



Coastal Adaptation Planning

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Alexandrina Council
SACCA Coastal Forum
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Why coastal planning?

- 25 km coastline
- Subject to erosion and inundation
- SLR: 0.3 m by 2050 & 1m by 2100
- Investigate how people, the natural environment and built assets might be impacted by rising sea levels
- Council and other stakeholders, such as State Government and private landowners, can plan for the future



Alexandrina's Coastal Adaptation Pathway



Undertook Coastal Adaptation Study (March 2018 – December 2019)

- Model current and future exposure to erosion and inundation
- Assess risk / hazard impacts: public, private, safety, ecosystems
- Identify possible adaptation options

Community and Stakeholder Engagement (Oct-Nov 2020)

- Face-to-face, Webinars & MySay
- Share results of modelling and risk assessment
- Seek feedback on possible adaptation options

Coastal Adaptation Study (February 2021)

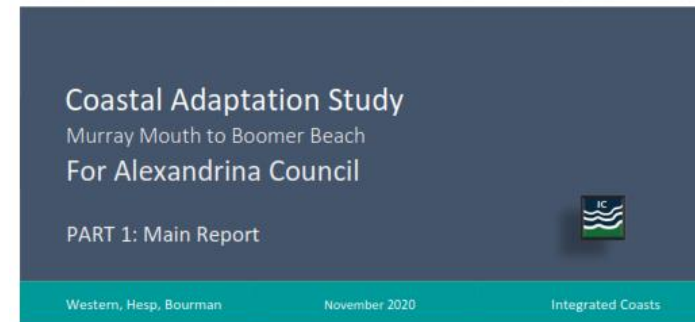
- High-level recommendation for each cell: avoid, hold the line, accommodate, manage retreat, defer and monitor, loss acceptance

Coastal Adaptation Plan (August 2022)

- Develop a plan with actions and schedule for implementation
- Identify resourcing requirement
- Develop an approach to monitoring and evaluation

Coastal Adaptation Study

- Undertaken by Integrated Coasts & URPS
- 6 key settlement areas:
 - Murray Estuary Settlements
 - Goolwa Beach
 - Middleton
 - Ratalang to Basham Beach
 - Port Elliot
 - Boomer to Knights Beach
- 2 conservation areas:
 - Tokuremoar Reserve
 - Ratalang/ Basham Beach CP



Coastal Adaptation Study

- Modelled current and future exposure to erosion and inundation
- Assessed risk / hazard impacts: public, private, safety, ecosystems
- Identified adaptation options
- High-level recommendation for each cell: avoid, hold the line, accommodate, manage retreat, defer and monitor, loss acceptance



Coastal Adaptation Study Murray Mouth to Boomer Beach For Alexandrina Council

PART 1: Main Report



Western, Hesp, Bourman

November 2020

Integrated Coasts



Coastal Adaptation Study



- Majority of Alexandrina's coastline has been identified as **low-medium** risk for future erosion and/or flooding.
- **Low lying areas**, such as the dunes along Goolwa and Ratalang-Basham beaches, or the low lying areas in the Murray Estuary Settlements, are identified as being at a **potentially higher risk to flooding (coastal inundation) and erosion** in the future (2050 and 2100)



6. Future exposure — erosion SF3-2 (2100)

Future Exposure

Map SF3-2 Goolwa Beach

2100 risk:

Erosion outlook

Assessment

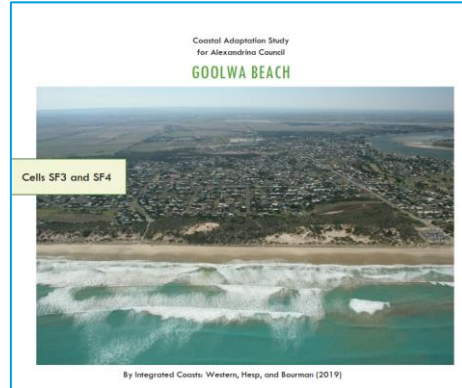
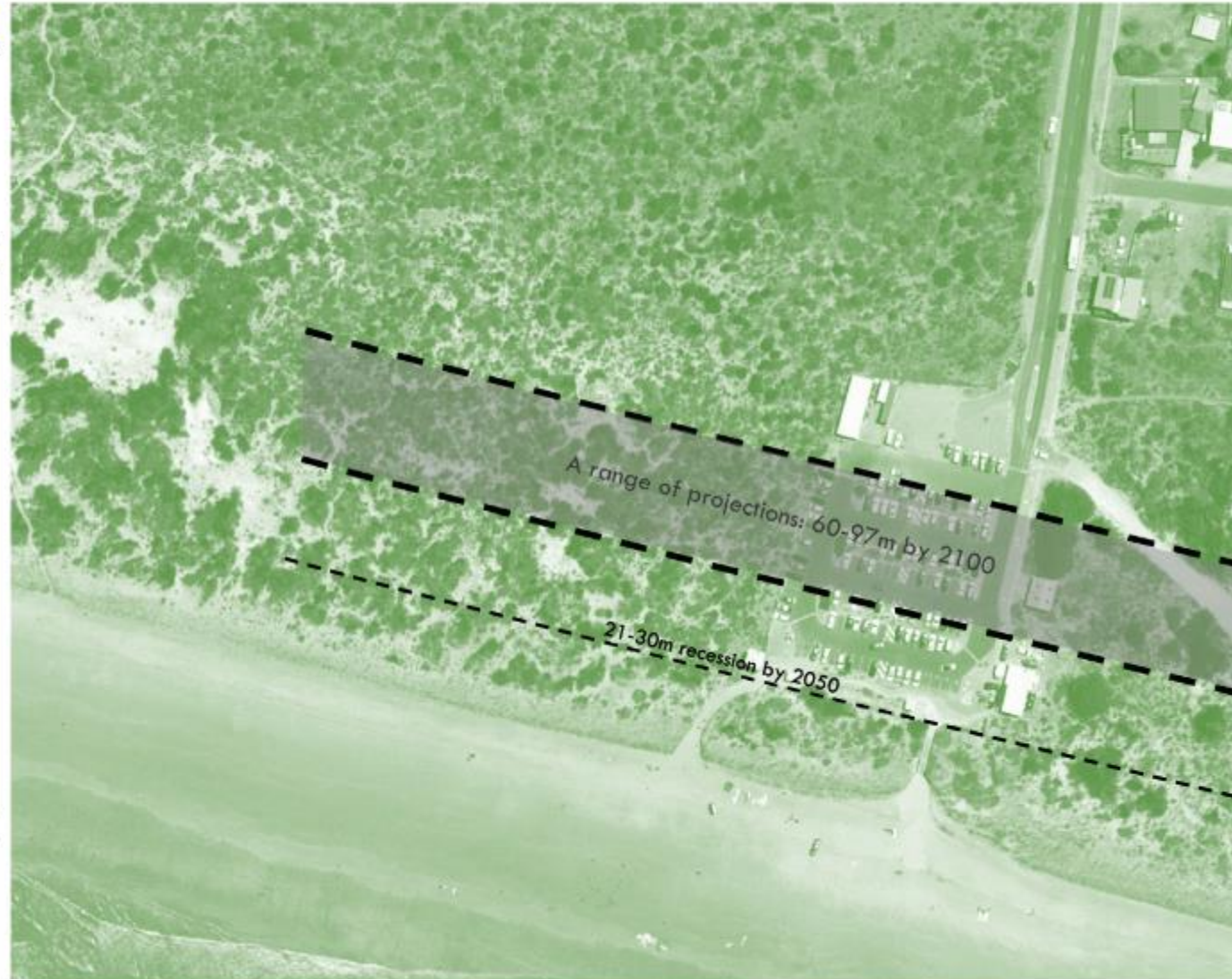
A number of evaluation methods have been utilised to provide the basis for an estimate of shoreline recession.

Sea-flood and routine high tide modelling indicates increased impact on dunes. Certainly 2100 scenarios indicate impact of the sea in alignment with the former shoreline.

Erosion assessment is difficult and estimates of shoreline recession is around 97m by 2100. Coast Protection Branch calculated recession of 60m by 2100.



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8a. Assets at risk

In the shorter time frame to 2050, public assets at risk are confined to beach access ways, dune fencing and other beach structures.

In the longer term, erosion estimates suggest that the carpark, walkways and other structures in the carpark are likely to come under threat. However, it is worth noting that the erosion estimates do not take into account any attempt to slow erosion through human intervention of dune fencing, planting, nourishment and other methods utilised to slow erosion.

In particular Council reports that the main beach stairs are often impacted by actions of the sea.

Review: Goolwa Beach Car Park and Surrounds Masterplan

The masterplan for the Goolwa Beach Car Park and Surrounds acknowledges the projection for a 60m recession of the coastline, and also notes that there is currently a 40m buffer between the dune escarpment and the carpark. The problem with this approach is that over time the existing dune buffer will reduce to zero, and in time actions of the sea will be interacting with the hard edge of the carpark. A review by coastal geomorphologists associated with this project (Dr Bouman and Professor Hesp) recommend that an increased buffer be provided to the dune of approximately 20m. This will provide 60m of dune to cater for the natural erosion and accretion cycles the beach may go through, but also for increased flexibility dealing with recession associated with sea level rise over the course of this century.

On a related point, Council reports that sand is constantly drifting into the carpark area. An increased buffer will allow the dune to be managed more naturally and the dune is likely to naturally increase in width and height.



8b. Assets at risk (private)

Private assets are unlikely to be at risk over the course of the current century.

8c. Safety of people

Sea level rise and associated erosion is unlikely to increase risk to the safety of people above that risk which is normally incurred by people at the beach.

8d. Ecology at risk

In this cell the dunes are likely to remain intact until the end of the century. This means that large scale threat to the ecology behind the dunes is unlikely.

9. Risk Assessment

Goolwa Beach (SF3)

Erosion assessment

Risk identification: Erosion is currently, or may in the future, cause the dune system to recede and assets placed at risk.

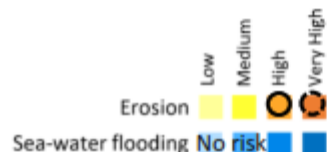
Coastal processes	Goolwa Beach is situated on a dissipative high energy beach facing the Southern Ocean. Over seventy years the coast has remained relatively stable while going through its natural cycles of accretion and erosion. Over the last ten years the Middleton – Goolwa coastline has been undergoing accretion.
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Are any strategies employed to mitigate the risk? Dune fencing and planting assist in limiting the rate of erosion.

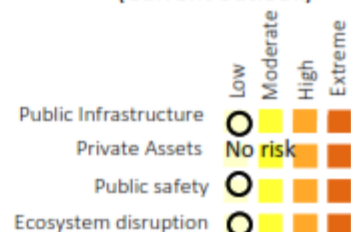
Receiving environment	Coastal Context	Time	Likelihood	Consequence	Risk
Public infrastructure	Carpark, walking pathways and tracks, beach access stairs, Surf Life Saving Club, and café, beach foreshore furniture. Currently the beach is in an accretion cycle.	current	<i>Unlikely</i>	<i>Minor</i>	low
		2100	<i>Likely</i>	<i>Significant</i>	high
Private assets	Private assets are not located in the vicinity of Goolwa Beach.	current	<i>No risk</i>	<i>No risk</i>	No risk
		2100	<i>No risk</i>	<i>No risk</i>	No risk
Safety of people	This assessment does not relate to general beach safety of pedestrians or swimmers. It relates only to how the safety of people may be exacerbated due to increased sea level (and associated impacts)	current	<i>Rare</i>	<i>Minor</i>	low
		2100	<i>Rare</i>	<i>Minor</i>	low
Ecosystem disruption	This assessment relates to large scale disruption to ecological systems. The dune system is not expected to break down over the course of the century and therefore major ecological disruption is unlikely.	current	<i>Rare</i>	<i>Minor</i>	low
		2100	<i>Unlikely</i>	<i>Minor</i>	low

Inherent Hazard Rating

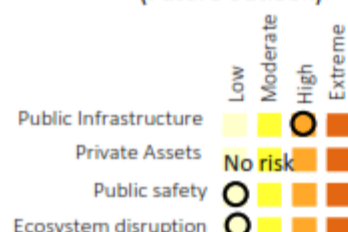
Sandy dissipative high energy beach backed by sand dunes



Erosion Hazard Rating (Current outlook)



Erosion Hazard Rating (Future outlook)



Note: the assignment of future risk assumes that no action is taken to mitigate the risk apart from normal safety procedures.

Rain intensity and storm water impacts not assessed in this risk assessment

Summary

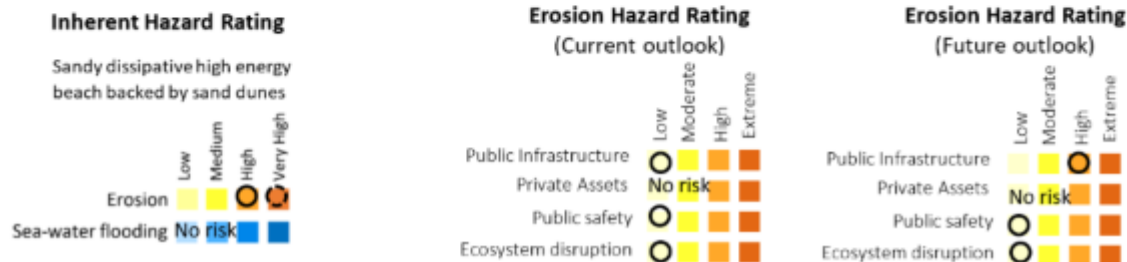
Currently Goolwa Beach is in an accretion cycle, and it is expected that the beach will return to an erosion cycle at some stage. Should the seas rise as projected, then the dunes will be impacted and recede accordingly. Over time the current buffer between the dune escarpment and the carpark will be lost, and actions of the sea will impact the carpark and associated infrastructure.

Adaptation strategy: Goolwa Beach (Cell SF3)

Coastal processes

Goolwa Beach is situated on a dissipative high energy beach facing the Southern Ocean. Over seventy years the coast has remained relatively stable while going through its natural cycles of accretion and erosion. Over the last ten years the Middleton – Goolwa coastline has been undergoing accretion.

Risk outlook



Adaptation overview:

The over-all long-term strategy for Goolwa Beach is to allow the dunes to retreat. Soft options such as dune fencing and planting will slow the rate of erosion. For the Goolwa Carpark area, the recommendation is to increase the dune buffer from 20m to 40m and reorientate the access stairs (ie review and amend Master Plan for Goolwa Beach carpark area. If the dunes erode at a later time in this location then a 'hold the line' strategy is likely to be employed to protect the carpark area or alternatively, accept loss.

Summary table:

	Approach	Short term strategy 2020	Mid-term strategy 2050	Long term strategy 2100	Adaptation Type	Monitoring strategy
Goolwa Beach Cell SF3	Incremental (monitor and respond)	Monitor [no immediate works are likely to be required]	Monitor [protection may be required by 2050, or the latter part of this century]	Overall strategy: Allow retreat of dunes. The exception is the carpark area which may need protection later in this century.	Environmental: Increase dune field at the carpark. Continue use of dune fencing and planting. Engineering: Reorientate beach access point.	Shoreline position Sand volumes Storm impacts on backshore

Context - Operational



Middleton



Chiton



Beacon 19



Horseshoe Bay

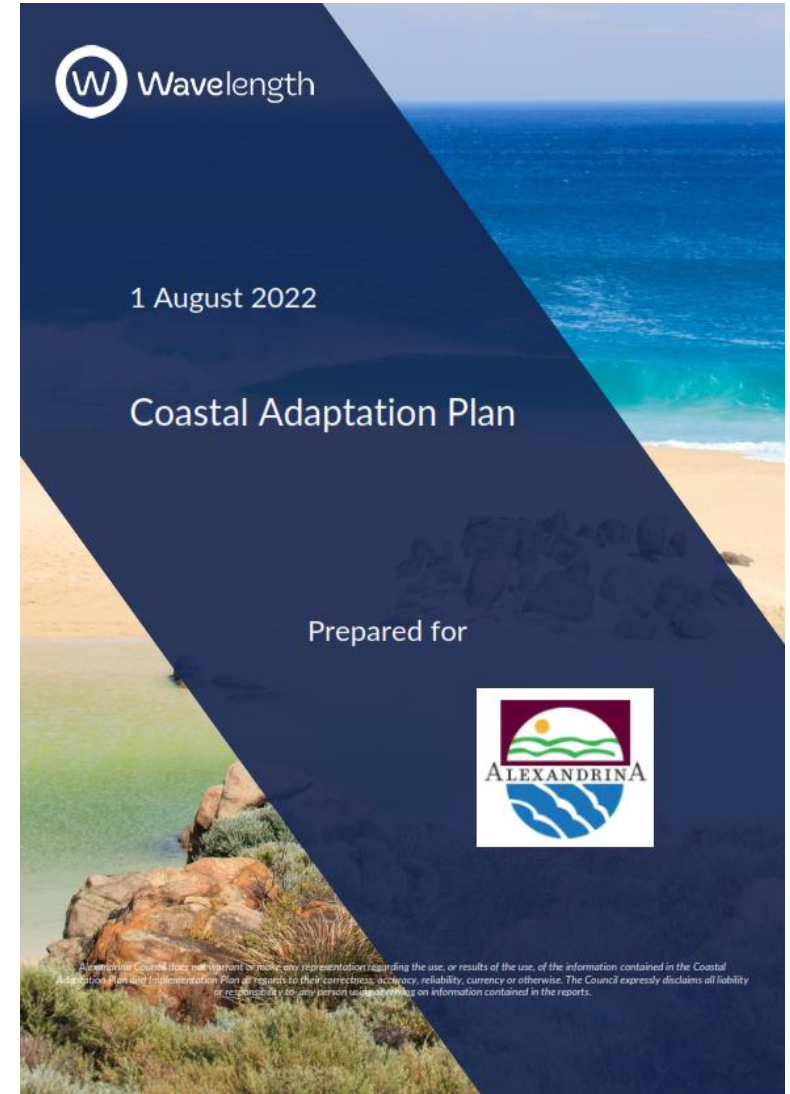
Coastal Adaptation Plan



- Undertaken by Wavelength & URPS
- **Clear and defensible plan for identifying priority works** for the immediate, intermediate, and longer term
- Output:
 1. Coastal Adaptation Report; and
 2. Implementation Plan per cell

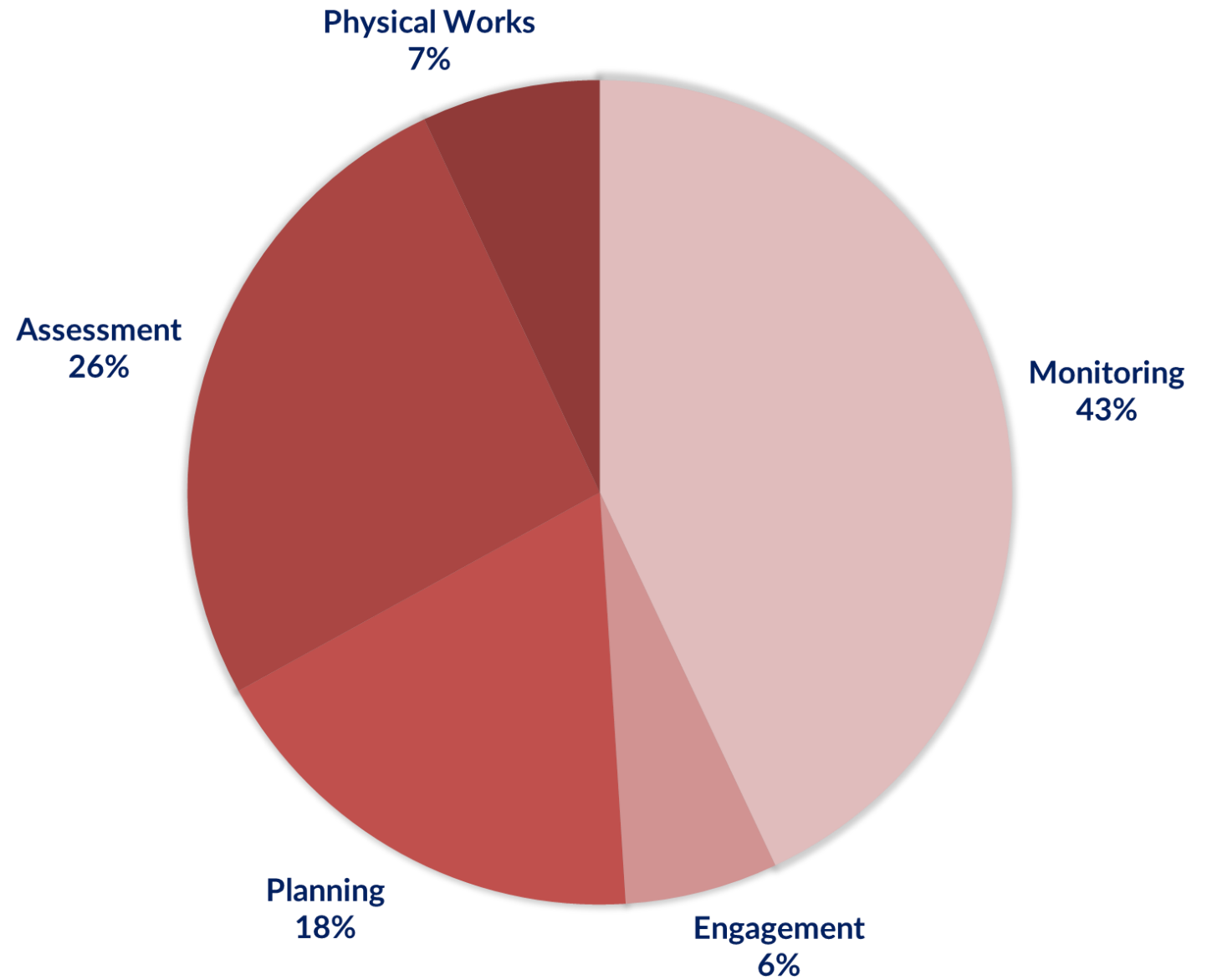
The image shows a collage of various tables and charts from the Coastal Adaptation Plan. Key elements include:

- Cell 1: Working Harbour Settlements**: A table with columns for Cell No., Cell Name, Hazard Rating, Assets at Risk, and Adaptation Overview.
- Cell 2: Gonia Beach**: A table with columns for Cell No., Cell Name, Hazard Rating, Assets at Risk, and Adaptation Overview.
- Cell 3: Middleton Beach**: A table with columns for Cell No., Cell Name, Hazard Rating, Assets at Risk, and Adaptation Overview.
- Cell 4: Tokoumou Reserve**: A table with columns for Cell No., Cell Name, Hazard Rating, Assets at Risk, and Adaptation Overview.
- Cell 5: Middleton Creek**: A table with columns for Cell No., Cell Name, Hazard Rating, Assets at Risk, and Adaptation Overview.
- Cell 6: Gonia Bay**: A table with columns for Cell No., Cell Name, Hazard Rating, Assets at Risk, and Adaptation Overview.
- Cell 7: Ratalang Basham**: A table with columns for Cell No., Cell Name, Hazard Rating, Assets at Risk, and Adaptation Overview.
- Cell 8: Broomer - Highgate Beach**: A table with columns for Cell No., Cell Name, Hazard Rating, Assets at Risk, and Adaptation Overview.
- Cell 9: Dinkley Bay**: A table with columns for Cell No., Cell Name, Hazard Rating, Assets at Risk, and Adaptation Overview.
- Alexandria Council - Coastal Adaptation Plan Monitoring Plan**: A summary table with columns for Cell ID, Cell Name, Risk Name, Risk Description, Status, Responsibility, and Completion Date.



Implementation Plans

Category of tasks



Next steps / priority actions

1. Establish coastal monitoring programs (all cells)
2. Engage with the Attorney General's Department Planning and Land Use Services review process (Middleton)
3. Communicate risk to the Crown Land and the Railway Society regarding the train line
4. Consultation regarding current and future flood risk (Murray Estuary)
5. Data collection and modelling study (Horseshoe Bay)
6. Initial consultation with asset owners regarding the master planning process (Horseshoe Bay)



Questions