

# **CHARLES STURT'S COASTLINE**

AN OVERVIEW, QUICK HISTORY & UPDATE

# **GEOGRAPHICAL SETTING**

- Exposed to the ocean swells from the south west
- Prevailing south westerly sea breezes also generate waves from the south west
- Driving sand in a northerly direction along the east of Gulf St Vincent
- The rate in which sand is moving north is increasing
- Whilst that explains the natural system it is important to reflect on the impact of early settlement...



# LOCAL SETTING & LITTORAL DRIFT



## THE PAST

### Impact of early settlement (1800 – 1970s)

- All coastal environments have a natural process that relies on the availability of a sand buffer (a dune). In general some of this sand can move offshore in winter and come back onshore during summer.
- European settlement interfered with this in most parts of Australia by clearing the dunes for development.
- Removing this sand supply is a key reason coastal management has been an uphill battle ever since.
- Natural coastal processes, such as storms, then had significant impacts on the foreshore.
- Pollution of the rivers and streams (fertilizers, phosphates animal waste & sewage etc) also lead to the dieback of seagrass meadows, resulting in higher wave energy and greater impact on the beaches (more sand lost).
- Subsequently, construction of seawalls and groynes ultimately impinge on the beach and the natural processes, promoted the loss of beach.
- Leaves us with most metro beaches across the country being "managed".

**Replenishing / recirculating / recycling sand at frequent intervals to counter littoral drift.** 

## IT'S BEEN BAD BEFORE...

*By the 1960s....* 

- Adelaide's coastline was is a bad way
- Asbestos shacks along the coast
- Unplanned, ineffective structures littered the coastline
- The dunes were unmanaged and unstable
- Property and infrastructure was at serious risk
- By the end of the 1960's it was clear something had to be done...





The 'Beach Shacks' that were between Henley Beach Rd and the old swimming pool at Henley.

Interesting to note the top of the Shacks are at current road level.

Image Courtesy Merve Allen



Shows the remnants of the Shacks after a storm in 1947.

Image Courtesy Merve Allen



Shows the view of the Seawall opposite Gilmore Rd in 1963, prior to the rock being installed in front of the wall.

Image Courtesy Merve Allen



### **COAST PROTECTION BOARD [CPB] ESTABLISHED** *By the 1970s....*

In 1970 the Culver Report - identified to stop further coastal development, nourish the beaches and maintain sand reserves where possible.

Coastal Protection Board was established in 1972, a number of management approaches have been adopted subsequently:

Adopted sand recycling as the management approach (back-passing and nourishing)

Back-passing = Moving sand from North to South.

"Recycling to back to where it came from".

- Together with:
  - Improved seawall design....
  - Dune management
  - Monitoring (beach profiles, seagrass meadows)

# THE PROBLEM AS IT STANDS

- CCS hot spots, the general depletion of sand, leads to loss of the berms or the series of offshore sandbars.
- Critical in dissipating the wave energy off shore.
- Exacerbated by the loss of seagrass meadows
  - harvested after white settlement, further denuded by high nutrient run off.
- Once the sand volume is depleted the full force of the wave action happens on the exposed beach and this accelerates the carve out and transportation of sand.
- Then in storm events it has the effect of carving out dune faces creating danger, mass sand loss and lost amenity



# **SEMAPHORE PARK**













# JOES KIOSK







# HENLEY SURF CLUB

# **DIFFERENT PROBLEMS ELSEWHERE IN SA**



Accretion of sands severely impacting a property at North Beach, Wallaroo, SA.

### ADELAIDE LIVING BEACHES 2005 [ALB]

To limit the disruption of trucking sand, in 2005 the "Adelaide Living Beaches Strategy "was formed.

Further technical studies undertaken building on the Culver Report. Broadly, key themes;

- 1. Continue to recycle sand
- 2. Use a pipeline to improve efficiency and reduce disruption
- Implemented by the Labor Govt in the southern metro beaches
- Proven effective
- Project not completed in the central / northern beaches. Lack of \$
- Trucks continued North of Glenelg. (West beach onwards)



## **DHI STUDY**

- In 2016 CCS convened a series of Coastal Stakeholder Workshops to raise awareness.
- CCS Co-funded the DHI Study (CCS, West Beach Parks and DEWNR) DHI: Danish company, world leaders operate globally in 150 countries
- To address:
  - Failings of the ALB strategy.
  - Plug Data Gaps.
  - Provide contemporary Analysis (supercomputer modelling) and Recommended Solutions

### West Beach Coastal Processes Study

**Stakeholder Presentation** 

*Tim Womersley – Principal Engineer;* 

6 December 2018



Extracts of Presentation

- Full Prestation will be

available on EM's

Extranet

### **Beach Volume History of West Beach**

- Significant decline mid-late 1980s
- 1M m3 mass nourishment 1990s significantly increased beach volume
- Volumes have declined continuously since late 1990s
- Total volume loss approximately 600,000m3





### 2011-2017 Conceptual Model of West Beach



- Longshore transport capacity is upto 2x greater than previous estimates
- The rate of erosion observed is very significant (~60,000m3/yr)
- Without the sand backpassing over this period, the rate of erosion observed would have been worse



© DHI

### Selection of Potential Management Options for West Beach

Principal Technical and Feasibility Considerations agreed by DEW

- Significant initial nourishment required to restore the beach volume of West Beach
- Continuing to backpass from Torrens Outlet would need additional external sources of sand
- All management options would need to provide ongoing supply of sand to downdrift Henley Beach cell that match the longshore transport capacity of 100,000m3/yr



### **Key Findings**

- A sustainable solution to the observed erosion problems at West Beach needs to include some form of long term nourishment at a rate of around 100,000 m3/yr on average; otherwise, the erosion problems will continue to worsen and migrate northwards into the Henley Beach cell.
- A mass nourishment at West Beach of around 1.5 M m3 will solve the erosion problems at West Beach and prevent erosion of Henley Beach cell for a period of at least 7.5 years. Back-passing sand from Torrens Outlet could extend the benefit of the mass nourishment solution for up to 10 years.
- Back-passing sand at a rate of around 100,000 m3/year from the northern sediment cells via a pumping system every year would stabilise the erosion at West Beach.





#### West Beach

Around 600,000 m<sup>3</sup> of sand has been lost from West Beach since 1994 as it has drifted northwards.

#### Semaphore, Largs Bay, Taperoo

More than 1.4 million m<sup>3</sup> of sand has built up in Semaphore, Largs Bay and Taperoo since 1994.

#### Source DEW: Managing Adelaide's Beaches

# **DEW / PREVIOUS GOVERNMENT POLICY**



#### About the project

The state government has committed \$48.4 million to secure the future of our coastline. The project will:

- Construct a sand recycling pipeline from Semaphore to West Beach to move sand from beaches where it builds up.
- Deliver a large quantity of sand (500,000 cubic metres) to West Beach from outside of Adelaide's beach system.
- Restore sand dunes using best practice techniques and native plants in partnership with local councils and coastal community groups.

Before the pipeline is built and the external sand is delivered, sand needs to be moved from Semaphore to protect West Beach in the interim (2020/21). <u>View a</u> <u>brochure</u> with more details about the project including the timelines or <u>read FAQs</u>.

#### Seeking to close out the issue:

Anticipated sand sources not available (Pt Stanvac)

Turned to quarry sand (very expensive)

Pipeline designed and approved (on eve of election)

Public opposition from northern beaches

Mass fill not completed (election)

Program halted on turn of Govt

Further review

### **REVIEW HALTED, FURTHER REVIEW**

 March 2022 (change of Government) project has been "halted" for further "review"

• Seeking to achieve a solution with 'Social Licence'

## **USE OF STRUCTURES**

Global trend is to use sand nourishment and replenishment instead of hard engineering structures like seawalls, groynes, breakwaters.

Replenishment: flexible and adaptive solution and maintains the natural beach amenity & dune environment.

Charles Sturt's coastline does rely on some historic structures (rock and vertical walls) and ongoing nourishment

A significant negative of structures is that where water then comes into contact with them (if beach levels are low) they accelerate the erosion and move the problem area immediately north of the structure, and so push the problem further along the coast.





And, Who Pay\$?

## **CURRENT MANAGEMENT PRACTICES**

#### **Coastal structures**

The rock and vertical walls along Charles Sturt's coastline are in varyingcondition.Mostly constructed by State Govt E&WS, now Councils problem

Most are at / or near the end of life (taken a hammering!) -> inadequate sand

Without ongoing nourishment, a beach in front of a rock/seawall is lost and promotes greater damage to the structure in storms,Problem moves north along to the next section

Recent Govt offer to contribute to design cost of Rock Wall at Joes Kiosk. Is this an acceptable solution?



Degraded historic Seawall at Henley South



### **ROCKWALL COSTS**

Current estimates are in the order of \$30k/metre - limited or no rock that can

- be recycled
- limited beach width.

May also require structure behind the rock due to limited space and assets.

From Lexington to Joe's Kiosk could be in range of \$18M and \$32M.

Likely at the higher end.



## JOES KIOSK

# When wall last painted

Now



### **SEMAPHORE PARK**

- Continual loss of dune
- Beach access often impacted due to erosion scarp
- No protection structures
- Private properties and other assets...
  - roads, lighting, stormwater in close proximity behind dune

## CRITICAL LOCATIONS ATM....

- West Beach & West beach Parks
- Rockingham st Dunes
- Henley South (Lexington Rd to Henley Beach Rd )
- Henley
- Bournemouth St
- Iluka Place Sempahore Park



## GOVT REVIEW, TOR & PANEL MEMBERS

#### Function

The Panel's role is to report to the Attorney-General (the Minister responsible for the Review) and the Department and provide assurance, advice and recommendations on matters relevant to the Terms of Reference in order to facilitate decision making.

#### Responsibilities

The Panel will:

- Inform the government's approach to sand management through their active involvement in the Panel.
- Facilitate an open, accurate, reciprocal communication channel to ask questions, raise issues and opportunities, and seek clarification or further information.
- Consider the approach and recommendations relating to the broader engagement and communications regarding sand management for the review.
- Consider the issues, concerns and values of the various interest groups and communities to inform the Panel's recommendations.
- Review ideas and concepts for sand management approaches as supported by scientific advice and provide feedback.
- Provide a forum to identify opportunities and resolve possible risks and issues of concern relating to the review.
- Receive and endorse quarterly briefings for updating the Attorney-General on the progress and outcomes of the review.

#### **Advisory Panel members:**

- Mark Searle, former CEO City of Marion
- Les Wanganeen, Kaurna representative
- Sarah Smith, Kaurna representative
- Beverley Clarke Professor, social science expert from Flinders University
- Nicholas Harvey Professor Emeritus, coastal science researcher from the University of Adelaide
- Michael Young Professor Emeritus, environmental science expert from the University of Adelaide.

# WHAT NOW?

### **Council approach..**

#### **Other Council technical work**

Current project underway to better understand the severity (quantify) coastal risk and assets at risk by undertaking a Coastal Hazard Risk Study

The project is collecting data, analysing & set recmended priorities in light of:

- Condition of existing / historic protection assets
- Detail the assets at risk



# **THANK YOU**