# Appendix C

# Preliminary Indicative Options Costings

*Table C.1: Literature Review on Costings for Coastal Protection Works*

| Option / Works Description | Rate | Unit | Annual Maintenance | Notes | Source |
|---|---|---|---|---|---|
| Groyne | $ 10,000 | metre | 1% | Incl. EIA/Approvals/Design $300,000 for 200 m structure. | Ballina Coastline Management Study (WBM, 2007) |
| | $ 10,000 | metre | 1% | Toe 2 m below seabed, crest +3.0 mAHD. Incl. supply of rock armour, transport and shore-based placement. | Byron Coastline Management Plan (WBM, 2003) |
| | $ 5,000 | metre | 1% | Toe level 2 m below seabed, crest +3.0 mAHD | Redcliffe Shoreline Erosion Management Plan (BMT WBM, 2009) |
| Low Amenity Seawall (e.g. rockwall) | $ 5,000 | metre | 1% | Incl. EIA/Approvals/Design. | Ballina Coastline Management Study (WBM, 2007) |
| | $ 5,000 | metre | 1% | | Wollongong Coastal Zone Management Study (MBT WBM, 2011) |
| | $ 5,000 | metre | 1% | Toe –3.0 mAHD, crest +5.0 mAHD. Incl. supply of rock armour, transport and shore-based placement. | Byron Coastline Management Plan (WBM, 2003) |
| | $ 6,500 | metre | $ 2,000 | | Parramatta River Estuary Coastal Zone Management Plan (Cardno, 2011) |
| | $ 3,000 | metre | N/A | Emergency rock armouring, supply and placement. Does not incl. site supervision and administration. | Coastal Erosion Emergency Action Plan for Beaches in Warringah (Worley Parsons, 2011) |
| | $ 45-65 | tonne | N/A | For rock armouring, cost of supply and transport. | Coastal Erosion Emergency Action Plan for Beaches in Warringah (Worley Parsons, 2011) |
| | $ 10-15 | tonne | N/A | To transport rock from stockpile site to beach. | Coastal Erosion Emergency Action Plan for Beaches in Warringah (Worley Parsons, 2011) |
| | $ 1,500 | metre | N/A | Upgrade existing seawall: excavation and stockpiling, sorting and disposal of unsuitable materials, temporary protection, dewatering, etc. | Scoping Study on the Feasibility to Access the Cape Byron Sand Lobe for Sand Extraction for Beach Nourishment (Patterson Britton, 2006) |
| | $ 30-40 | tonne | N/A | Armour rock supply to site. | Redcliffe Shoreline Erosion Management Plan (BMT WBM, 2009) |
| | $ 15-25 | tonne | N/A | Quarry run rock supply to site. | Redcliffe Shoreline Erosion Management Plan (BMT WBM, 2009) |
| | $ 3,000 | metre | 1% | Toe level -0.5 mAHD, crest +3.1 mAHD. | Redcliffe Shoreline Erosion Management Plan (BMT WBM, 2009) |
| High Amenity Seawall (e.g. stepped revetment with vegetation) | $ 10,000 | metre | 1% | | Wollongong Coastal Zone Management Study (MBT WBM, 2011) |
| | $ 12,500 | metre | N/A | | Wollongong Harbour (Brighton Lawn Reserve) - Cardno project. |
| Beach Nourishment^ | $ 5-8 | cubic metre | - | Offshore marine dredging <25 m of water. | Byron Coastline Management Plan (WBM, 2003) |
| | $ 7-10 | cubic metre | - | >25 m of water, requires large offshore dredge. | Byron Coastline Management Plan (WBM, 2003) |
| | $ 5-50 | cubic metre | - | Excl. GST. | Development of a Proposal and Environmental Assessment of Beach Scraping – New Brighton and South Golden Mile Beach (Carley et al., 2010) |
| | $ 25 | cubic metre | - | | Wollongong Coastal Zone Management Study (MBT WBM, 2011) |
| | $ 10-20 | cubic metre | - | Offshore marine dredging <1.5 km from shore. | Redcliffe Shoreline Erosion Management Plan (BMT WBM, 2009) |
| | $ 35-40 | cubic metre | - | Supply, deliver and place commercial sand. | Redcliffe Shoreline Erosion Management Plan (BMT WBM, 2009) |
| Beach Scraping | $ 4 | cubic metre | - | Assumed for planning purposes. | Byron Coastline Management Plan (WBM, 2003) |
| | $ 2-10 | cubic metre | - | Excl. GST. | Development of a Proposal and Environmental Assessment of Beach Scraping – New Brighton and South Golden Mile Beach (Carley *et al*., 2010) |
| Sandbagging* (slope 1:1.5) | $ 2,900 | metre | N/A | Supply and placement costs for 0.75 $m^3$ bags, excl. supervision, administrative costs and sourcing of sand. | Coastal Erosion Emergency Action Plan for Beaches in Warringah (Worley Parsons, 2011) |
| | $ 4,400 | metre | N/A | Supply and placement costs for 2.5 $m^3$ bags, excl. supervision, administrative costs and sourcing of sand. | |
| | $ 3,900 | metre | N/A | Supply and placement costs for 0.75 $m^3$ bags if sand commercially sourced, excl. supervision and administrative costs. | |
| | $ 5,900 | metre | N/A | Supply and placement costs for 2.5 $m^3$ bags if sand commercially sourced, excl. supervision and administrative costs. | |
| | $ 5,000 | metre | N/A | Supply and placement costs for 0.75$m^3$ bags if sand commercially sourced and vandal deterrent fabric used on one side, excl. supervision and administrative costs. | |
| | $ 6,500 | metre | N/A | Supply and placement costs for 2.5$m^3$ bags if sand commercially sourced and vandal deterrent fabric used on one side, excl. supervision and administrative costs. | |
| | $ 5,900 | metre | N/A | Supply and placement costs for 0.75 $m^3$ bags if sand commercially sourced and vandal deterrent fabric used on both sides, excl. supervision and administrative costs. | |
| | $ 7,200 | metre | N/A | Supply and placement costs for 2.5 $m^3$ bags if sand | |

| Option / Works Description | Rate | Unit | Annual Maintenance | Notes | Source |
|---|---|---|---|---|---|
| | | | | commercially sourced and vandal deterrent fabric used on both sides, excl. supervision and administrative costs. | |
| | $ 520 | tonne | N/A | Commercial supply clean sand. | Watsons Bay ferry arrestor - Cardno project. |
| | $ 120 | item | N/A | Geotextile bags (approx. 2.5m$^3$). | Watsons Bay ferry arrestor - Cardno project. |
| Site Establishment | $ 80,000 | item | N/A | For construction of a 70 m revetment. | Based on costs for training wall at ocean entrance to Lake Illawarra - Cardno project. |
| | $ 5,000 | item | N/A | Small marine-based project with no/limited land-based facilities. | Watsons Bay ferry arrestor - Cardno project. |
| | $ 100,000 | item | N/A | For offshore marine dredging in <25 m of water. | Byron Coastline Management Plan (WBM, 2003) |
| Site Dis-establishment | $ 25,000 | item | N/A | For construction of a 70 m revetment. | Based on costs for training wall at ocean entrance to Lake Illawarra - Cardno project. |
| | $ 8,000 | | | Small marine-based project with no/limited land-based facilities. Incl. work as executed survey. | Watsons Bay ferry arrestor - Cardno project. |
| | $ 100,000 | item | N/A | For offshore marine dredging in <25 m of water. | Byron Coastline Management Plan (WBM, 2003) |
| Deploy & Maintain Environmental Safeguards | $ 25,000 | 3-4 weeks | N/A | For construction of a 70 m revetment. | Based on costs for training wall at ocean entrance to Lake Illawarra - Cardno project. |
| | $ 7,000 | item | N/A | Install silt curtains and provide traffic control for small site. | Watsons Bay ferry arrestor - Cardno project. |
| Contingency | 20% | each | | | Ballina Coastline Management Study (WBM, 2007) |
| | 15% | each | | | Watsons Bay ferry arrestor - Cardno project. |

*Table C.2: Adopted Costings for Management Options*

| Item No. | Description of Works | Rate | Unit | Annual Maintenance | Notes / Assumptions |
|---|---|---|---|---|---|
| Environmental Approvals / Consultation | | | | | |
| 1 | Environmental impact assessment - development application for large scale or complex project. | $ 150,000 | item | - | |
| 2 | Environmental impact assessment - development application. | $ 45,000 | item | - | |
| 3 | Environmental impact assessment - self assessable proposal. | $ 15,000 | item | - | |
| 4 | Agency consultation, obtain permits and approvals - complex proposal. | $ 45,000 | item | - | |
| 5 | Agency stakeholder consultation, obtain permits and approvals as required - simple proposal. | $ 15,000 | item | - | |
| 6 | Community consultation - complex/large proposal. | $ 20,000 | item | - | |
| 7 | Community consultation - simple/small proposal. | $ 7,500 | item | - | |
| Design of Option | | | | | |
| 8 | Design - complex proposal | $ 100,000 | item | - | |
| 9 | Design - simple proposal | $ 50,000 | item | - | |
| Site (Dis)Establishment / Management | | | | | |
| 10 | Site establishment - structural/hard engineering works. | $ 80,000 | item | - | |
| 11 | Site establishment - non-structural/soft engineering works. | $ 10,000 | item | - | |
| 12 | Deploy and maintain environmental safeguards (e.g. silt curtains/traffic controls). | $ 7,500 | week | - | |
| 13 | Site dis-establishment – complex/large proposal. | $ 25,000 | item | - | |
| 14 | Site dis-establishment – simple/small proposal. | $ 10,000 | item | - | |
| Unit Rates | | | | | |
| 15 | Groynes | $ 5,000 | metre | 1% | Assumes a low energy wave environment similar to that of Moreton Bay. |
| 16 | Low Amenity Seawall (e.g. rockwall) | $ 5,000 | metre | 1% | Assumes a low energy wave environment. |
| 17 | Maintain Low Amenity Seawall | $ 1,500 | metre | N/A | |
| 18 | High Amenity Seawall (e.g. stepped revetment with vegetation) | $ 12,500 | metre | 1% | |
| 19 | Artificial Beach Nourishment | $ 35 | cubic metre | every 7 yrs | Assumes commercial supply of sand or nearshore dredging <25 m depth. |
| 20 | Sandbagging | $ 5,000 | metre | 2% | Supply and placement costs for 0.75m3 bags if sand commercially sourced and vandal deterrent fabric used on one side, excl. supervision and administrative costs. |
| 21 | Annual monitoring of coastal protection structure. | N/A | $ 500.00 | N/A | Assumes all structures are assessed on the same day(s) once annually. |

^Nourishment with offshore marine dredging: For each dredging campaign, there would be approximately $5 million associated with establishment and dis-establishment costs. On a large project, this cost might be able to be accommodated - for example, for a 1,000,000 m$^3$ beach nourishment project, this equates to a unit rate of $12-15/m$^3$ (WBM, 2003).
*For 0.75 m$^3$ geotextile bags, the rate of filling is about 12 bags per hour for 6 hours of an 8 hour day, and the placement rate is about 17 bags per hour for 6 hours of an 8 hour day. For the 2.5 m$^3$ geotextile bags, the rate of filling is much slower as large plant is required (e.g. 35 tonne excavator), and is in the order of 5 bags per hour for 6 hours of an 8 hour day for both filling and placement (Worley Parsons, 2011).