Scope Summary

Impact Assessment (Phase 2) of Moving Sand from Adelaide's Northern Beaches

1. Context

The Department for Environment and Water is commissioning independent assessments of the potential impacts on the northern Adelaide metropolitan beaches (Henley Beach to North Haven) of sand movement activities associated with the *Securing the future of our coastline* project. The potential impacts of two components of the project are being assessed:

- *Phase 1 (Completed): Interim sand management (2020-21): sand carting from the northern beaches to West Beach to match current rates of sand loss from West Beach while a new sand pumping system is planned, designed and constructed from West Beach to the northern beaches.*
- Phase 2: Ongoing sand management – use of the new sand pumping system to recycle sand on an annual basis from the northern beaches to West Beach to match measured sediment transport rates out of West Beach.

This document summarises the scope of Phase 2 of the independent impact assessment.

2. Background

The Adelaide metropolitan beach system between Kingston Park and Outer Harbor has been actively managed since 1973, when the Coast Protection Board began implementing a protection strategy focussed on beach replenishment. This protection strategy was designed to combat the ongoing, natural erosion of the coast and provide buffers for coastal development and infrastructure against storm damage. Sand is taken from areas of accretion to replenish eroding beaches. A key aspect, and reflected in subsequent strategies, is the recognition that coastal management is adaptive by nature, needing to respond to climate and geomorphological variability and social and economic changes.

In 2005, the *Adelaide's Living Beaches* strategy was adopted. Rather than continue treating the metropolitan beach system as one continuous beach, the strategy incorporated new and older coastal infrastructure at Glenelg, West Beach and Semaphore South and divided Adelaide's beaches into cells. These cells became discrete areas of management, with pumps and pipeline infrastructure proposed to enable flexible movement of sand within and across these cells. When the Government of the time considered the strategy and its cost implications, not all the infrastructure was delivered. Two sections of pipeline were built at critical locations – between Glenelg and Kingston Park; and from the Torrens Outlet dunes to West Beach.

The existing system from Glenelg to Kingston Park has been operating effectively on an annual basis. The West Beach system was operated successfully until 2017, but has not been used in the last three years due to beach management considerations at the sand collection zone near the River Torrens Outlet.

The sand pumping system at West Beach has been effective at recycling sand within the West Beach coastal management cell. However, the original intent of the system was that the pipeline would extend northwards to Semaphore to allow additional sand to be brought back efficiently to offset losses within the West Beach cell. The decision not to construct the northern section of pipeline meant that sand had to be trucked back from Semaphore at high cost. Only limited quantities of sand could be trucked back from Semaphore within the available operational budget, leading to an overall and ongoing decline in the volumes of sand within West Beach. As a result, coastal erosion represents an increasing threat to public infrastructure at West Beach.

In response to the increasing sand management issues at West Beach, DEW commissioned a coastal processes modelling study in 2017, undertaken by the Danish Hydraulics Institute (DHI). The key findings of the 2018 DHI Report included:

- The West Beach management cell is experiencing an alongshore sand transport of approximately 115,000 m3/year on average, leading to a net loss above the present rates of replenishment of approximately 60,000m3/year, and has been doing so since the sand pumping started.
- The West Beach area has steadily lost sand since beach profile monitoring started (the first useable data was collected in 1978), except when boosted by the large scale external replenishment program in the early 1990s, and in a minor way by bypassing sand around the West Beach harbour in the 2000s.
- The replenishment from Torrens Outlet dunes to the West Beach dunes (back-passing, or moving sand from north to south against the direction of natural sand movement, within this cell) has reduced the erosion which would otherwise have occurred on the south end of West Beach. The reduction has not been large enough to mitigate erosion.
- The sand harvesting at Torrens Outlet has likely increased the decline in sand volumes observed on the southern section of Henley Beach, by reducing the amount of sand reaching this section of the shoreline by 10,000 - 20,000 m3/year.
- Maintaining current beach management activities will further draw down the Torrens Outlet dunes and the erosion of the West Beach and Henley Beach South dunes will continue. The narrowing of Henley Beach South dune buffers will progressively move northward as sand availability further reduces.
- Net accretion (build-up of sand) has occurred in Largs Bay and North Haven, equivalent to the loss from West Beach. A component of this accretion is likely to be from the onshore and northward movement of sand from the historic loss of offshore seagrass meadows.
- Accretion has also occurred at the northern end of Henley Beach and Semaphore (the location of the offshore breakwater salient).

Based on these findings and the scenario modelling undertaken by DHI, the solution for the long term management of Adelaide's beaches recommended to government by the Coast Protection Board and DEW was:

- Large scale replenishment of West Beach and Henley Beach South from an external sand source.
- Construction of a sand pumping system from Semaphore to West Beach to enable effective and efficient sand recycling.
- For the interim period during planning and delivery of the above two components, immediately increase sand carting from the northern beaches to West Beach to stabilise existing beach levels and dunes.

Further background information, including the *Adelaide's Living Beaches* Technical Report, the DHI report and FAQs on the Securing the Future of Our Coastline project, is available at:

https://www.environment.sa.gov.au/topics/coasts/managing-adelaides-beaches

3. The Securing the Future of Our Coastline Project

In the 2019-20 budget, the South Australian Government announced the $48.4 million *Securing the Future of our Coastline* project. The project is being delivered over four financial years from 2019-20 to 2022-23 and consists of three main elements:

- An immediate increase in beach replenishment to match the rate of sand loss at West Beach and Henley Beach South in the short term (2019-20 and 2020-21).
- Large scale beach replenishment at West Beach (up to 500,000 cubic metres) from an external source.
- Construction of a sand recycling pipeline from Semaphore to West Beach.

In addition, works to rebuild, revegetate and stabilise sand dune buffers will be undertaken in partnership with councils and the community.

The scope and timeframes for delivery of the Securing the Future of our Coastline initiative as announced by the Minister are shown in Attachment 1.

4. Phase 2 Impact Assessment: Ongoing Sand Movement Operations (post pipeline construction)

4.1. Activity to be assessed

- Annual movement to West Beach of sand from areas of sand accumulation between Henley Beach and Largs Bay (hereafter referred to as the northern beaches) using the sand pumping system to be constructed as part of the *Securing the future of our coastline* project.
- The annual volume of sand to be moved to West Beach will match the net volume loss from West Beach each year (due to littoral drift) as measured by annual topographical survey information. (The West Beach Coastal Processes Modelling study (DHI, 2018) estimated that the annual rate of sand movement due to littoral drift out of West Beach is between 50,000 and 150,000m^3/year, with a long term average of between 100,000 and 115,000m^3/year.)
- Sand will be collected by land plane (scraper) from the beach between the low water mark and 5m from the toe of dune and pumped to West Beach using a sand pumping system that is yet to be designed, but will be similar to the existing sand pumping systems on the Adelaide metropolitan coast. The locations of sand intake points to the pumping system have yet to be determined.

4.2. Methodology

The methodology is to be developed by the consultant. It is anticipated that the methodology will include:

- Analysis of the department's beach profile line monitoring records to identify long term trends of accretion and/or erosion along the northern beaches.
- Updating of the total sand volumes for management cells 4 to 7 as calculated by DHI (2018) to include the profile data collected since that study.
- Use the above analysis to provide advice regarding possible sand collection areas and pipeline intake locations for the new sand pumping system.
- Based on these sand collection areas and intake locations, undertake an analysis of backpassing scenarios (to be agreed with the department) based on a range of assumed future annual sediment transport rates out of West Beach to determine possible impacts on the northern beaches.

4.3. Assessment Required

Environmental

- Review the findings of the West Beach Coastal Processes Modelling study (DHI, 2018) and in particular the total sand volume analysis (changes over time) for each sand management cell undertaken by DHI.
- Update the total sand volume analysis for each sand management cell with beach profile line data collected since the DHI study.
- Use this analysis and previous investigations into sand movement along Adelaide's metropolitan coastline to assess any potential longer term impacts on the beaches and dune systems between West Beach and Largs Bay as a result of the ongoing implementation of the sand movement strategy outlined in Section 4.1 (following construction of the sand pumping system).
- Make comment on whether backpassing of sand using the sand pumping system increases potential sediment transport rates through disturbance and destabilisation of the beach in the collection and deposition areas.
- Make comment on implementation and operational strategies to mitigate potential:
    - impacts of the sand movement works on beach in-fauna.
    - impacts of the sand movement works on bird and marine life.

Social

- Make comment on possible implementation and operational strategies to mitigate social impacts associated with potential:
    - accessibility issues due to dune recession or erosion scarps.

- noise pollution issues.
- public safety risks during operation.
- public safety issues associated with erosion scarps as a result of sand movement works.

Economic

- Based on any identified long term dune recession, assess the remaining "dune buffer" that provides protection to infrastructure and any risks associated with damage to public or private infrastructure.

4.4. Reporting

- Prepare a draft report summarising findings. Give a presentation on the draft report to the *Securing the future of our coasts* Community Reference Group (either in person or remotely via video conferencing).
- The draft report is to include recommendations for operational procedures to mitigate identified impacts.
- Respond to comments on the draft report and prepare a final report incorporating agreed changes.

4.5. Not Included in Scope

- Assessment of impacts during construction of the sand pumping system from West Beach to Semaphore.
- Assessment of impacts associated with deposition of sand at West Beach.
- Greenhouse gas emission analysis.
- New field work such as topographical surveys or flora and fauna assessments.
- Community consultation (noting that a community consultation process is in place and being implemented by the Department).