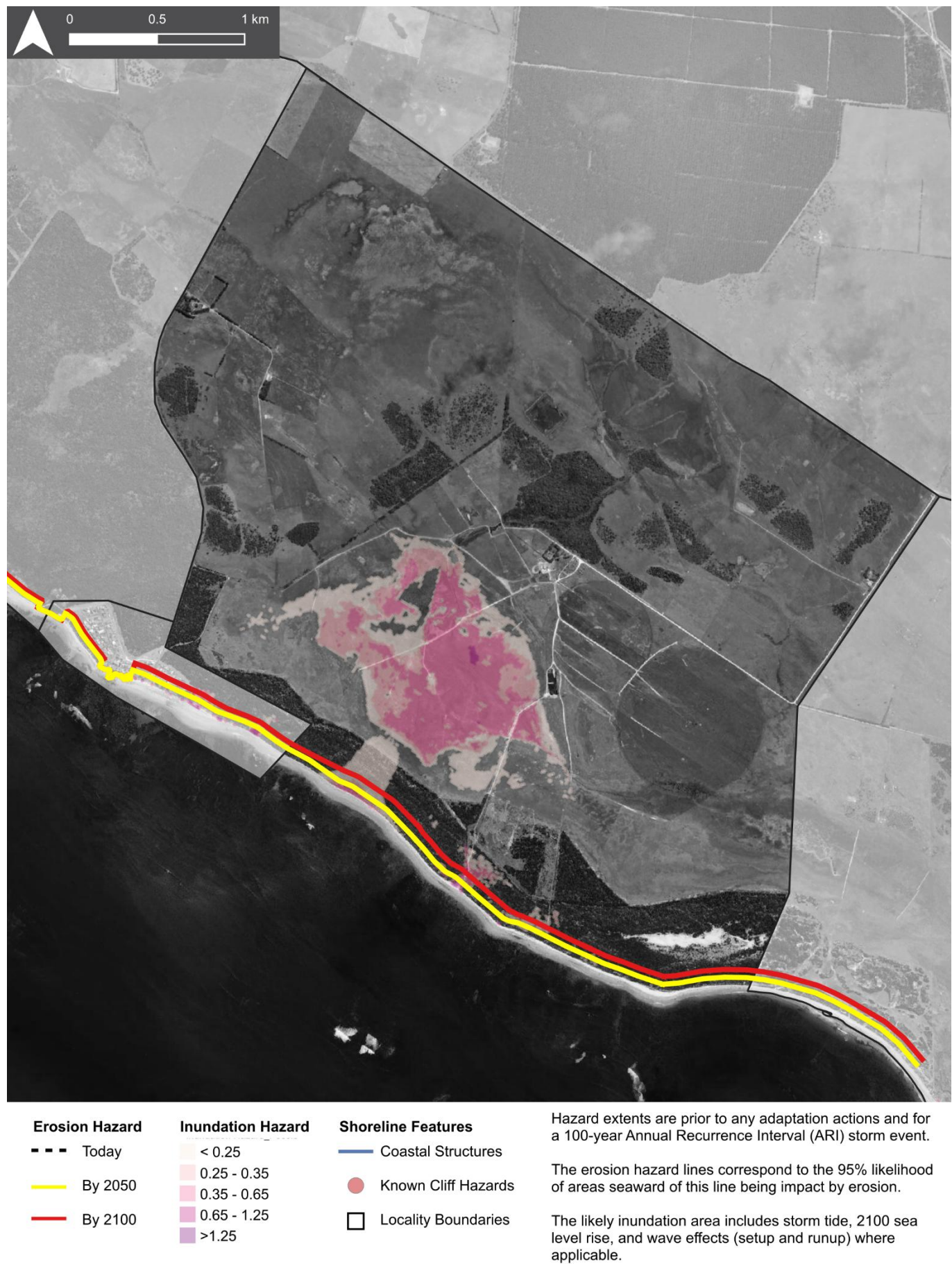
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

6.2 Area 2



Assets at risk

During large storm events, elevated water levels propagate through a depression in the landscape into the hinterland. Areas to the east are also sources of inundation to this location. Much of the shoreline in this area is relatively mobile (e.g., sandy beach) and thus susceptible to coastal erosion over the medium and long term. This erosion is located within the coastal conservation lands.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Coastal Conservation Land	Environmental	High	Medium*	High	High	6.9-6.11

* Some assets within this category have a lower risk rating

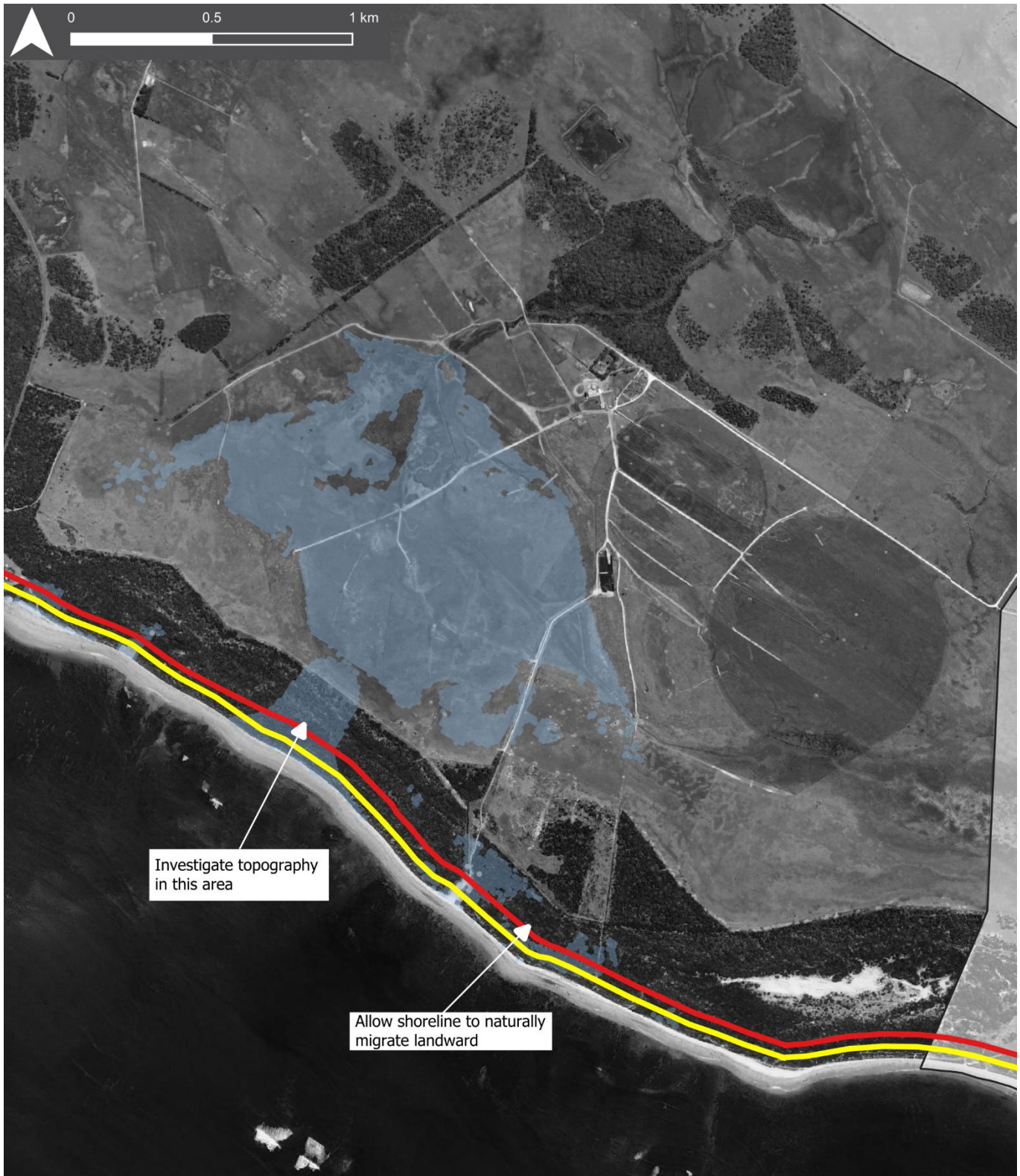
Adaptation Actions

This area consists principally of coastal reserve and adjacent livestock land with no public assets.

ID	ADAPTATION ACTIONS	SHORT TERM (NOW) 0 – 0.5 m	MID TERM (By 2050) 0.5 m	LONG TERM (By 2100) 1.0 m
6.9	Investigate topography and consider re-evaluate inundation extent.			
6.10	Accept risk and allow coastal processes to occur.			
6.11	Monitor coastal erosion progression.			

Why adopt these actions?

- The inundation extent is strongly affected by the dune topography within the coastal reserve. The existing topography data requires reassessment to determine if this topography is correct. Once the topography has been concerned, the inundation extent needs to be reevaluated during the next reassessment.
- Erosion hazards are restricted to the coastal reserve with no assets. Based on the assessment of different options, accommodating the coastal processes was considered to be a more cost-effective and environmentally appropriate response.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

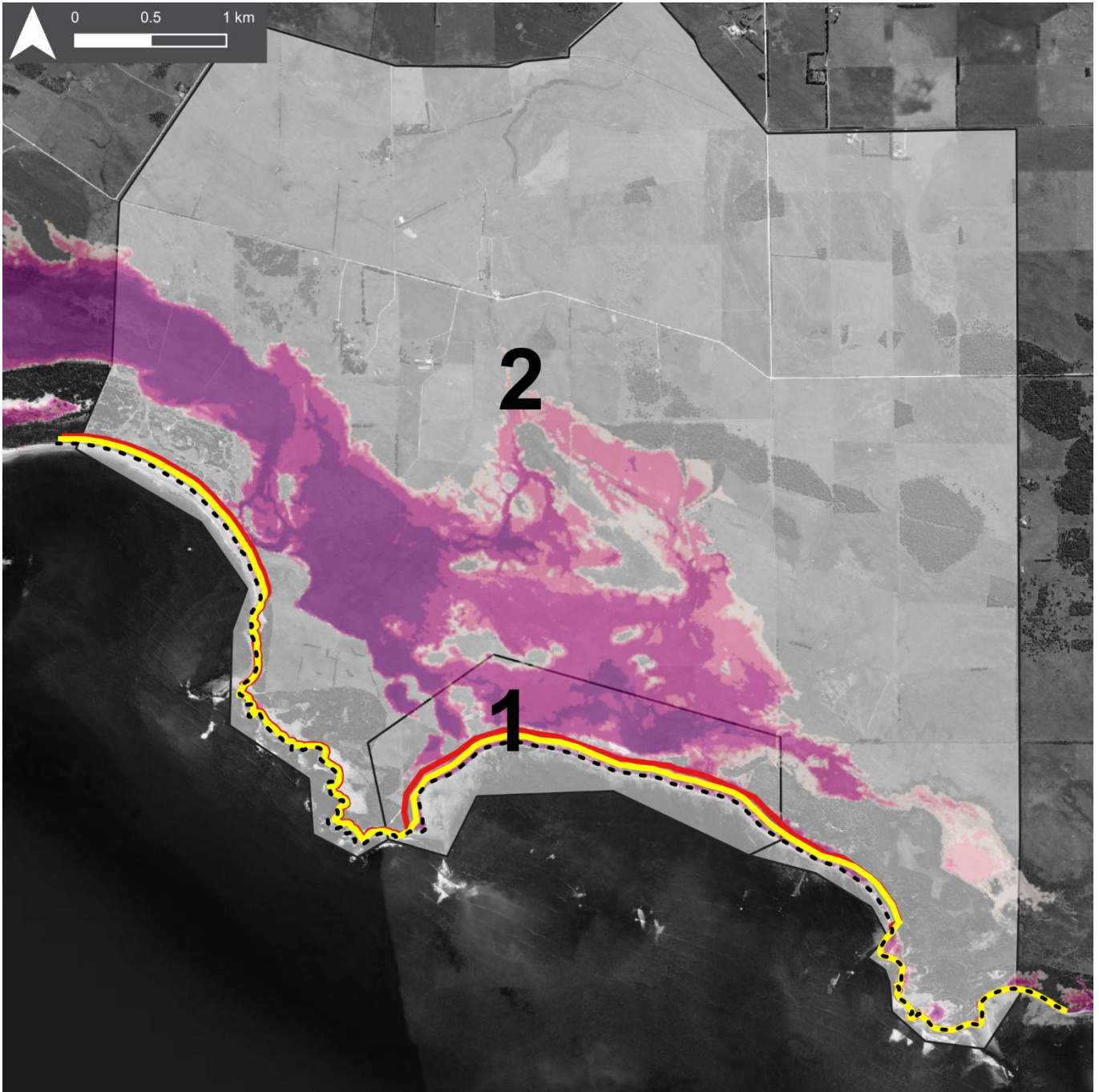
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

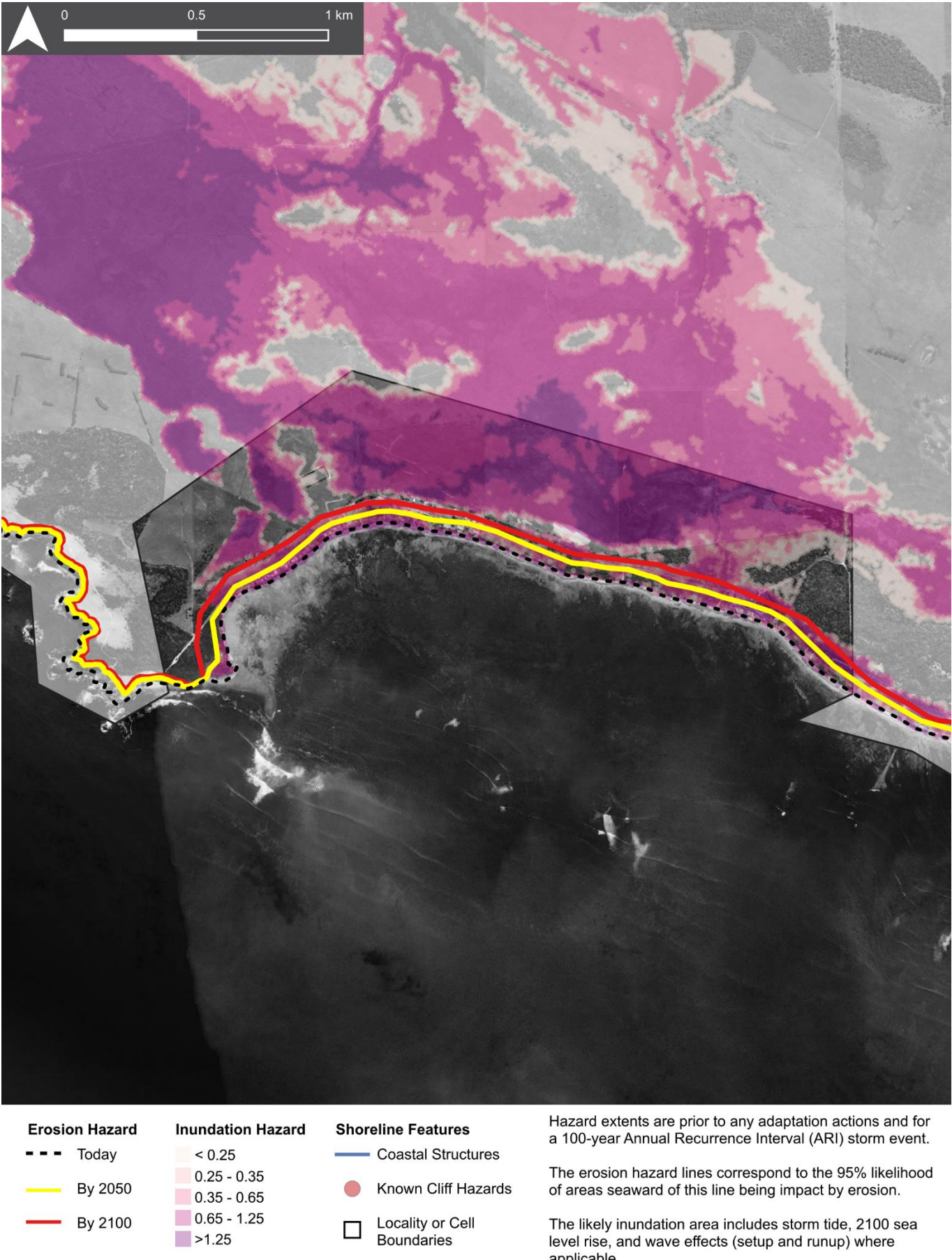
The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

7 CAPE DOUGLAS



7.1 Area 1



Assets at risk

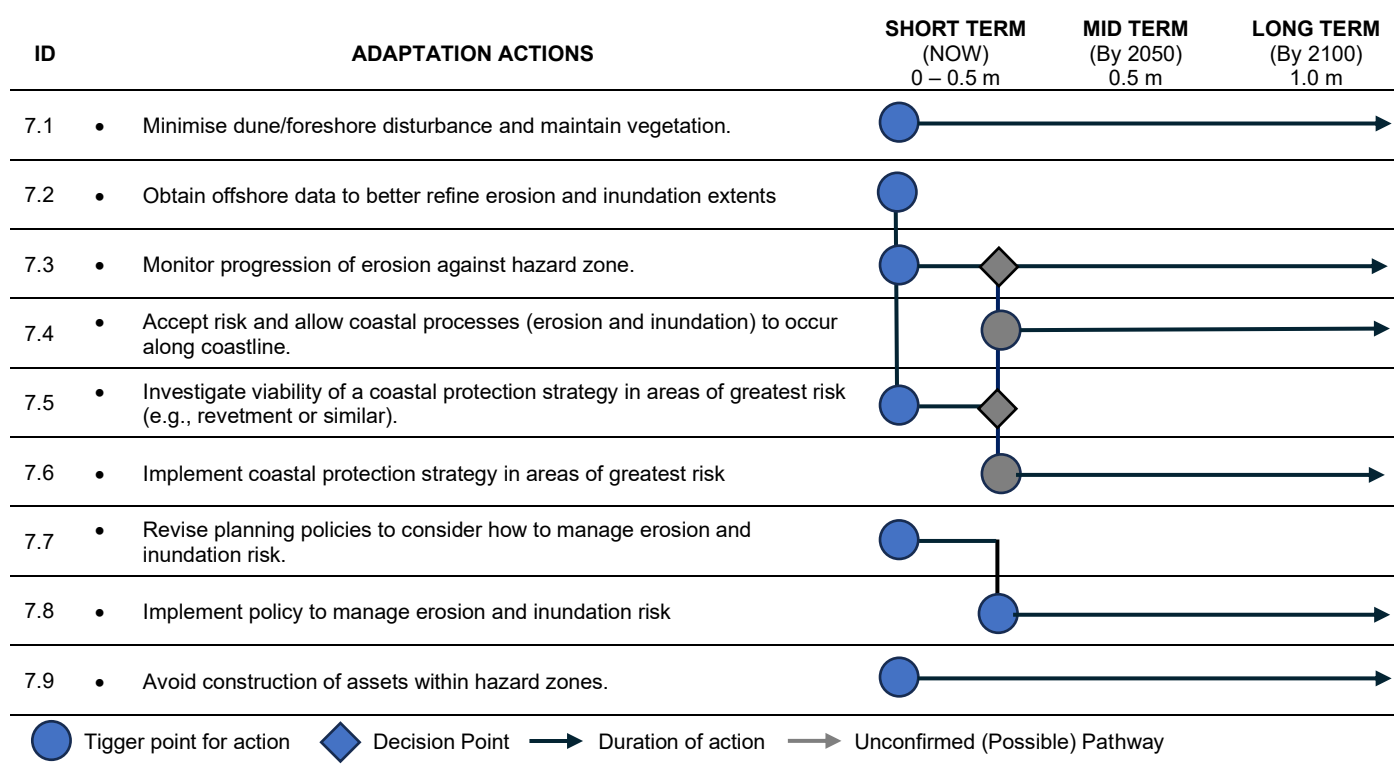
The majority of assets in this area are at risk of both erosion and inundation throughout the assessment horizon. The public assets at risk include transport and water management assets.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Cape Douglas Road	Transport	High	Significant	High	High	7.1-7.9
Coastal Conservation Land and foreshore vegetation	Environmental	High	Significant*	High	High*	7.1-7.4, 7.7-7.9
CWMS Reservoir and access road	Water	Low	Medium*	Significant	Significant*	7.1-7.3, 7.8

* Some assets within this category have a lower risk rating

Adaptation Actions

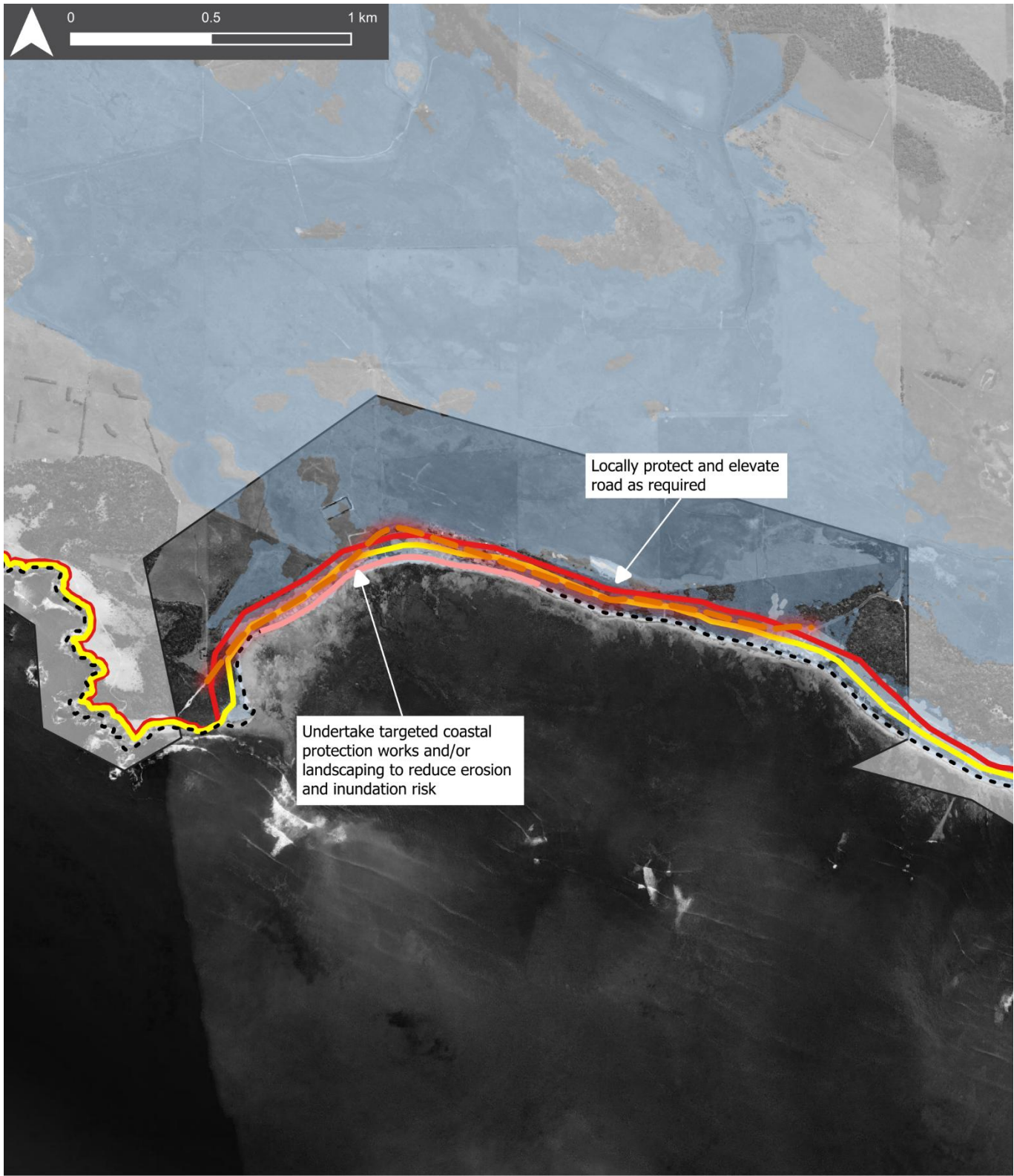
The low elevation of this area exposes much of the area to storm driven inundation throughout the assessment horizon. This inundation occurs due to increases in water level directly offshore of the area, which allows water to pass over the landscape and spread throughout the region in multiple locations. Shoreline erosion is also expected to impact much of the area over the assessment period.



Why adopt these actions?

- The low laying topography of the town results in assets being highly exposed to storm inundation over the assessment horizon. The extent of works required to protect the town from inundation is substantial as protection would need to be provided on both the sea and landsides of the town.

- The soft geology of the area means the shoreline is expected to be impacted by shoreline erosion. This erosion is expected to persist throughout the area in a manner consistent with the erosion observed to date over geological timescales.
- The rate of erosion remains uncertain due to poor bathymetric data and the presence of reef features in this area and thus the appropriate trigger for a change in approach is when erosion begins to impact assets.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

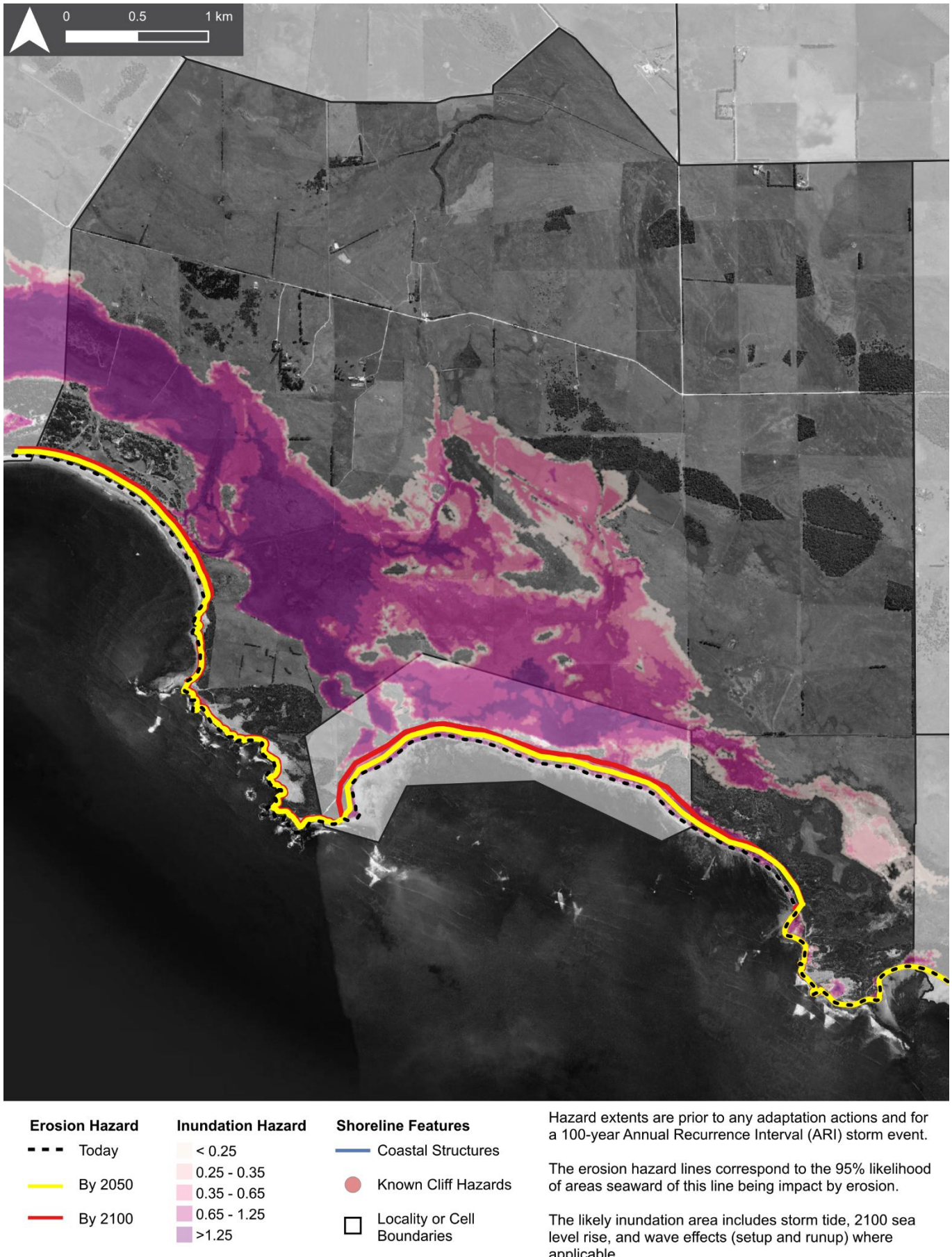
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, 2100 sea level rise, and wave effects (setup and runup) where applicable.

7.2 Area 2



Assets at risk

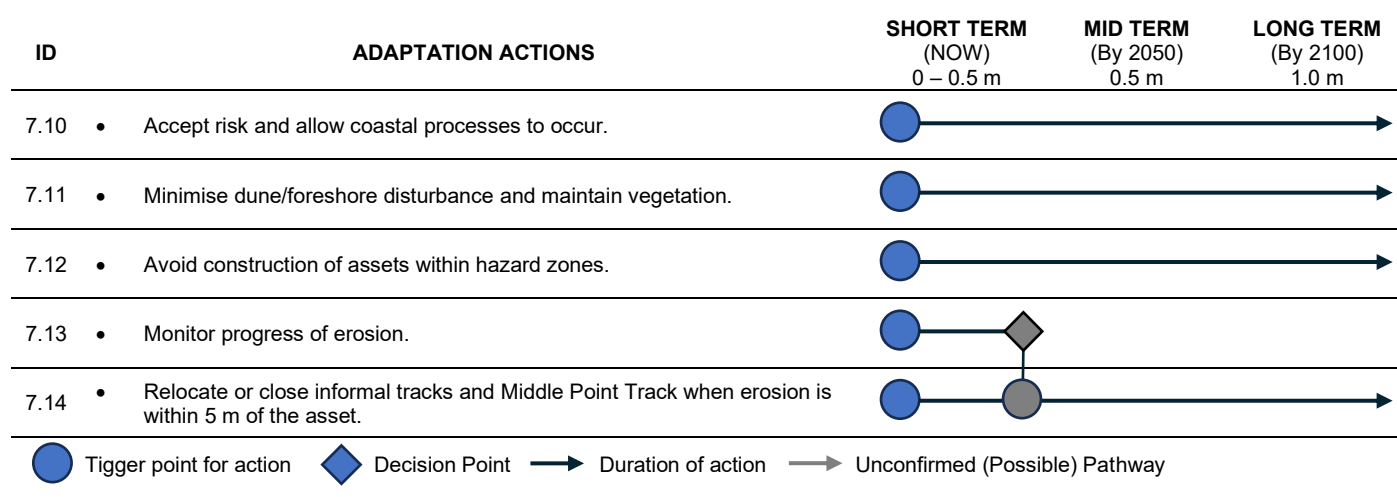
The public assets exposed to coastal hazards in this area are coastal reserve. However, these hazards also impact nearby livestock and industrial zone lands. We note that some areas particularly to the west of Cape Douglas have been identified as being at risk of inundation, however this inundation is unlikely and may be a spurious elevation data in the underlying elevation dataset.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Coastal Conservation Land and foreshore vegetation	Environmental	High*	Significant*	High*	High*	7.10-7.12
Informal coastal tracks	Transport	High*	Low	High*	Significant*	7.10-7.14
Middle Point Track	Transport	High*	Low	High*	Significant*	7.10-7.14

* Some assets within this category have a lower risk rating

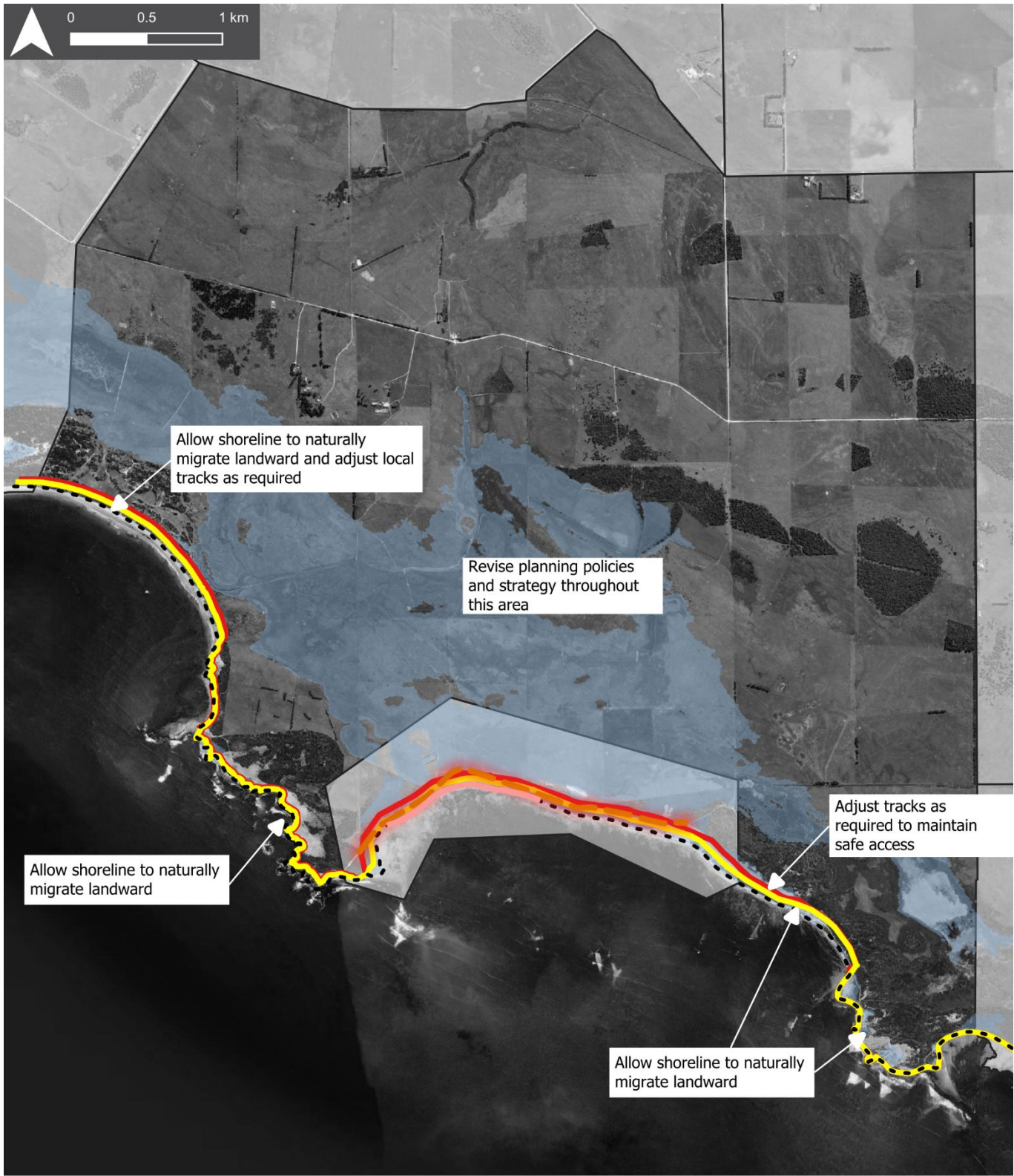
Adaptation Actions

The inundation is associated with variations into topography, with interconnecting pathways that enable water to propagate through the landscape to these lower elevation. In some areas coastal erosion is limited due to the rocky nature of the shoreline, whilst in other locations the sandy coast is highly susceptible to coastal retreat.



Why adopt these actions?

- The erosion in this area impacts environmental reserves and informal tracks that weave throughout these areas. These informal tracks can be relocated outside hazard zones or closed as they are not critical transport infrastructure.
- Locations of inundation in this area are restricted to coastal reserves and therefore inundation can be permitted to occur. This may impact surrounding livestock lands, which may require actions by local landholders.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

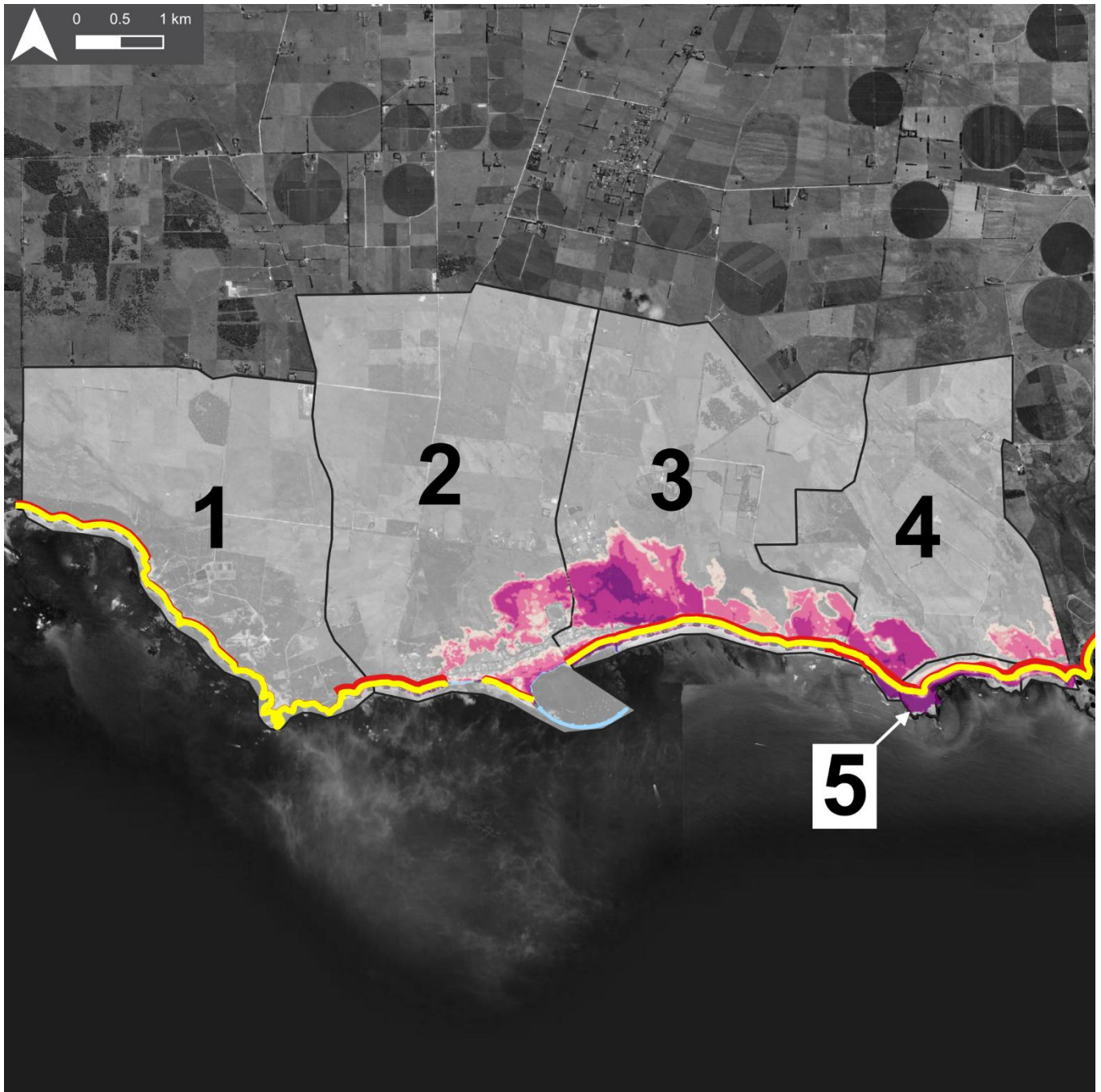
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, 2100 sea level rise, and wave effects (setup and runup) where applicable.

8 PORT MACDONNELL & RACECOURSE BAY



8.1 Area 1



Assets at risk

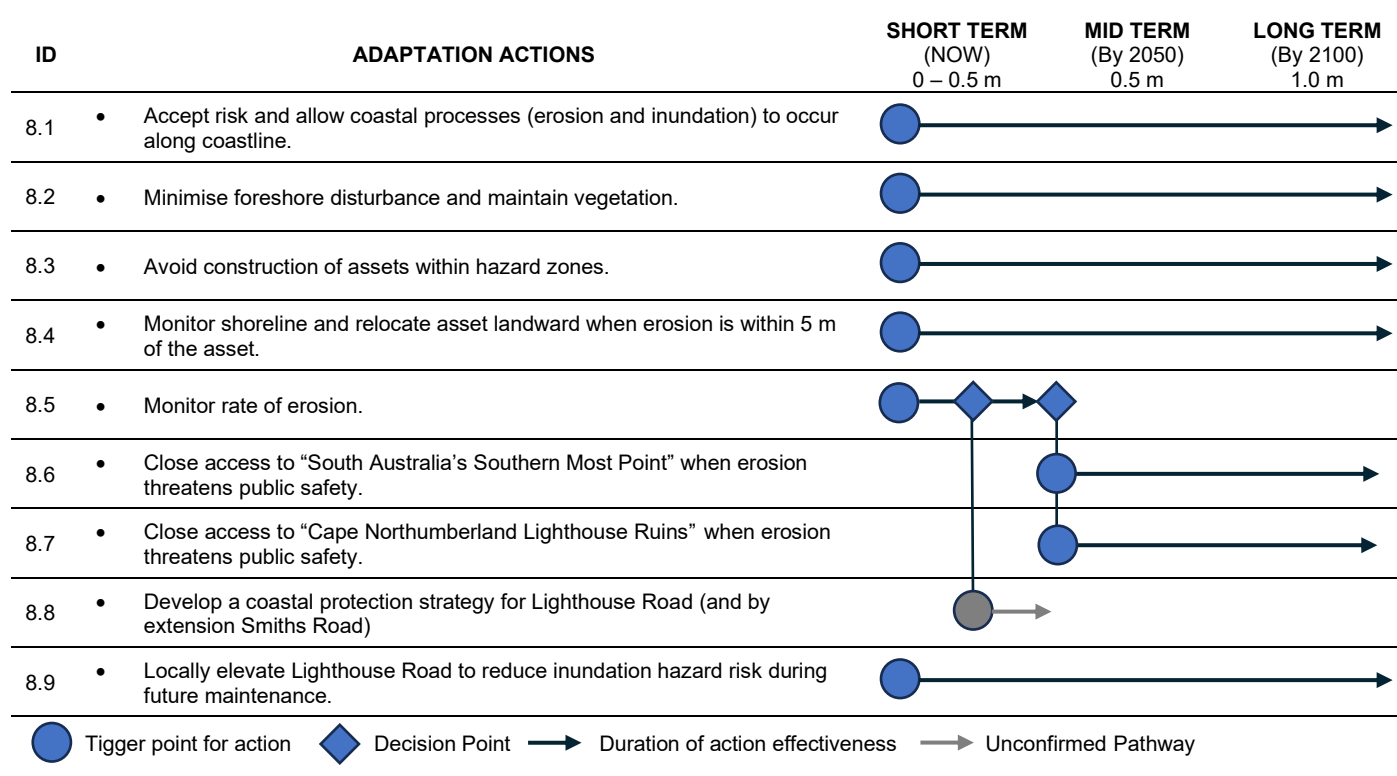
The shoreline in this area is rugged, relatively remote and consists of rocky cliffs and sandy shorelines. For the few assets in this areas erosion was identified as the key hazard to be considered. Some assets are currently considered to be significant to high risk, whilst others are considered medium risk.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Finger Point Road and Lookout	Transport	Medium*	Low	Medium*	Low	8.1-8.4
Surfer's Way and Carpark	Transport	Medium*	Low	Medium*	Low	8.1-8.4
Light House Road	Transport	High*	Low	High*	Low	8.8, 8.9
Cape Northumberland Road	Transport	Low	Low	Low	Low	No Action
Cape Northumberland Carpark	Transport	Low	Low	Low	Low	No Action
Cape Northumberland Lighthouse Ruins	Tourism	Medium	Low	Significant	Low	8.5, 8.7
South Australia's Southern Most Point	Tourism	Medium	Low	Significant	Low	8.5, 8.6
Smiths Road	Transport	Significant	Low	High	Low	8.8
Foreshore Reserve (including beaches)	Environment	Low	Low	Low	Low	No Action

* Some assets within this category have a lower risk rating

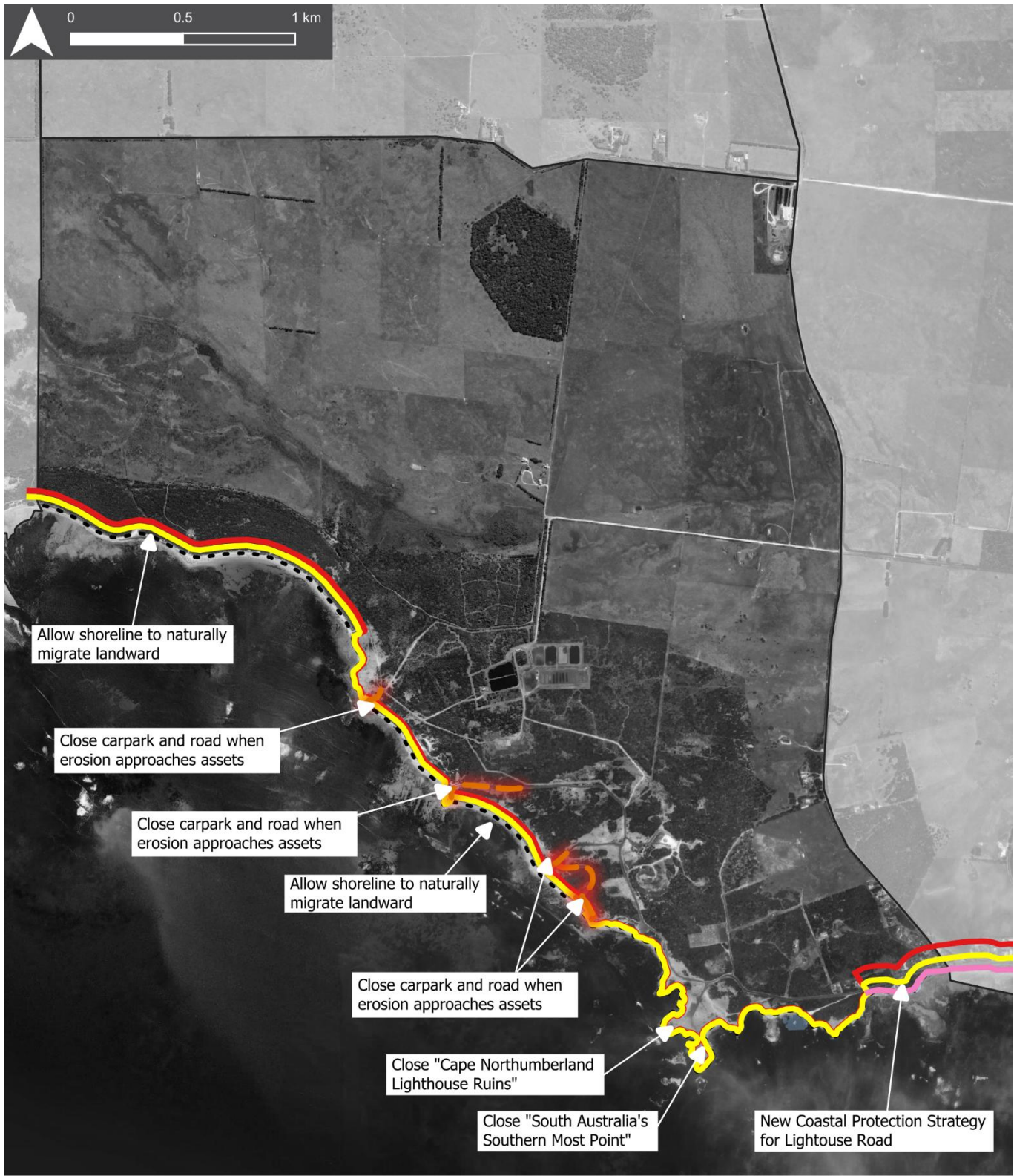
Adaptation Actions

Adaptation actions in this area predominantly focus on allowing coastal processes to progress with some accommodate, protection strategies and nature based approaches that seek to reduce the impact of the hazards closer to town.



Why adopt these actions?

- The primary hazard in this area is erosion, with few assets located within the identified hazard zones. Some assets will need to be relocated as erosion progresses. Notable tourism sites such as the Lighthouse Ruins and South Australia's Southern Most Point will need to be closed to public access as erosion progresses. The trigger for these actions is when public safety is impacted.
- A localised increase in the elevation of Lighthouse Road is required to limit landward inundation flows.



Erosion Hazard

- - - Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

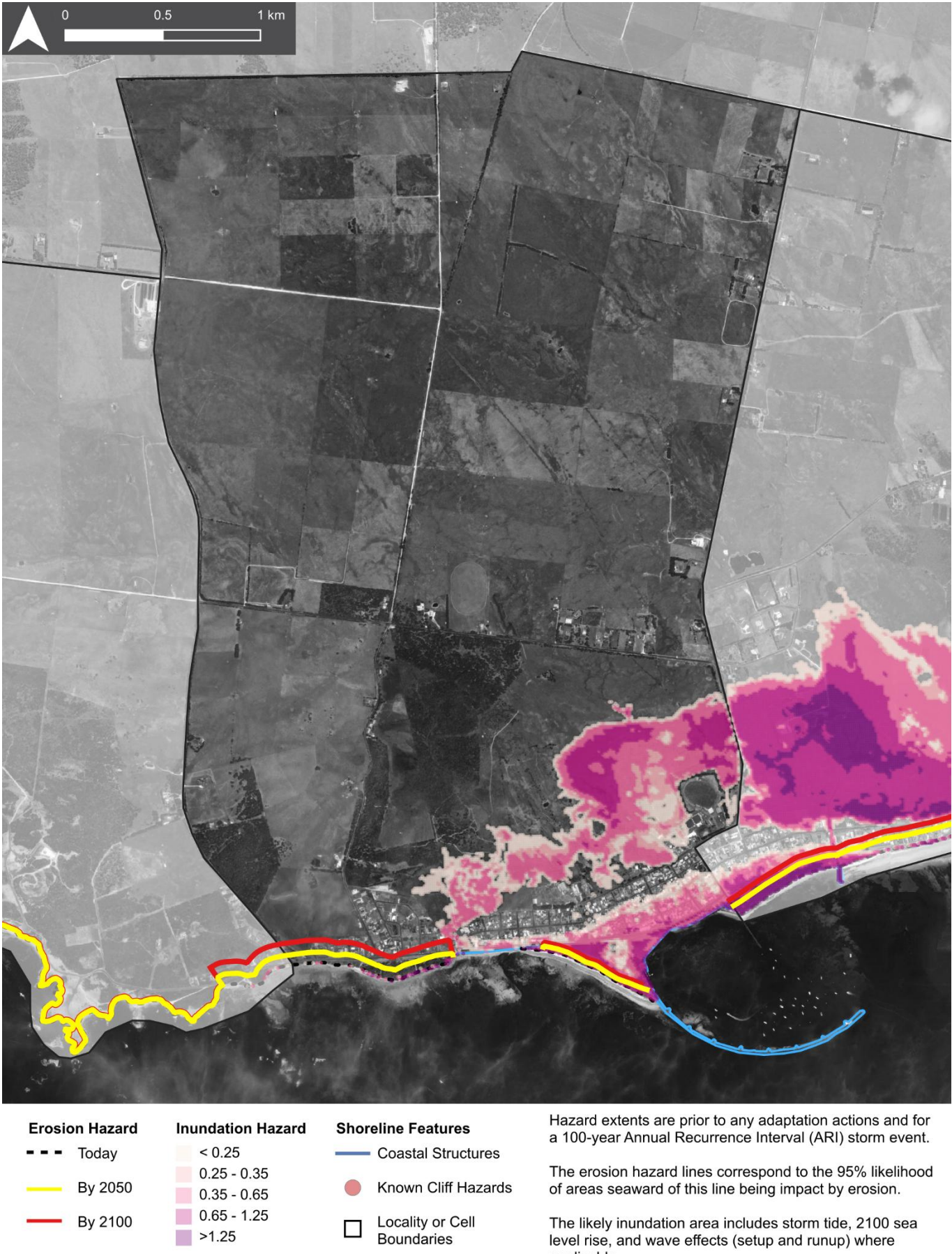
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

8.2 Area 2



Assets at risk

The shoreline in this area consists of a combination of soft movable material (sandy coast) and engineered shoreline (revetments). The engineered shoreline provides protection against erosion to some sections of the town, however where this infrastructure does not exist, the shoreline is expected to be impacted by erosion. The low elevation of the town exposes the town to inundation during storm events. This inundation is expected to impact much of the town if unmitigated.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Springs Road	Transport	Low	Low	Medium	Low	8.10-8.13
Sea Parade	Transport	High	Medium	High	Significant	8.10-8.13
Local Streets within Port MacDonnell	Transport	Low	Medium*	High*	Significant*	8.10-8.13 8.19
Port MacDonnell Golf Course	Recreational		Medium		Significant	8.10-8.13 8.19
Port MacDonnell Football and Netball Club	Recreational		Medium		Significant	8.10-8.13 8.19
Harbour of Port MacDonnell – Boat ramp and Parking (including Fuel Self Service)	Public Amenity	Medium	Medium	High	Significant	8.10-8.13
Foreshore Reserve (including public amenities)	Public Amenity	High*	Significant*	High*	High*	8.10-8.13

* Some assets within this category have a lower risk rating

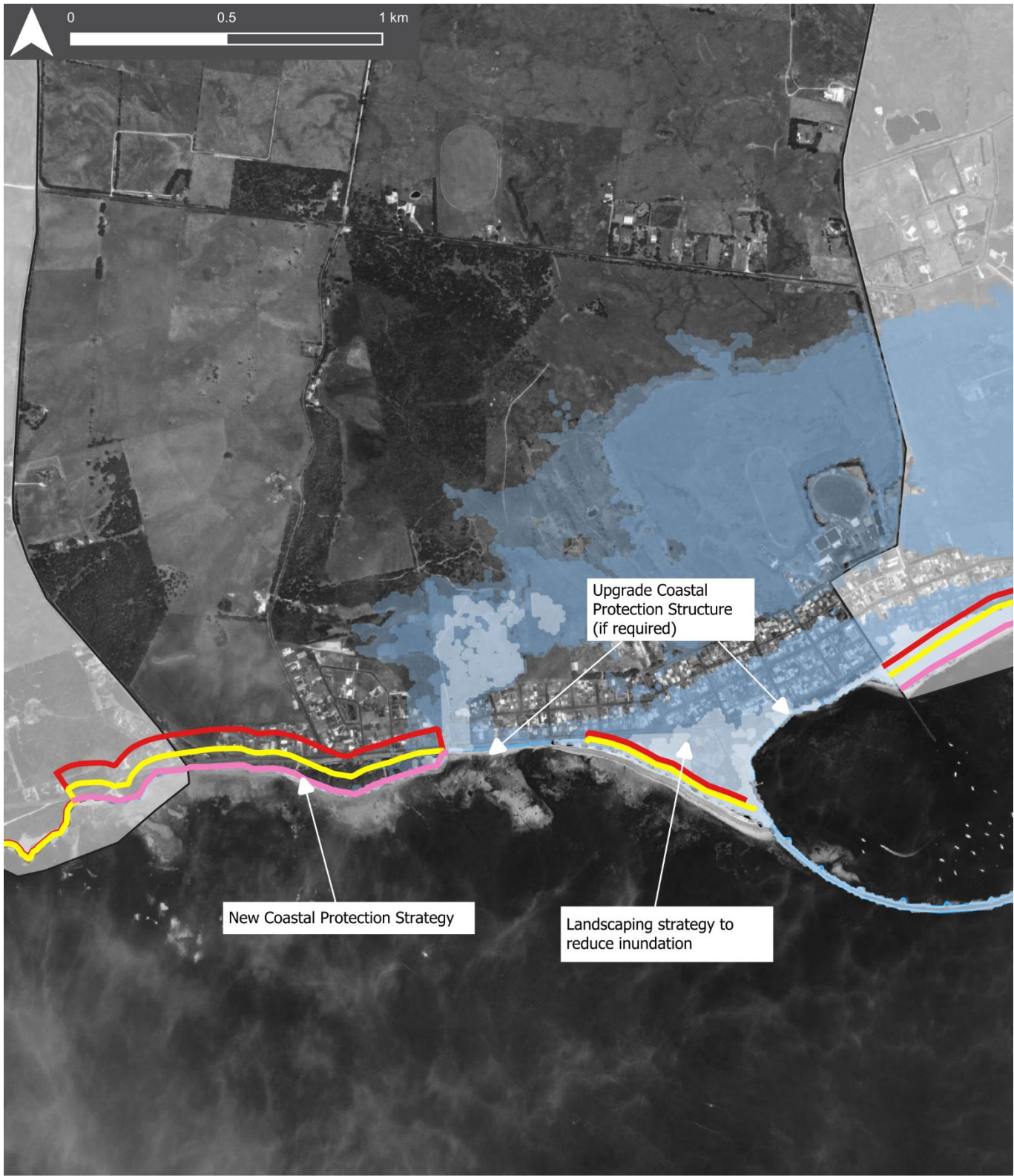
Adaptation Actions

Adaptation actions in this area predominantly focus on protection strategies and nature based approaches that seek to reduce the impact of the hazards.

ID	ADAPTATION ACTIONS	SHORT TERM (NOW) 0 – 0.5 m	MID TERM (By 2050) 0.5 m	LONG TERM (By 2100) 1.0 m
8.10	Undertake a detailed survey of coastal protection assets and shoreline to determine if additional elevation works / features are required.			
8.11	Implement a coastal protection strategy along Sea Parade to manage coastal erosion and inundation into town.			
8.12	Upgrade existing coastal protection structures along Sea Parade to manage inundation into town.			
8.13	Develop landscaping strategy to create natural barriers to inundation within Port MacDonnell Boat Ramp area.			

Why adopt these actions?

- Much of the shoreline already has coastal protection structures in place. Upgrading these structures to increase their elevation was identified as an effective strategy to reduce inundation and erosion risk.
- Undertaking shoreline landscaping in areas where inundation is the main hazard was identified as an effective approach to manage overland flow during storm events.
- Some additional actions undertaken in adjacent areas will also reduce the risk in this area (e.g., closure of drains).



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

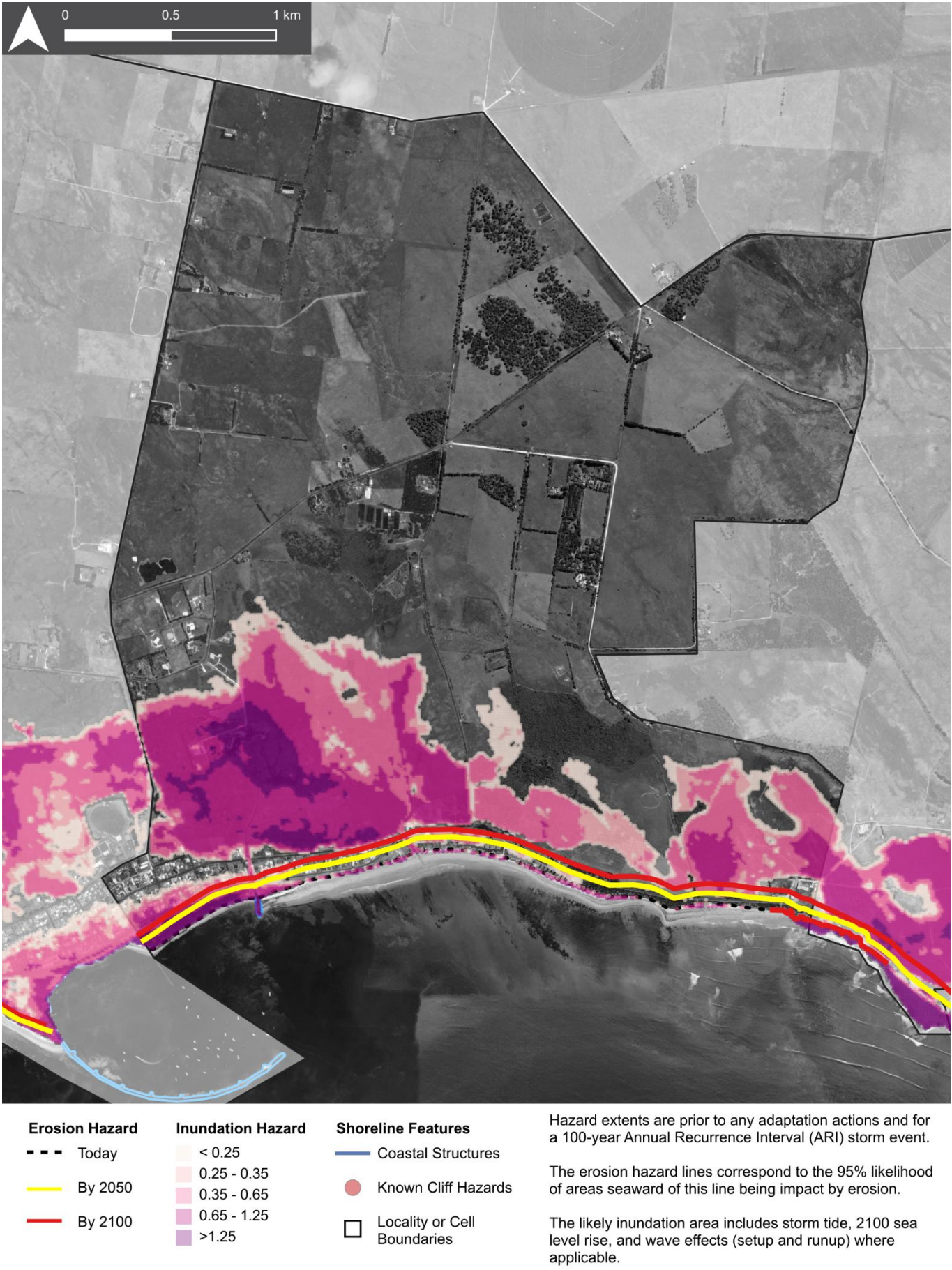
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

8.3 Area 3



Assets at risk

The shoreline in this area consists of a combination of soft movable material (sandy coast) and engineered shoreline (revetments). The engineered shoreline provides protection against erosion to some sections of the town, however where this infrastructure does not exist, the shoreline is expected to be impacted by erosion. The low elevation of the town exposes the town to inundation during storm events. This inundation is expected to impact much of the town if unmitigated.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Sea Parade	Transport	High	Medium*	High	Significant	8.14 -8.18
Local Streets within Port MacDonnell	Transport	Low	Medium*	High*	Significant*	8.14 -8.19
Foreshore Reserve (including Little Hunter playground)	Public Amenity	High	Significant	High	Significant	8.14 -8.18
Port MacDonnell Sailing Club	Recreational	High	Low	High	Low	8.20, 8.21
Woolwash Interpretive Centre	Tourism	High	Low	High	Medium	8.20, 8.21
Port MacDonnell Foreshore Tourist Park	Tourism	High	Medium	High	Significant	8.19-8.21
Eight Mile Creek Rd (and foreshore)	Transport	High	Low	High	Medium	8.19-8.21

* Some assets within this category have a lower risk rating

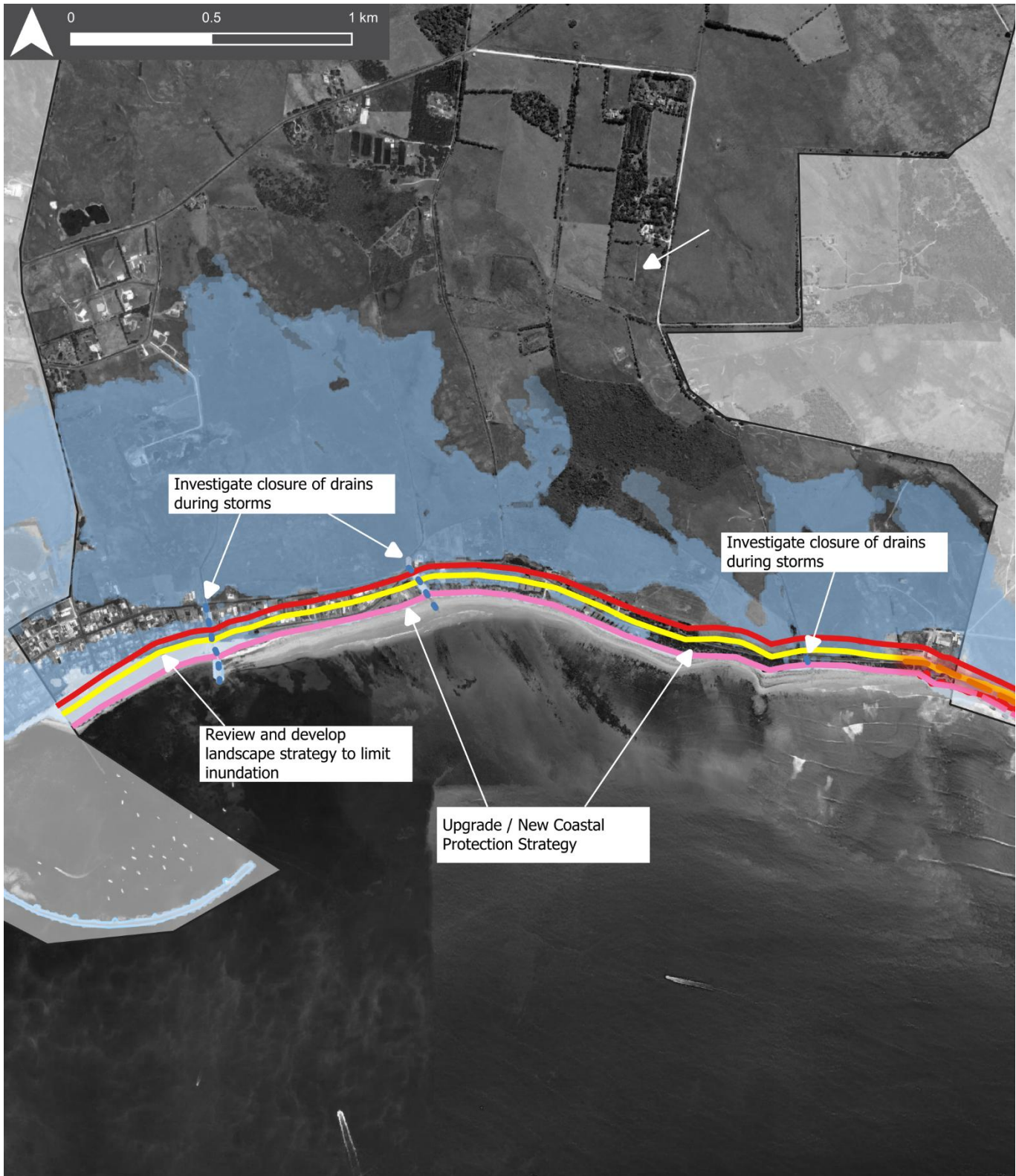
Adaptation Actions

Adaptation actions in this area predominantly focus on protection strategies and nature based approaches that seek to reduce the impact of the hazards.

ID	ADAPTATION ACTIONS	SHORT TERM (NOW) 0 – 0.5 m	MID TERM (By 2050) 0.5 m	LONG TERM (By 2100) 1.0 m
8.14	Minimise foreshore disturbance and maintain vegetation. Replace exotic vegetation with native vegetation.			
8.15	Avoid construction of assets within hazard zones.			
8.16	Undertake a detailed survey of the shoreline to determine if additional elevation works / features are required.			
8.17	Implement a coastal protection strategy to manage coastal erosion and inundation into town (e.g., dune restoration/reinforcement and revetments where required).			
8.18	Develop landscaping strategy to create natural barriers to inundation where existing barriers are not sufficient.			
8.19	Investigate options to close drains to prevent/limit inundation via drainage network and 'town from behind'.			
8.20	Investigate the implementation of an appropriate shoreline protection strategy			
8.21	Re-evaluate adaptation pathway			
 Trigger point for action  Decision Point  Duration of action effectiveness  Unconfirmed Pathway				

Why adopt these actions?

- Much of the shoreline already has coastal protection structures in place. Upgrading these structures to increase their elevation was identified as an effective strategy to reduce inundation and erosion risk.
- Undertaking shoreline landscaping in areas where inundation is the main hazard was identified as an effective approach to manage overland flow during storm events.
- Some additional actions undertaken in adjacent areas will also reduce the risk in this area (e.g., closure of drains).



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

8.4 Area 4



Assets at risk

The assets in this area are exposed to inundation and erosion. During large storm events, elevated water levels propagate over the shoreline and into this area. Eight Mile Creek Road is only exposed to limited inundation, however over road flows can propagate into surrounding areas. Erosion of the shoreline over the assessment horizon is expected to impact both public and private assets.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Eight Mile Creek Rd	Transport	High*	Low	High	Medium	8.22, 8.25, 8.27-8.9
203 Eight Mile Creek Road Parking	Public Amenity	High	Medium	High	Medium	8.22-8.24, 8.27, 8.29
Foreshore Reserve	Public Amenity	Significant	High*	High	High*	8.22-8.24

* Some assets within this category have a lower risk rating

Adaptation Actions

Adaptation actions in this area predominantly focus on allowing coastal processes to progress with some accommodate and nature based approaches that seek to reduce the impact of the hazards.

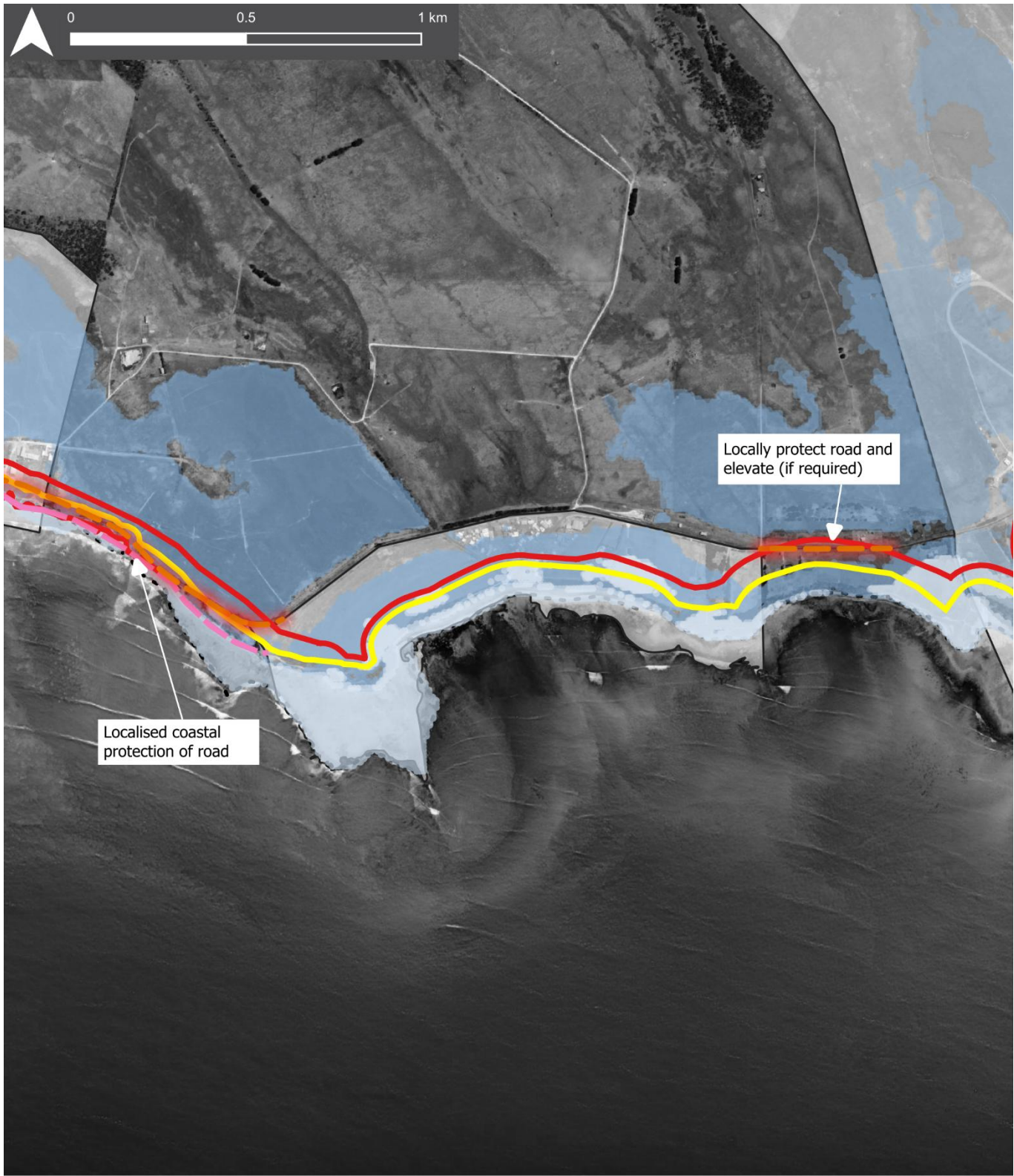
ID	ADAPTATION ACTIONS	SHORT TERM (NOW) 0 – 0.5 m	MID TERM (By 2050) 0.5 m	LONG TERM (By 2100) 1.0 m
8.22	Accept risk and allow coastal processes (erosion and inundation) to occur along coastline.			
8.23	Minimise foreshore disturbance and maintain vegetation.			
8.24	Avoid construction of assets within hazard zones.			
8.25	Raise elevation of Eight Mile Creek Road during future maintenance works.			
8.26	Prepare/update coastal development planning policies to address inundation and coastal erosion hazards in design.			
8.27	Monitor rate of erosion.			
8.28	Undertake local erosion protection works for Eight Mile Creek Road (as required)			
8.29	Re-evaluate adaptation pathway when erosion is within 5 m of assets.			

Why adopt these actions?

- Inundation of this area during substantial storm events over the entire assessment horizon is expected to impact most assets in this area. This is due to the low elevation of this area, which exposes assets to substantial volumes of water during event surge.
- Eight Mile Creek Road is expected to be impacted by inundation over the assessment horizon, however this risk is low to medium. Therefore, monitoring of the risk at this time is deemed to be an appropriate

action with increases in the road elevation to be undertaken during future road maintenance activities to further reduce the inundation risk.

- The inundation of this area has been assessed to be significant. Mitigation of this risk, as well as the risk of impact to surrounding public assets is not expected to be viable without substantial investment. Thus accepting risk of impact of public assets is recommended, with recovery actions recommended.
- Erosion of the shoreline is expected to impact Eight Mile Creek Road and other assets in this area over the assessment horizon. However, the rate of erosion remains uncertain due to the limited geological and geomorphological data available at this location. Localised protection works of Eight Mile Creek Road between rocky features is expected to reduce the erosion hazard. The current adaptation pathway is to monitor the erosion hazard and to develop planning policies on how this hazard should be managed when erosion is within 5 m of an asset. Shoreline stabilisation activities including the protection of vegetation and reinforcement of dune features are to be undertaken.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

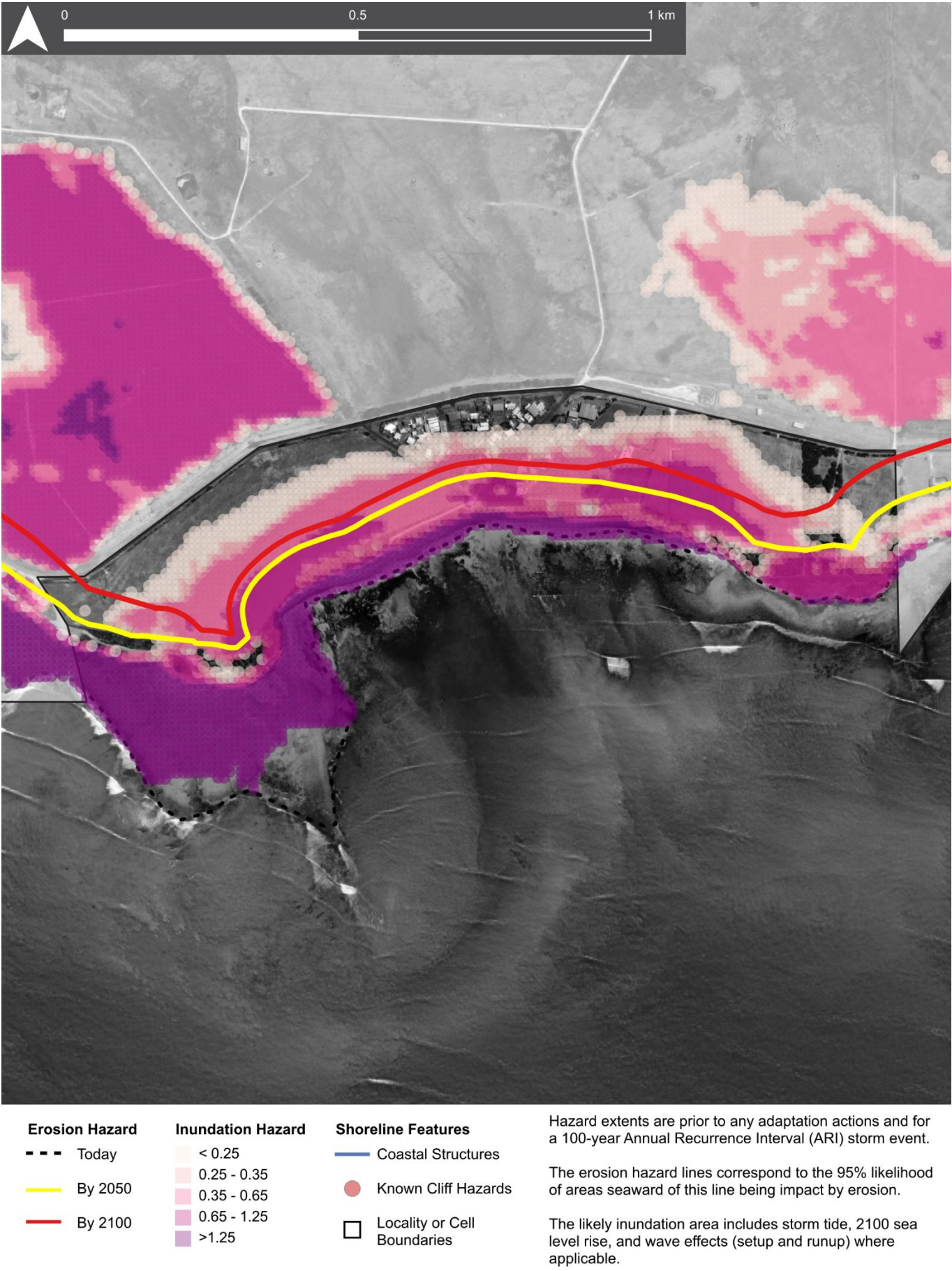
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runoff) where applicable.

8.5 Area 5



Erosion Hazard

- - - Today
- By 2050
- By 2100

Inundation Hazard

- < 0.25
- 0.25 - 0.35
- 0.35 - 0.65
- 0.65 - 1.25
- > 1.25

Shoreline Features

- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, 2100 sea level rise, and wave effects (setup and runup) where applicable.

Assets at risk

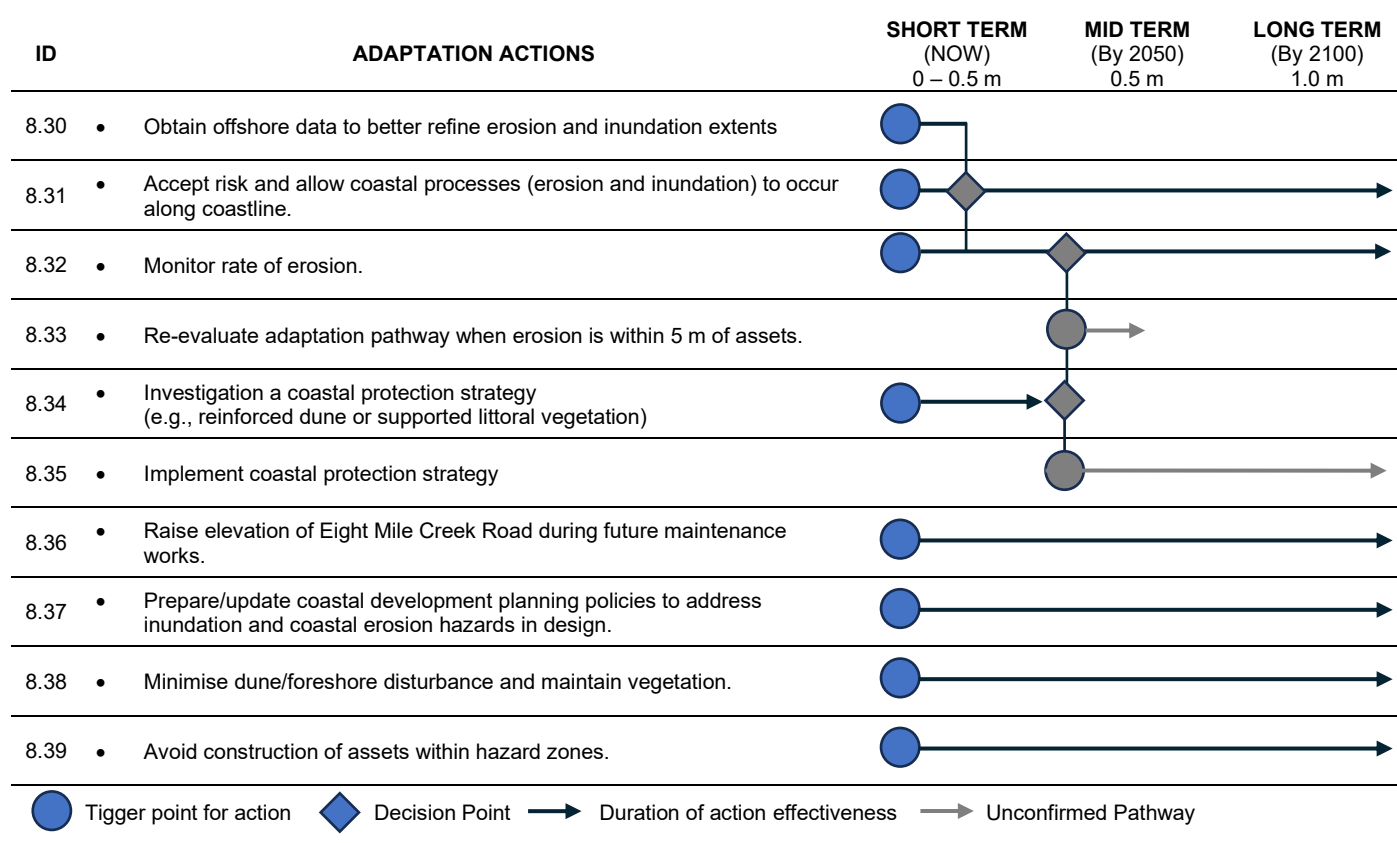
The assets in this area are exposed to inundation and erosion. During large storm events, elevated water levels propagate over the shoreline and into this area. Eight Mile Creek Road is only exposed to limited inundation, however over road flows can propagate into surrounding areas. Erosion of the shoreline over the assessment horizon is expected to impact both public and private assets.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Eight Mile Creek Rd	Transport		Low		Medium	8.30-8.36, 8.38-8.39
Kuhl Drive	Transport	High	Significant*	High	Significant	8.30-8.36, 8.38-8.39
Foreshore Reserve and Carpark	Public Amenity	High	Significant	High	High*	8.38-8.39

* Some assets within this category have a lower risk rating

Adaptation Actions

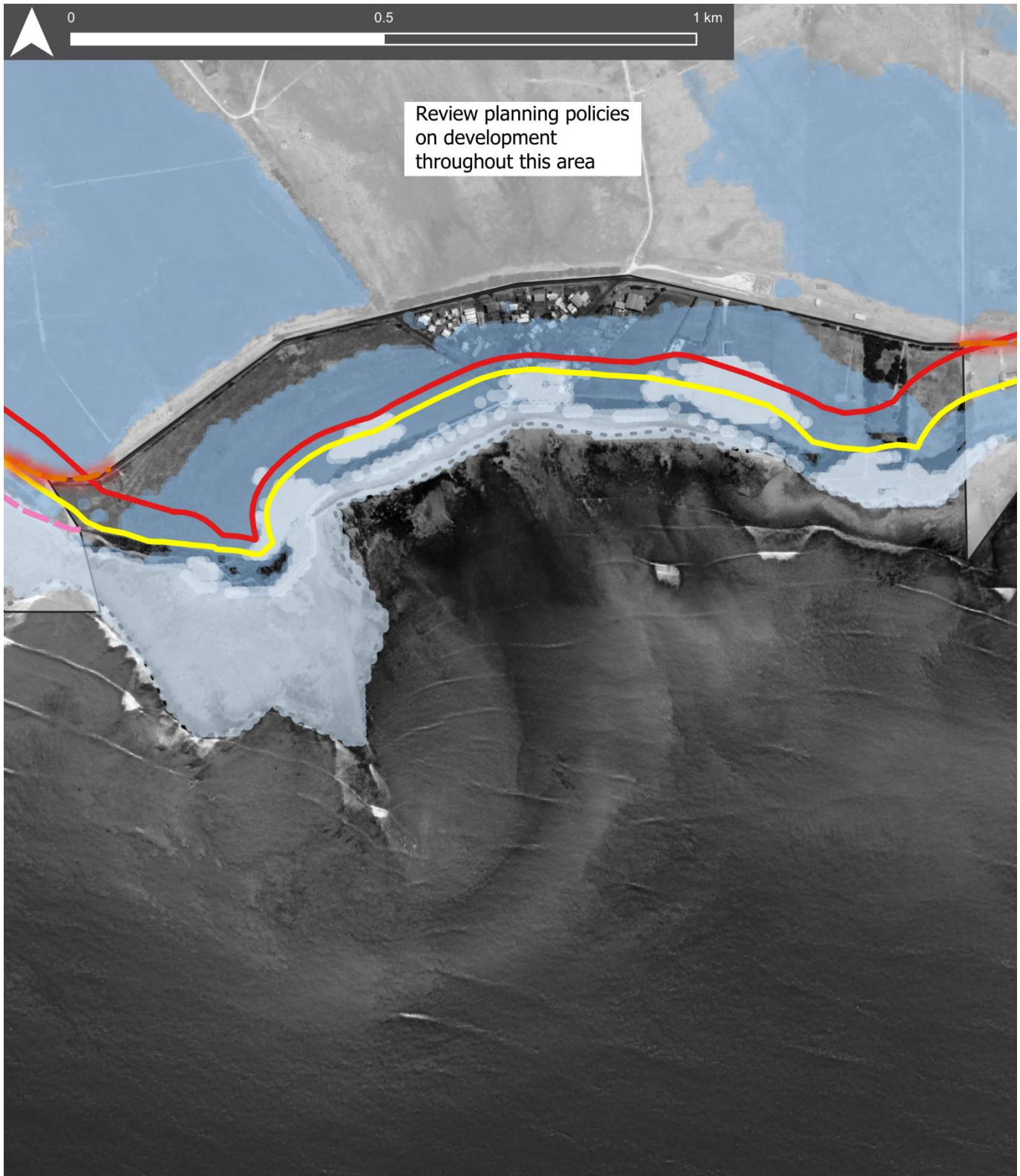
Adaptation actions in this area predominantly focus on allowing coastal processes to progress with some accommodate and nature based approaches that seek to reduce the impact of the hazards.



Why adopt these actions?

- Inundation of this area during substantial storm events over the entire assessment horizon is expected to impact most assets in this area. This is due to the low elevation of this area, which exposes assets to substantial volumes of water during event surge.

- Eight Mile Creek Road is expected to be impacted by inundation over the assessment horizon, however this risk is low to medium. Therefore, monitoring of the risk at this time is deemed to be an appropriate action with increases in the road elevation to be undertaken during future road maintenance activities to further reduce the inundation risk.
- The inundation of Kuhl Drive is assessed to be significant. Mitigation of this risk, as well as the risk of impact to surrounding public assets is not expected to be viable without substantial investment. Thus accepting risk of impact of public assets is recommended, with recovery actions recommended.
- Erosion of the shoreline is expected to impact Kuhl Drive and other assets in this area over the assessment horizon. However, the rate of erosion remains uncertain due to the limited geological and geomorphological data available at this location. The current adaptation pathway is to monitor the erosion hazard and to develop planning policies on how this hazard should be managed when erosion is within 5 m of an asset. Shoreline stabilisation activities including the protection of vegetation and reinforcement of dune features are to be undertaken.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

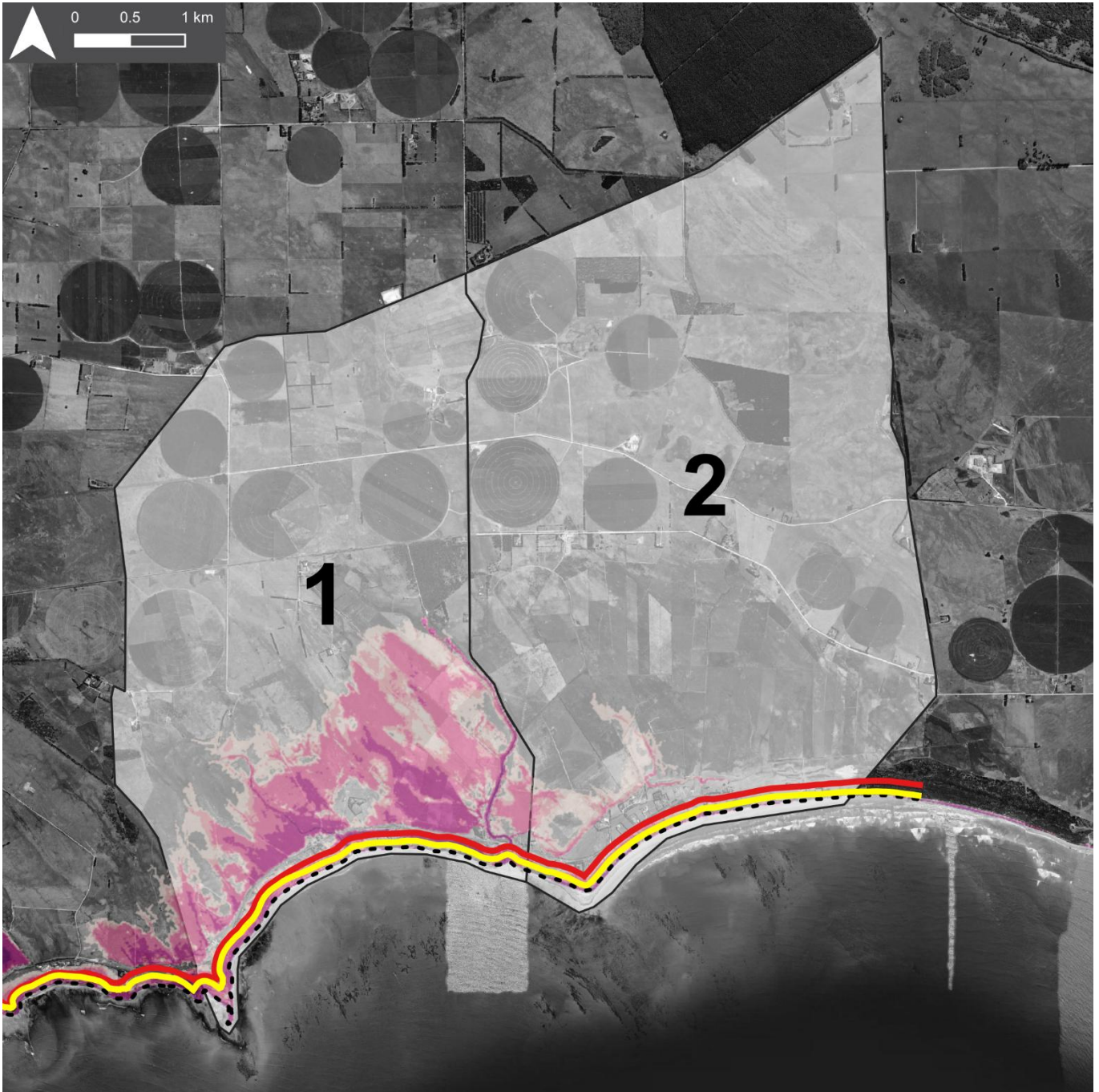
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

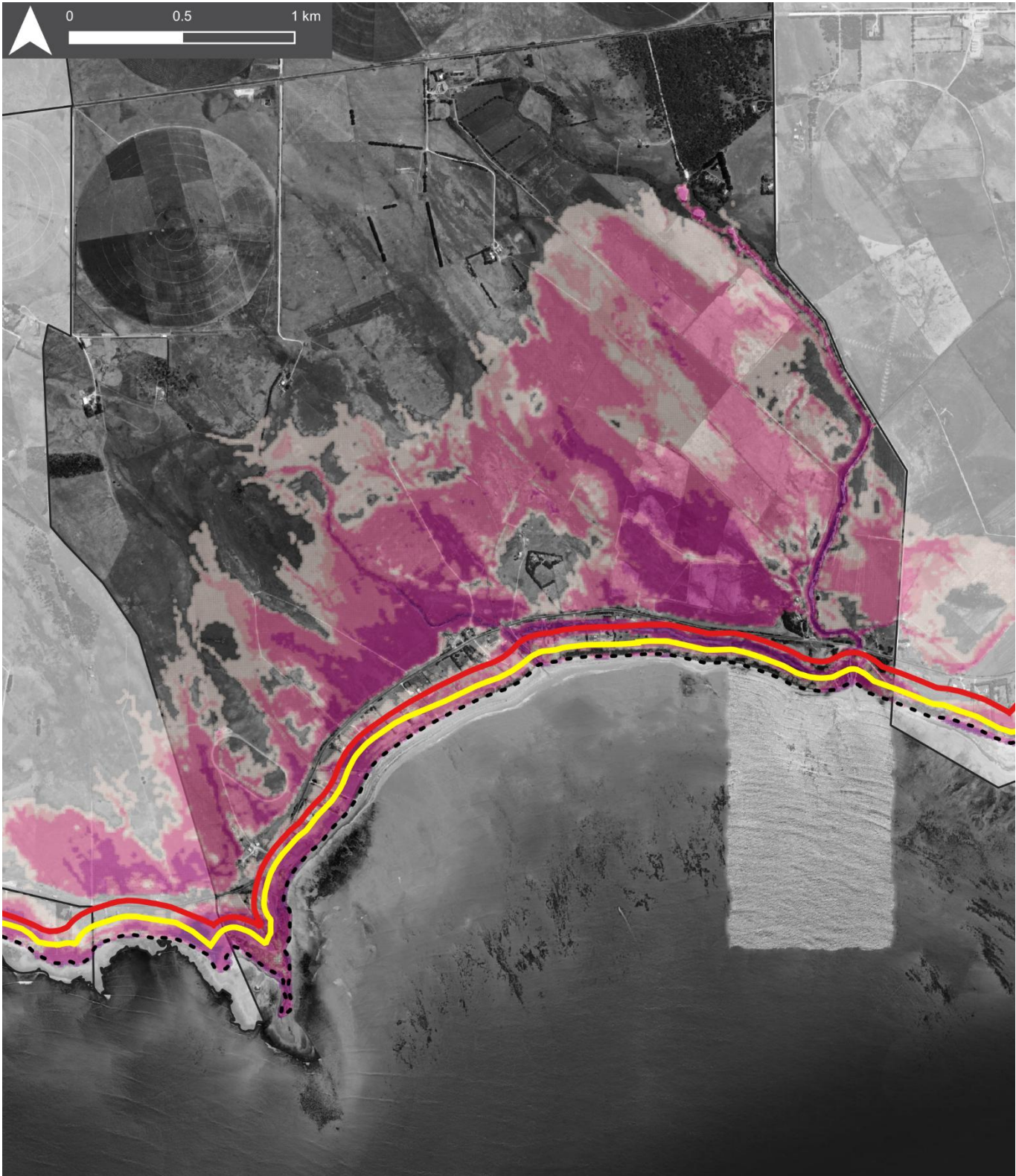
The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

9 EIGHT MILE CREEK



9.1 Area 1



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- < 0.25
- 0.25 - 0.35
- 0.35 - 0.65
- 0.65 - 1.25
- > 1.25

Shoreline Features

- Coastal Structures
- Known Cliff Hazards
- Locality Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, 2100 sea level rise, and wave effects (setup and runup) where applicable.

Assets at risk

Assets in this area are low lying on relatively soft sediments, which exposes these assets to both inundation during storms, as well as persistent erosion. Various drains along this section of shoreline and facilitate the propagation of storm surge into the hinterland, which then spreads throughout the area. These temporary inundation waters impact public and private assets as well as nearby livestock lands.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Eight Mile Creek Road	Transport	Low	Low	Medium*	Medium*	9.1, 9.3, 9.5
Eight Mile Creek Road (Near No 1 Milstead Main Outlet)	Transport	High	Low	High	Medium	9.1, 9.3, 9.5
Peacocks Road	Transport	Low	Low	Low	Medium*	9.1, 9.6
Private Assets on Riddoch Bay side of Eight Mile Creek Road	Private Assets	High	Significant*	High	High*	9.2-9.4, 9.6
Private Assets landward of Eight Mile Creek Road	Private Assets	Low	Medium*	Low	Significant*	9.2-9.4, 9.6

* Some assets within this category have a lower risk rating

Adaptation Actions

Adaptation actions in this area predominantly focus managed retreat of assets away from the shoreline as well as some localised asset relocation and inundation management strategies.

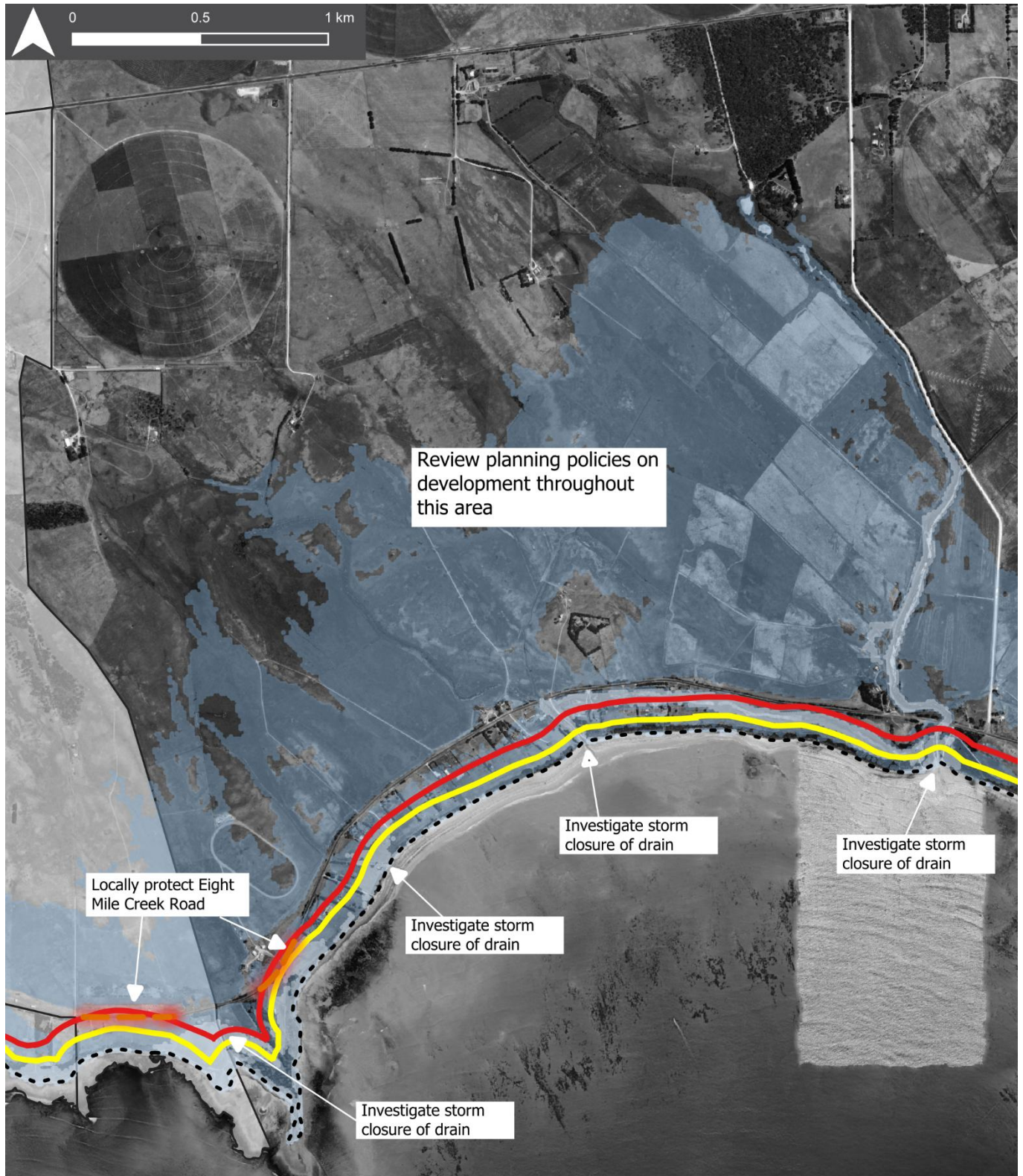
ID	ADAPTATION ACTIONS	SHORT TERM (NOW) 0 – 0.5 m	MID TERM (By 2050) 0.5 m	LONG TERM (By 2100) 1.0 m
9.1	Accept risk and allow coastal processes to occur.			
9.2	Review planning policies and prepare a policy for future managed retreat			
9.3	Monitor progress of erosion.			
9.4	Investigate managed retreat planning policy for when erosion begins to impact assets.			
9.5	Protect Eight Mile Creek Road near No 1 Milstead Main Outlet when erosion is within 5 m of impact assets.			
9.6	Investigate options for closing various drains during major storm events to reduce landward inundation through drainage network.			

Why adopt these actions?

- The cost to mitigate erosion along this section of coastline is expected to be very high. The proposed action is to instead investigate policies to facilitate a process of managed retreat as erosion progresses landwards and impacts assets.
- Projection of Eight Mile Creek near No 1 Milstead Main Outlet will mitigate the erosion risk to this section of the road.
- Much of the inundation throughout this area is due to a combination of low lying land and the presence of an extensive drainage network that is important for the livestock and farming industry. Public assets

were identified to be at a risk of medium or lower, and thus at this stage the risk should thus be monitored.

- Investigating options to manage the landward propagation of storm surge through the drainage network should be investigated. A detailed assessment is required to understand the impact of different interventions. This assessment should consider compound flooding events (i.e., rain along with coastal driven inundation). Possible options may include construction of a gate at various drains that could be lowered to reduce the volume (or rate) of inundation through drains. It is likely that this would need to be able to be opened at other times to maintain drainage and environmental flows.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

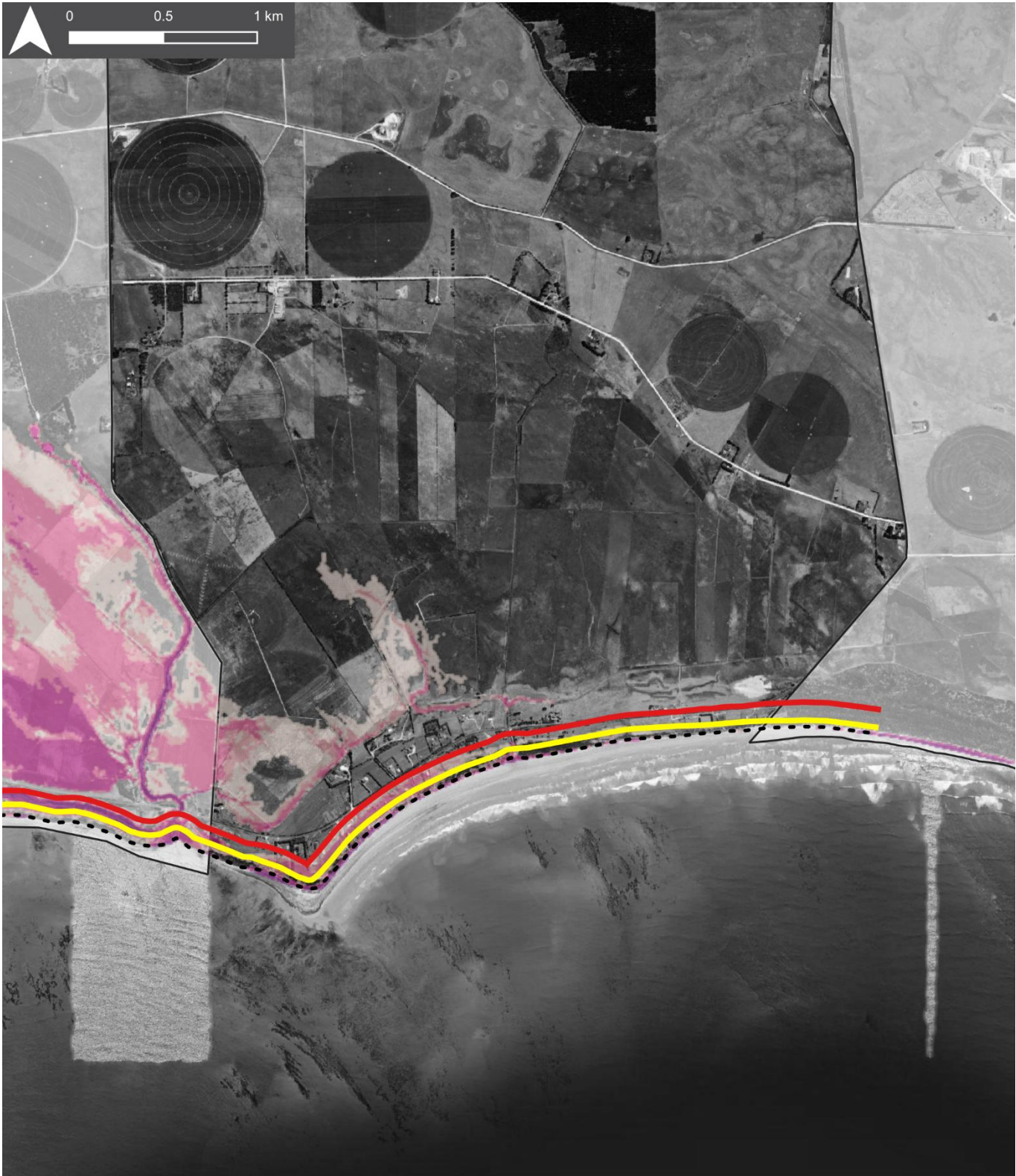
- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.

9.2 Area 2



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- < 0.25
- 0.25 - 0.35
- 0.35 - 0.65
- 0.65 - 1.25
- >1.25

Shoreline Features

- Coastal Structures
- Known Cliff Hazards
- Locality Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, 2100 sea level rise, and wave effects (setup and runup) where applicable.

Assets at risk

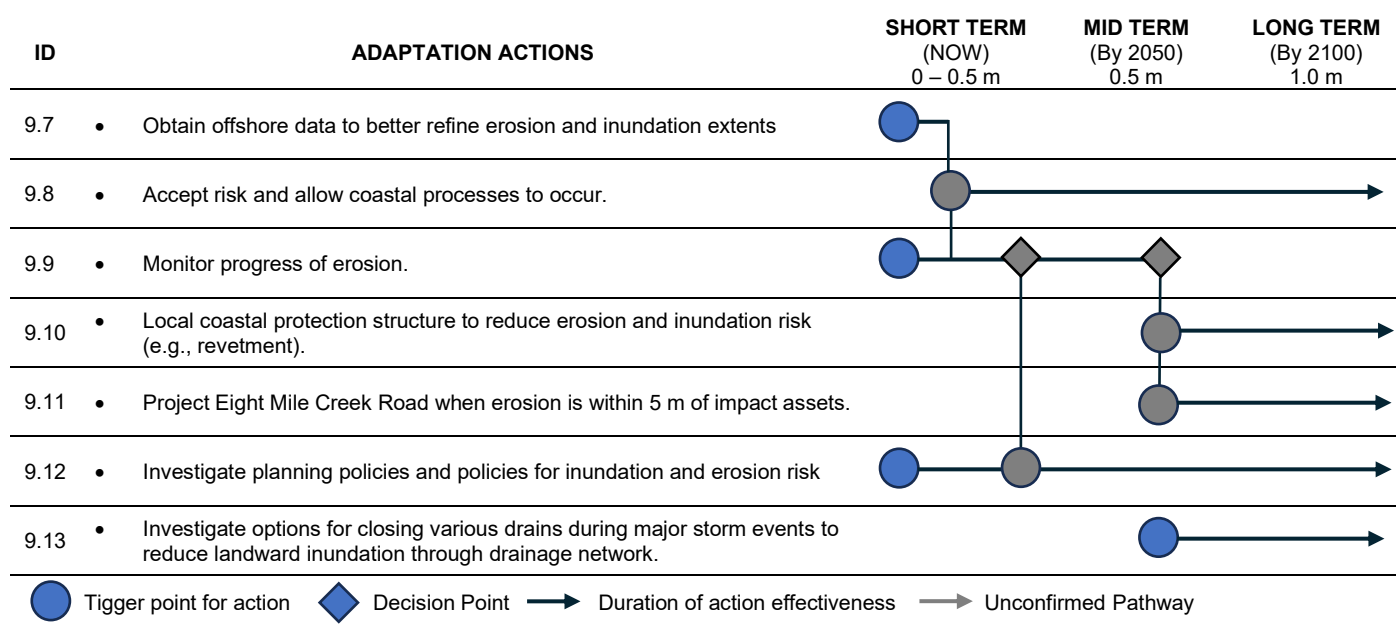
Assets in this area are low lying on relatively soft sediments, which exposes these assets to both inundation during storms, as well as persistent erosion. This places several assets at high risk over the entire assessment horizon. Various drains along this section of shoreline and facilitate the propagation of storm surge into the hinterland, which then spreads throughout the area. These temporary inundation waters impact public and private assets as well as nearby livestock lands.

ASSET	ASSET TYPE	2050		2100		RELATED ACTIONS
		EROSION	INUNDATION	EROSION	INUNDATION	
Eight Mile Creek Road	Transport	Low	Low	High	Low	9.7-9.11
Eight Mile Creek Road (Lot 898 to 958)	Transport	Low	Low	High	Medium	9.7-9.11
Private Assets on Riddoch Bay side of Eight Mile Creek Road	Private Assets	High	Medium*	High	Significant*	9.7-9.9, 9.12-9.13
Private Assets landward of Eight Mile Creek Road	Private Assets	Low	Low	Low	Significant*	9.7-9.9, 9.12-9.13
Danger Point Access Track	Transport	High	Medium	High	Medium	9.7, 9.9, 9.12-9.13
Ian Mitchener Bird Hide	Public Facilities	High	Medium	High	Medium	9.7, 9.9, 9.12-9.13
Browns Bay Access Track	Transport	High	Low	High	Medium	9.7, 9.9, 9.12-9.13
Browns Bay car park and facilities	Public Facilities	High	Low	High	Low	9.7, 9.9, 9.10

* Some assets within this category have a lower risk rating

Adaptation Actions

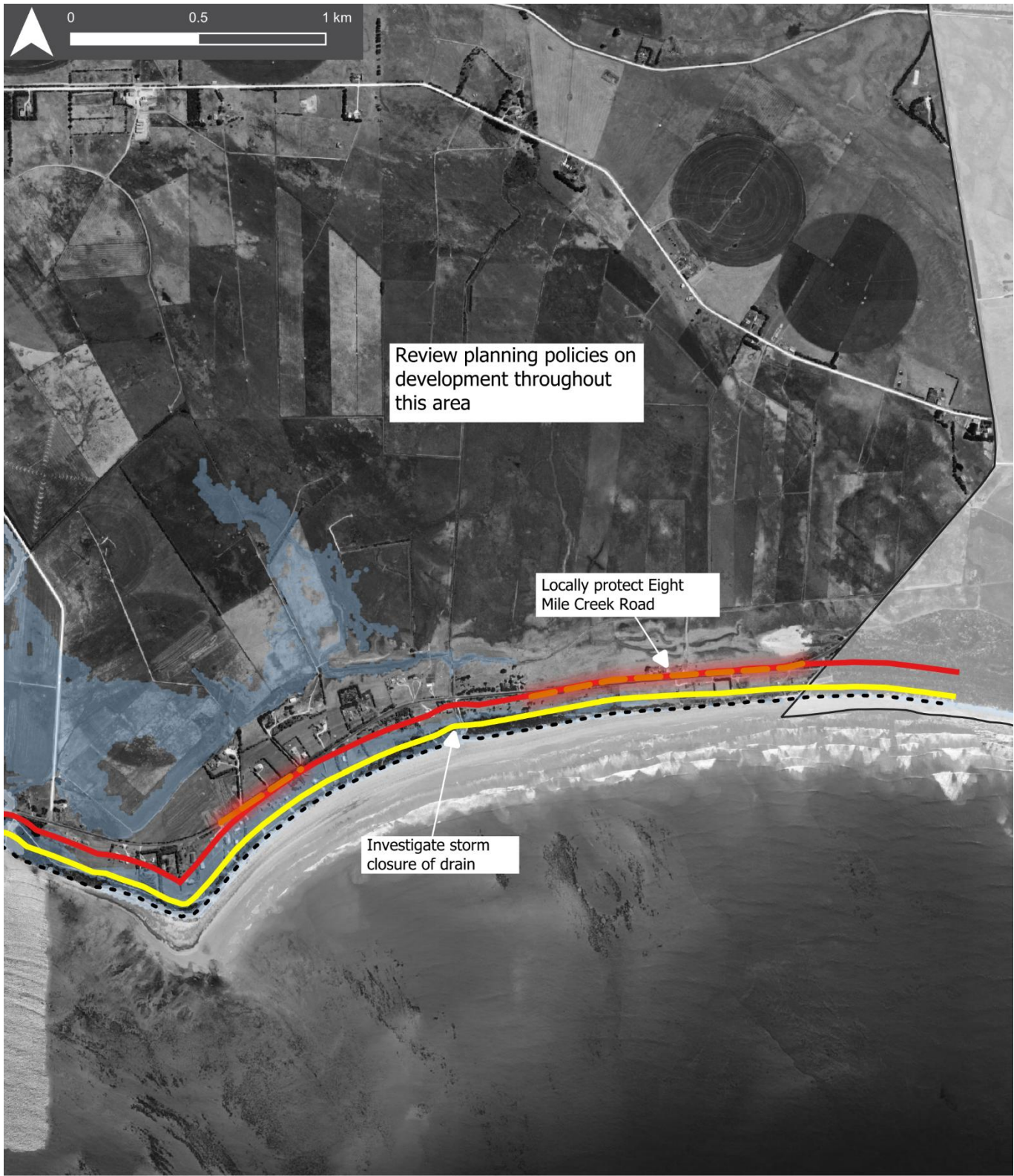
Adaptation actions in this area predominantly focus managed retreat of assets away from the shoreline as well as some localised asset relocation and inundation management strategies.



Why adopt these actions?

- The cost to mitigate erosion along this section of coastline is expected to be very high. The proposed action is to instead investigate policies to facilitate a process of managed retreat as erosion progresses landwards and impacts assets.

- Protection of some sections of Eight Mile Creek will mitigate the erosion risk to these sections of the road.
- Much of the inundation throughout this area is due to a combination of low lying land and the presence of an extensive drainage network that is important for the livestock and farming industry. Public assets were identified to be at a risk of medium or lower, and thus at this stage the risk should thus be monitored.
- Investigating options to manage the landward propagation of storm surge through the drainage network should be investigated. A detailed assessment is required to understand the impact of different interventions. This assessment should consider compound flooding events (i.e., rain along with coastal driven inundation). Possible options may include construction of a gate at various drains that could be lowered to reduce the volume (or rate) of inundation through drains. It is likely that this would need to be able to be opened at other times to maintain drainage and environmental flows.



Erosion Hazard

- Today
- By 2050
- By 2100

Inundation Hazard

- By 2050
- By 2100

Shoreline Features

- Coastal Structures
- Known Cliff Hazards
- Locality or Cell Boundaries

Hazard extents are prior to any adaptation actions and for a 100-year Annual Recurrence Interval (ARI) storm event.

The erosion hazard lines correspond to the 95% likelihood of areas seaward of this line being impact by erosion.

The likely inundation area includes storm tide, sea level rise, and wave effects (setup and runup) where applicable.



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