Adelaide Beach Management Review Implementation Program 2025-26

Recycling of sand by truck in the Northern Management Area

Government of South Australia
Department for Environment and Water

Table of Contents

1 Introduction

1.1 Background

The independent Adelaide Beach Management Review (ABMR or 'the Review') was an election commitment to review sand management practices employed on Adelaide's beaches by the incoming South Australian Government in 2022.

An Independent Advisory Panel (the Panel) was appointed to oversee a process for the identification of sustainable sand management approaches on Adelaide's beaches that could achieve the following three objectives:

1. Maintain sandy beaches,
2. Minimise community disruption, and
3. Avoid environmental harm.

The process involved a desktop scientific review of Adelaide beach management by independent firm Bluecoast Consulting Engineers, and a program of community consultation facilitated by independent engagement specialists URPS.

The Panel considered the outcomes of this work, documented in the ***ABMR Independent Advisory Panel Report***, and made two key recommendations:

1. Restore West Beach with external sand within 5 years.
2. Recycle sand between northern beaches and West Beach.

DEW was tasked with implementing the Panel's recommendations, including reviewing the feasibility of dredging as a means of restoring West Beach and managing sand within the system.

This report provides a summary of the operations that would be implemented in a 'Recycling by truck' scenario to meet Recommendation 2.

1.2 Purpose

The aim of this report is to outline the program of work that would be required to deliver a long-term recycling program between the northern beaches and West Beach using trucks, or sand carting. The recycling program would be required to sustainably recycle 90,000 m^3 of sand on average per annum from the northern beaches to West Beach.

This report provides information on the planning and approvals pathways, location and volume of suitable sand sources sustainably accessible by truck, operational program timeframes, and indicative costings based on DEW's current sand carting campaign costs. Operational constraints, risks and challenges are also outlined along with advantages and opportunities.

2 Regulatory Framework

The relevant referral agencies to any recycling program include the Coast Protection Board and the EPA. The EPA assesses and provides guidance on development applications referred under the PDI Act whereas the Coast Protection Board has the power of direction (if required).

Planning, Development and Infrastructure Act 2016 (PDI Act) The Planning, Development and Infrastructure Act 2016 (PDI Act) establishes South Australia's planning and development system – providing for infrastructure planning, encouraging state wide economic growth and supporting liveability, in an ecologically sustainable way. The PDI Act includes the Planning and Design Code which is a single set of planning rules for the entire state. It includes various zones, overlays, general development policies including design standards and guidance. Several agencies with specific expertise may be deferred development applications for assessment when applicable.	PDI Act – development application is not required
Coast Protection Act 1972 The *Coast Protection Act 1972* works to protect South Australia's coast from erosion, damage, deterioration, pollution and misuse amongst other things. The Coast Protection Board (CPB) was formed in 1972 with the proclamation of the Act. .	Under the Act, the Board has the power to carry out works and remove sand. Therefore, certain activities required to recycle sand can be administered by the Coast Protection Board. authorisation of works is sought from the Presiding Member of the Coast Protection Board (CPB). CPB authorisation is managed internally by DEW consequently, timeframes associated with acquiring the necessary approvals is relatively short.
Environment Protection Act 1993 (EP Act) The Environment Protection Act, 1993 (EP Act) provides the regulatory framework to support the protection of South Australia's environment including land, air and water and is administered by the Environment Protection Authority. The Act outlines the obligations of businesses and individuals to protect the environment, as well as enforcement processes and penalties for non compliance. The EPA are a referral body under the PDI Act and will be requested to assess and provide comment on any development application when applicable. The EPA also regulate the act of dredging through a separate process Dredging is a prescribed activity of environmental significance under the EP Act and defined as '*removing solid matter*[1] *from the bed of any marine waters*[2] *or inland waters by any digging or suction apparatus, but excluding works carried out for the establishment of a visual aid to navigation and any lawful fishing or recreational activity*'. The EPA has regulatory responsibilities under the EP Act for licensing dredging.	In this instance the EPA's legislative requirements under the *Environment Protection Act 1993* relate to dredging for this activity. Therefore, a relevant dredge licence and approved DMP is required prior to works commencing. The activity of the removal of sand from the intertidal area is regarded as dredging. Consequently, any activity to recycle sand will require the following: Submission of a new licence application for the dredging activity to the EPA for assessment. This is to include a Dredge Management Plan (DMP). It is important to note that contractors can already hold a licence to dredge which is not site or job specific. However, a relevant and approved DMP is required to dredge. The DMP needs to contain sufficient information for the EPA to be confident that potential impacts on the environment, and public health and amenity have been identified and suitable measures to mitigate those impacts will be applied for the entirety of the project. Additional studies may be required to support the DMP. This requirement is at the discretion of the EPA

	Once the DMP is approved by the EPA, a licence can be issued for the works, provided there is a related approved development application. The Licence would include Conditions including the submission of the final DMP. EPA assessment and approval includes a statutory requirement for a minimum 2 week public notification. Any submissions received from the public notification process must be addressed by the applicant at this stage. Notifications are required with relevant stakeholders prior to works commencing including private land holders and councils

2.1 Procurement

The procurement process for the sand carting program is managed under the Panel Agreement established in 2021 for the movement of sand along the Adelaide Metropolitan beaches. Any contract awarded under the Panel Agreement is considered a secondary procurement which provides significant advantages. Works for the sand carting campaigns are generally awarded and delivered by one contractor.

3 Recycling sand by truck (sand carting)

The coastal management practice of sand carting has been undertaken along the Adelaide metropolitan coast since the 1970s. Sand carting has largely been focused in the Northen Management Area to recycle beach sand from the northern areas to West Beach after the construction of the southern sand pumping pipeline in 2014. Sand carting involves the use of civil machinery to backpass or recycle sand (forward-passing and/or back-passing) from suitable areas where sand accretes to areas where coastal erosion is occurring.

Sand carting is typically undertaken in autumn and spring and is subject to change depending on the needs and status of the coastline at that time. Programs are designed to avoid high use periods such as school holidays.

3.1 Equipment

A typical campaign generally includes the following equipment:

Sand harvesting:

- 1x tractor with a land plane (scraper) attachment
- 1x excavator.

Sand loading:

- 2x excavators + 1 x conveyor (if required to transport under Semaphore Jetty)
- 1x loader/ excavator
- 1 to 2 x dump trucks (to/from temporary stockpiles)
- 10 to 15 x road trucks (6 axles semitrailers carrying 25 to 29t of sand per load).

Re-loading of sand from road truck onto dump truck at placement area:

- 1 x 30t excavator
- 2 -4 x dump trucks.

Shaping of sand placement

- 1 x 36t excavator
- 1 x bulldozer.

Other operational requirements:

- signage
- development and delivery of various communications materials
- traffic management / spotter
- DEW employed site supervisor
- bird spotters
- repair and replacement of associated infrastructure e.g. kerbing.

3.2 Operational Program

Suitable sand sources have been determined based on modelling from long-term monitoring datasets. The volume for delivery to West Beach (on average per annum) to maintain beach levels is 90,000 m^3/year.

A sand carting program to achieve this is outlined below:

Collection Area		Volume	Timeframe	Equipment at Collection Area	Equipment at Placement Area
Semaphore Breakwater		40,000	2 months	1 x tractor with landplane 1 x 30t excavator 1 x loader 2 x dump trucks 10-15 x road trucks	1 x 30t excavator 2 x dump trucks 1 x bulldozer 10-15 x road trucks from Collection Area
Semaphore-Largs Bay Jetty		20,000	1 month	1 x tractor with landplane 2x 30t excavators 1 x conveyor 1 x loader 2 x dump trucks 10-15 x road trucks	1 x 30t excavator 2 x dump trucks 1 x bulldozer 10-15 x road trucks from Collection Area
Largs Bay Jetty-Seafield Tce		15,000	2-3 weeks	1 x tractor with landplane 1 x 30t excavator 1 x loader 2 x dump trucks 10-15 x road trucks	1 x 30t excavator 2 x dump trucks 1 x bulldozer 10-15 x road trucks from Collection Area
Torrens Outlet	via road	15,000	2-3 weeks	1 x tractor with landplane 1 x 30t excavator 1 x loader 2 x dump trucks 10-15 x road trucks	1 x 30t excavator 2 x dump trucks 1 x bulldozer 10-15 x road trucks from Collection Area
	Via beach	15,000	2-3 weeks	1 x 30t excavator 4 x dump trucks	4 x road trucks 1 x excavator for shaping
	via existing pipeline	15,000	5-6 weeks	1 x Sand Collection Unit 1 x tractor with landplane 1 x 30t excavator	No other equipment required at these discharge outlets

Note: Each road truck will complete 6-7 loads each per day which results in 12-14 truck movements (in and out) per day per truck.

3.3 Indicative Costs

The average cost to collect, deliver and spread beach sand from within the Northern Management Area varies with the borrow and placement areas chosen. For short distances and easily accessible harvest locations (e.g. Semaphore breakwater) costs are significantly lower than harvesting from Largs Bay and Semaphore jetty. This is due to the complexities with transferring sand underneath the historic Semaphore jetty. This broad range in costs adds to the complexities of being able to forecast budget requirements with an adequate level of certainty. However, cost estimates for the proposed recycling program are outlined below:

Collection Area		Volume (m^3)	Costs/m^3	Total Cost
Semaphore Breakwater		40,000	$20-$25	$800,000-1,000,000
Largs Bay Jetty		20,000	$25-$30	$500,000-$600,000
Largs North		15,000	$25-$30	$375,000-$450,000
Torrens Outlet	via road	15,000	$15-$20	$225,000-$300,000
	via beach	15,000	$7-$10	$105,000-$150,000
	via existing pipeline	15,000	$3-$5	$45,000-$75,000

4 Considerations

4.1 Risks and Opportunities

Several risks and opportunities to support sand carting are outlined below:

Risks and Constraints	Opportunities and Benefits
Significant truck movements on local roads.	Established program and methodology. Operational constraints are well understood and level of certainty to deliver a program of works is high.
Significant machinery on the beach.	Flexible program.
Direct impacts (e.g. accelerated deterioration) to beach access infrastructure.	Seagrass and sand can be collected with no separation or screening required.
Construction of additional suitable beach access tracks or improvements to existing access tracks will be required – includes impacts to the dune systems	Campaigns are spread over various sections of beach – resulting in less intense activity in one location.
Disruption to community access to beach during campaigns.	Approval for the works is exempt under the Planning, Development and Infrastructure Act 2016 (PDI Act).
Potential impact on biodiversity from physical movements, including on beach nesting bird sites, meiofauna and other species.	Procurement process is well known with the establishment of a relevant Panel Agreement.
Additional complexities with moving sand underneath the historic Semaphore Jetty.	
Significant consumption of diesel fuel, which has local pollution and carbon emission impacts	

4.2 Assumptions and level of certainty

DEW has been actively undertaking these programs since 2014. The methodologies, constraints and costs are relatively well understood and the level of certainty that the program can be delivered is high.

This methodology allows for operational flexibility, the program can be altered according to the needs and health of the coast at the time or to avoid periods of high activity (e.g. school holidays). For example, sand can be collected from areas where sand is accreting (building up) to areas where the erosion has most occurred in the preceding period, provided the site can be safely accessed by trucks.

However, to support a long-term recycling program using sand carting, improvements to existing access roads will need to be completed. Additional access tracks may also need to be construction. These improvements will require the clearance of dune vegetation and physical disturbance to the coastal dune systems across the Northern Management Area. This is unlikely to be popular with the local community.

5 Summary

The coastal management practice of recycling sand by trucking (sand carting) is a well understood programs of work. The methodology are well established, providing a high level of certainty that the program can be delivered within specified time frames. The program utilise civil machinery and require trucks to enter and move along the public beach.

Harvest and replenishment locations have been determined over time based on long-term monitoring datasets. Improvements have been made to ensure public safety and beach amenity are maintained.

The key risks and constraints include:

- Significant truck movements on local roads and on the beach– both in areas of sand collection and sand placement.
- Requires large fleet of vehicles which may be impacted by truck demands generated by other civil works projects (e.g. T2D).
- Significant consumption of diesel fuel.
- Disruption to community access to beach during campaigns.
- Potential impact on biodiversity from physical movements.
- Uncertainties in costs as these directly relate to distances between harvest and replenishment zones.

The key known opportunities or benefits include:

- The methodology is well established.
- Operational flexibility with the ability to adjust timing of sand delivery.

Regulatory approvals from both the CPB and the EPA is required prior to works commencing. Under the *Environment Protection Act 1993* (EP Act), the collection of sand from the intertidal area is regarded as dredging under the EP Act. This enacts an additional approvals process from the EPA. Consequently, the approvals requirements for each can be lengthy and subject to EPA discretion.