

6 PROGRAM OF WORKS AND COST ESTIMATE

6.1 Program of works

After review of the coastal processes, risks and values for each section of the Redcliffe SEMP shoreline and an assessment of the available management options, the following actions have been recommended:

- 1 Upgrade of existing foreshore armouring at Princess Terrace/Haysmouth Parade, Clontarf;
- 2 Formalisation of existing shoreline protection works between Woody Point and Picnic Point, Woody Point;
- 3 Upgrade of existing seawall at Picnic Point, Woody Point;
- 4 Beach nourishment of Margate Beach, Margate;
- 5 Implementation of seawall with beach nourishment at Queens Beach South, Redcliffe
- 6 Beach nourishment with groyne enhancement at Queens Beach, Redcliffe;
- 7 Beach nourishment with groyne enhancement at Queens Beach North, Scarborough;
- 8 Investigate cliff degradation at Drury Point Cliffs (geotechnical investigation and monitoring program);
- 9 Rock armouring of the cliff base at Scarborough Cliffs, Scarborough;
- 10 Extension of rock wall along southern end of Oyster Point Esplanade, Scarborough;
- 11 Ongoing maintenance beach nourishment at eastern beaches, including sand recycling from Redcliffe Point groyne and from Scarborough Point groyne;
- 12 Ongoing maintenance and repair on all shoreline protection structures within RSEMP study area;
- 13 Implementation of a monitoring and review program; and
- 14 Implementation of a dune management program.

A summary of the recommended coastal engineering and management actions for Redcliffe is set out in Table 6-1, including a preliminary estimate of likely costs. It can be seen that implementation of the recommended capital works (i.e. implementation/upgrade of shoreline structures and initial beach nourishment) would cost in the order of \$9M, based on present understanding of the required works and sand sourced from Ningi. The actual costs of implementing the works will vary, depending on the adopted scope, circumstances and timing of the works and activities undertaken. Nevertheless, they provide a basis for planning and budgeting purposes.

This would need to be followed by ongoing maintenance expenditure of about \$270,000 per year for beach nourishment and sand recycling operations, plus about \$270,000 per year for ongoing maintenance and repair of the various existing and proposed shoreline protection structures. In addition, there should be a minimum provision of about \$60,000 per year for beach monitoring, dune management, inspections and project management. It is likely that the monitoring survey costs could be reduced over time.

It should be recognised that protection of private property is primarily the responsibility of the property owners. As such where shoreline protection works are primarily implemented to provide protection to private property, (parts of) these works could be funded by benefited property owners.

It is noted that non-action, or works inconsistent with the recommended SEMP strategy, may result in greater risks and increased rehabilitation costs in the long run.

6.2 Sand sourcing

Implementation of the recommended actions will be dependent on the level of threat, the availability of materials and financial resources.

It is recognized that a significant issue relating to beach nourishment is the sourcing of suitable sand and transportation to the subject site. Most of the current beach nourishment sand for the Eastern Beaches is sourced from a sand pit at Ningi and delivered to site by truck. For planning purposes in this SEMP, a typical costs of \$40 per cubic metre has been applied for sand importation works.

While land based sources would typically require fewer approvals, they may not be preferred in the long term, as there are practical delivery issues associated with them. For large quantities, land based sources would require substantial truck movements, which may cause significant disruption and damage along access roads. Furthermore, land based sand sources may be limited and not be the most cost effective option.

If major beach nourishment exercises were planned, then studies are to be undertaken to identify suitable sand sources and methods of delivery that would cause less community disruption. It is recommended that sand sourcing from Moreton Bay is further investigated as a potential source of sand for beach nourishment. These investigations should include the consideration of the effects of the introduction of Moreton Bay sand (i.e. finer sand) on the beaches and sediment transport processes.

Should available funds for works be limited, priority should be given to those areas where nourishment is most needed or where nourishment is most effective (eg. southern end of coastal segments).

6.3 Funding

Although it is beyond the scope of the RSEMP to address funding issues specifically, with respect to funding of the required works, it is recommended that Council adopts a funding philosophy that is supported by beneficiaries of the works and the wider community.

It should be recognised that protection of private property is primarily the responsibility of the property owners. As such where shoreline protection works are primarily implemented to provide protection to private property, (some of) these works could be partially funded or financed by benefited property owners.

Some of the recommended works may be eligible for government subsidies or funding under State Government or Australian Government programs including:

- **State Government Programs:**

- **Environment Infrastructure Program (EIP):** The level of subsidy under the Environmental Infrastructure Program is dependent on the relative priority of the project and the impact on ratepayers. Any project funded under EIP will receive a minimum subsidy of 25% of the capital cost.
- **NRM Incentives:** Funding may be available through other NRM incentives programs at State level. These can be searched at http://www.regionalnrm.qld.gov.au/get_involved/incentives/search.php.
- **Australian Government Programs**
 - **Natural Disaster Mitigation Program:**¹⁷ Under the Program, funds are available to local councils for natural disaster mitigation works, measures and related activities that contribute to safer, sustainable communities better able to withstand the effects of natural disasters. The Program is run through the three levels of government, with the Australian Government generally contributing one-third of project costs. The State Government is required to match this funding, with the remainder of the funding contributed by local government and potentially private contributions. Variations to this arrangement may apply. Works and activities that are eligible for funding include, but are not limited to: land and building purchase schemes in high risk areas; structural works to protect against damage; and investment in disaster resilient public infrastructure. Projects that are not eligible include: on-going maintenance of existing works and measures; and reimbursement for works and measures already undertaken. Applications for funding are sought on an annual basis.
 - **Caring for our Country:**¹⁸ This program commenced on 1 July 2008, combining the Natural Heritage Trust (NHT), the National Action Plan for Salinity and Water Quality (NAP), Environmental Stewardship Program, the National Landcare Program (NLP), the Working on Country Indigenous land and environmental program, to provide a coherent and coordinated approach to the Australian Government's investment in environment protection and natural resource management. The six national priorities for this funding program are: the national reserve system; biodiversity and natural icons; coastal environments and critical aquatic habitats; sustainable farm practices; natural resource management in remote and northern Australia; and community skills, knowledge and engagement. A business plan will be set on a regular basis that will identify outcomes against each of the national priority areas for investment, and outline targets to achieve these outcomes. Funding may be allocated to eligible proposals for activities to deliver investments against these priorities and targets.
 - **Other Programs:** Funding may also be available under other programs, such as the Indigenous Heritage Program (IHP), if the works comply with funding program objectives and other requirements. For example, the IHP supports projects that identify, conserve and promote the Indigenous heritage values of places important to Aboriginal and Torres Strait Islander people. Other heritage grants and funding can be searched at <http://www.environment.gov.au/heritage/programs/>.

¹⁷ For further information see

http://www.ema.gov.au/aqd/ema/emainternet.nsf/Page/Communities_Natural_Disasters_NDMP_About_the_NDMP (accessed 24 February 2009).

¹⁸ For further information see <http://www.nrm.gov.au/funding/future.html> (accessed 24 February 2009).

Table 6-1 Summary of Recommended Restoration and Management Actions

The Problem	Residential properties at Princess Terrace and Haysmouth Parade within short term erosion zone	Residential properties between Woody Point and Picnic Point within short term erosion zone	Existing concrete seawall at Picnic Point is in poor condition	Margate Bathing Pavilion, infrastructure and recreational facilities at Margate Beach within short term erosion zone	Persistent shoreline erosion at Captain Cook Park; Significant Norfolk Pines and park facilities within short term erosion zone Sand deposition at creek outlet and Reciflle Jetty	Residential properties at Queens Beach within short term erosion zone	Public car park and Council facilities at Queens Beach North within short term erosion zone	Likely Cliff Erosion at Drury Cliffs, but rate of erosion and associated risks unknown	Cliff Erosion at Scarborough Cliffs; Risk of sudden slumping of cliffs and unsafe public beach access (possible casualties)	Road along Oyster Point within short term erosion zone	Persistent loss of sand from Eastern Beaches	Maintenance requirements of existing/recomm ended shoreline protection structures	Limited records of beach processes and behaviour.	Project management to ensure satisfactory completion.
Do Nothing	Private property under erosion threat during storm events	Private property under erosion threat during storm events	Existing concrete seawall at Picnic Point likely to fail during significant storm events	Margate Bathing Pavilion, infrastructure and recreational facilities under erosion threat during storm events	Loss of significant trees and park facilities; Blockage of stormwater drainage system, siltation at Redcliffe Jetty	Private property under erosion threat during storm events	Public carpark and Council facilities under erosion threat during storm events	Ongoing cliff erosion with possible sudden slumping; Possible casualties	Ongoing cliff erosion; Possible casualties (public beach access)	Infrastructure under erosion threat during storm events	Beaches continue to be starved of sand; erosion would continue with reduced beach area and shoreline recession	Deterioration of protection performance	A collection of anecdotal observations of beach behaviour lacking quantified data.	Responsible use of public funds must have milestones of achievement
Proposed Action	Upgrade 90m of existing rock revetment	Formalise/upgrade existing shoreline protection works along 400m of shoreline	Replace existing 80m seawall with a rock wall	Beach nourishment (60,000m ³)	Implementation of 130m long seawall with beach nourishment	Beach nourishment (60,000m ³) plus groyne enhancement of Osbourne Point groyne	Beach nourishment (37,000m ³) plus groyne enhancement of Donkin Street groyne	Undertake geotechnical investigation with ongoing cliff monitoring	Armouring of cliff base Upgrade of staircase	80m extension of existing rock wall	Ongoing beach nourishment and sand recycling (18,000 m ³ /yr)	Ongoing maintenance and repairs	Monitoring at eastern beaches	Project Management
The Outcome	Protection of private property	Protection of private property	Protection of parkland and park facilities	Protection of public assets and improved beach amenity	Protection of public assets and improved beach amenity	Protection of private property and improved beach amenity	Protection of public assets and improved beach amenity	Need for erosion management works determined	Safe public beach access	Protection of public infrastructure	Beaches are maintained at their improved level	Protection of public land, public assets and private property	Records of beach before and during accretion in correlation to the works being undertaken.	Scheduled tasks completed on schedule and on budget to the satisfaction of the community, council and EPA
Cost Estimates <small>(based on 2009 costing, future years need to allow CPI increases)</small>	\$15k design and approvals [#] \$110k works	To be determined; assessment of structural capacity of existing structures required	\$35k design and approvals [#] \$290k works	\$290k design and approvals [#] \$2.4 million works	\$60k design and approvals [#] \$0.5 million works	\$300k design and approvals [#] \$2.5 million design, approvals and works	\$190k design and approvals [#] \$1.6 million design, approvals and works	\$100k to \$150k	\$50k design and approvals [#] \$420k works	\$12k design and approvals [#] \$100k works	Ongoing at \$270k/yr	Ongoing at 270k/yr	5 year monitoring program \$0.15M at \$30k/yr	5 year Project Management \$0.15M at \$30k/yr
Timing	1-2 years	2-5 years	2-5 years	1-2 years	0-1 years	1-2 years	1-2 years	0-1 years	0-1 years	0-1 years	ongoing	ongoing	0-5 years	0-5 years
Possible Funding Sources	Council allocation, Private property holders, eligible state/federal government funds	Council allocation, Private property holders, eligible state/federal government funds	Council allocation, eligible state/federal government funds	Council allocation, Private property holders, eligible state/federal government funds	Council allocation, eligible state/federal government funds	Council allocation, Private property holders, eligible state/federal government funds	Council allocation, eligible state/federal government funds	Council allocation, eligible state/federal government funds	Council allocation, eligible state/federal government funds	Council allocation, eligible state/federal government funds	Council allocation, eligible state/federal government funds	Council allocation	Council allocation with EPA support, eligible state/federal government funds	Council allocation with EPA support, eligible state/federal government funds

¹⁸ This may need to be increased to about 25,000m³ per year in the future if mean sea level rise accelerates to projected levels due to climate change.

[#] Nominal value of 12% of works costs assumed