



Clontarf/Bantry Bay Estuary Management Plan

Final Report

Executive Summary

May 2008



Clontarf/Bantry Bay Estuary Management Working Group

Manly Council resolved at its Planning & Strategy Committee meeting on Monday 8 May 2006 to establish the Clontarf / Bantry Bay Estuary Management Working Group, as a sub-committee of the existing Manly Harbour Foreshores Management Committee. This Working Group has overseen the development of the EMP with involvement of representatives from the community, Precincts, Aboriginal Heritage Office, Council's Scientific Advisory Panel, Council staff and relevant state government agencies. Members of the Group are:

Group	Representing Organisation	Name
Councillors	Manly Council	Dr. Peter Macdonald
	Manly Council	Dr. Judy Lambert AM
Precinct	Clontarf Precinct	Carlo Bongarzoni
Community		John Connor
		Matt Hayes
		Lyn Green
		Philippa Giles
Aboriginal	Local Government – Aboriginal Heritage Office	David Watts
Govt	Dept of Lands	Stan Rees
	Dept of Environment & Climate Change	Daniel Wiecek
	Dept of Primary Industries (Fisheries)	Paul Schuettrumpf
	NSW Maritime	Anita Robinson
Scientific Advisory Panel		A/Prof Jan Ritchie
Council	Manly Council	Dr. Rafiqul Islam

Internal Staff Working Group

In order to support the Working Group and to obtain expert contribution in the formulation of the EMP, an *Internal Staff Working Group* was also formed. The present membership of this group is:

Name	Position
Eduard McPeake	Manager, Community & Environmental Partnership Branch
Ted Williams	Manager, Civic Services
Hanno Klahn	Land & Property GIS Officer
-	Precinct Coordinator
Chris Kraus	Bushland Management Coordinator
Michael Diba / Mark Purday	Town Planner / Senior Strategic Planner
Brett Maina	Environmental Education Projects Officer
Judy Reizes	Community Projects Officer, Manly Environmental Centre
Anna Nikolov	Social Planner
Lee Lau	Water Cycle Management Team Leader
Tim Macdonald	Coastal Management Team Leader
Rafiqul Islam	Estuary Management Officer

Contributions of the Clontarf/ bantry Bay Estuary Management Working Group and Internal staff Working group are highly acknowledged. Acknowledgements are also due to Vaughan Middleton, Ted Pirola, Michael Galloway, Dalene Amm, Kym Thrift, John MacRitchie, Justin Shupe, Skye Rose (Manly Council), Phil Hunt (Aboriginal Heritage Office), Karen Kennedy (Sydney Metropolitan Catchment Management Authority), Brian Graham (Department of Water & Energy), Craig Morrison (Sydney Coastal Council Group), James Sakker (Department of Primary Industries) for their contributions and review of the EMP. Scott Macher was Estuary Management Officer during initial stages of formulation of this EMP.

Preparation of this EMP is financed from the Environment Levy of Manly Council and a grant under the Estuary Management Program 2005-06 of the Department of Environment & Climate Change (DECC)



i. EXECUTIVE SUMMARY

The Clontarf / Bantry Bay Estuary Management Plan (EMP) was adopted by the Council at its Planning & Strategy Committee meeting on 12 May 2008. Prior to this, public exhibition of the Plan occurred during 17 March – 21 April 2008 and a final endorsement of the Plan by the Clontarf / Bantry Bay Estuary Management Working Group on 28 April 2008. Supporting documents include an Estuary Processes Study describing the baseline condition and an Estuary Management Study describing management objectives, options and impacts. These documents were finalised in August and November 2007, respectively.

About the Plan

This Plan is prepared through the process outlined in the NSW Estuary Management Manual. Extensive community consultation was initiated through establishing a community participated Working Group and conducted through mechanisms including, display panels, information sharing through Precinct newsletters and Council's webpage, formal questionnaire surveys and community Field Days.

This Plan addresses the portion of the Middle Harbour estuary and foreshore that aligns with the Manly Local Government Area border. The study area covers 350 hectares, with a perimeter of 11.5km, and takes in the suburbs of Balgowlah Heights, Clontarf and Seaforth. The entire study area is covered within the Sydney Harbour Foreshores and Waterways Area and also within the Sydney Metropolitan Catchment Area.

The Plan has been developed in response to legislative requirements and community issues in accordance with current best practices for the management of estuaries and its catchment. The development of an Estuary Management Plan is identified in Manly Plan 2007-2010 and Sustainability Strategy 2006.

Preparation of this EMP fulfils implementation of Action C1.3.4 (*Establish a Community Working Group and undertake Estuary Management Plan for Clontarf and Bantry Bay coastline areas*) of the Manly Sustainability Strategy.

The Plan addresses the following 10 broad based key issues, derived from community consultations:

- Water quality & pollution,
- Aquatic/intertidal habitat conservation & management,
- Bushland/terrestrial habitat conservation & management,
- Sedimentation & beach erosion,
- Hazards & risks including climate change,
- Estuary use,
- Access,
- Foreshore infrastructure & facilities,
- Heritage conservation & management and
- Monitoring.

The Plan has been developed under the following vision statement:

"A thriving community, enhanced by heritage and lifestyle, where residents and visitors work together to live in harmony with the unique natural environment, both on land and in the sea."

This Estuary Management Plan is a strategic plan with a long-term time frame of 15- 20 years and firmed up implementation program of 5 years. This plan will be reviewed and revised every 5 years and a new implementation program will be adopted in line with priorities of the period.

This Estuary Management Plan has evolved through incorporation of strategic directions from a number of Council's management documents and land use planning instruments. In order to embed estuary management as part of Council's core business, the adopted Plan will link into documents such as: Manly Plan, Manly Sustainability Strategy, Manly Social Plan, Coastline & Estuary Management Plans, Manly Local Environmental Plan, Development Control Plans (DCPs), and Plans of Management.



Strategic Framework & Management Strategy

A series of goals and objectives for the future management of the Clontarf/Bantry Bay Estuary were developed on the basis of information received through community and stakeholder consultation. For each management issue a goal has been defined, along with a range of management objectives that have been further translated into management options. The Plan follows the four basic principles of Ecologically Sustainable Development (ESD) and also considers the State Plan, state-wide targets set by the Natural Resources Commission and regional targets set by the Sydney Metropolitan Catchment Management Authority (SMCMA).

This Plan sets 10 Goals and 35 Objectives to be addressed through 85 Management Options (**Table A**). Only 53 of these are new activities. Of these 53, 15 management options are proposed for immediate implementation, 25 within 2 years, 12 within 3-4 years and only 1 at later years. Overall, 22 management options have been rated to have high priority, 56 as medium priority and only 7 as low priority.

Strategic Management Options

Strategic management options cover a wide range of structural and non-structural solutions. These are briefly summarised here addressing each of the 10 key management issues.

Options addressing Water Quality & Pollution

A total of 12 management options are proposed (Table A) to address five objectives: reduction of pollutant loads, sewage discharges, sustainable use of groundwater; pollution levels at public swimming enclosures and continuation of education programs.

Five of these are high priority management options and relate to continuation of existing GPTs (Gross Pollutants Traps), formulation of comprehensive Stormwater Management Plan, confirmation of location of sewage overflow points and managing *faecal coliform* and *enterococci* levels at public swimming enclosures. The remaining seven management options have medium priority.

Four of the management options are on-going activities. Four options that have been proposed for immediate implementation relate to confirmation of location of sewage overflow points, addressing high *faecal coliform* and *enterococci* levels at Sangrado swimming enclosure and investigations/survey into groundwater and greywater use in the study area.

Options addressing Aquatic/Intertidal Habitat Conservation & Management

A total of 14 management options are proposed (Table A) to address five objectives: preserving seagrass beds, eradication of *Caulerpa taxifolia*, maintenance of existing mangrove population, protection of areas of ecological significance and investigation into factors affecting areas of high ecological value.

Only one high priority management option relates to increased enforcement of boating restrictions over seagrass beds. Further ten management options have medium priority.

Six of the management options are on-going activities. Two options that have been proposed for immediate implementation relate to enforcement of boating restrictions on seagrass beds and implementation of 'Fisher Bay Mangrove Expansion Program'.

Options addressing Bushland/Terrestrial Habitat Conservation & Management

A total of 10 management options are proposed (Table A) to address three objectives: continuation of Council's bushland management program, establishment of native vegetation corridors and encouraging community participation.

There are no high priority management options identified. However, nine management options have medium priority. Six of the management options are on-going activities. One option that has been proposed for immediate implementation relates to identification of adhoc tracks from private properties.



CLONTARF / BANTRY BAY ESTUARY MANAGEMENT PLAN

Options addressing Sedimentation & Beach Erosion

A total of three management options are proposed (Table A) to address two objectives: to gain a comprehensive understanding on estuarine sediment transport patterns and mitigating foreshore accretion/erosion processes.

All three management options have been rated as of high priority and relate to a comprehensive study on estuarine sediment transport patterns, mitigation measures for erosion prone sites and addressing siltation of the Clontarf swimming enclosure.

None of the management options are on-going activities. One option that has been proposed for immediate implementation relate to a comprehensive study on estuarine sediment transport patterns.

Options addressing Hazards & Risks including Climate Change

A total of seven management options are proposed (Table A) to address two objectives: identification of existing and potential hazards and implications of sea level rise.

Only one high priority management option relates to preparing Council's policy and strategy documents incorporating the 4th IPCC and other regional and national projections. The remaining six management options are each categorised in medium priority.

One of the management options are on-going activity. One option that has been proposed for immediate implementation relate to assessing stability of seawalls protecting public lands.

Options addressing Estuary Use

A total of 13 management options are proposed (Table A) to address three objectives: safe and enjoyable public areas, encouraging boating use and supporting recreational fishing.

Of them, three high priority management options relate to installation of adequate waste recycling stations, supporting jetski and commercial fishing bans. The remaining 10 management options are each categorised in medium priority.

Eight of the management options are on-going activities.

Options addressing Access

A total of four management options are proposed (Table A) to address three objectives: maintenance of the Manly Scenic Walkway, increased disabled access and facilitation of dog-walking.

One high priority management option relates to installation of adequate dog faeces bins and bag dispensers. Two management options are categorised in medium priority.

Two of the management options are on-going activities of the Council.

Options addressing Forshore Infrastructure & Facilities

A total of eight management options are proposed (Table A) to address five objectives: rationalisation of mooring places, construction of public boats landing facilities, establishing dinghy and kayak storage facilities, improvement of usability of public swimming enclosures and betterment of general amenities.

Four high priority management options relate to installation of dinghy and kayak storage facilities, restoration of collapsed Sangrado swimming enclosure and enhancement of general amenities such as public toilets and street lights. The remaining four management options are each categorised in medium priority.

Two management options are already on-going activities. Four options that have been proposed for immediate implementation relate to construction of a public floating pontoon, installation of dinghy storage, installation of rods to tie boats and restoration of collapsed Sangrado swimming enclosure.

Table A: Summary of Proposed Management Options

Objectives	Management Options	Responsible Agency (ies)	Performance target	Estimated Cost			Time Frame	Priority	Remarks
				Capital	Operational	Total			
(WQ) WATER QUALITY									
Goal: Ensure that the water quality of the estuary is suitable for maintaining healthy natural aquatic ecosystems, and for recreational pursuits									
WQ 1 Reduce the level of catchment sourced pollutants sufficiently.									
WQ1.1. Formulate comprehensive Stormwater Management Plan for Manly LGA encompassing the study area.		MC (NR) ¹	Management Plan completed	0	70,000	70,000	Within 3- 4 years	High	
WQ1.2. Continue maintaining existing gross pollutant traps (GPTs) in the Clontarf catchment.		MC (NR)	Efficient GPT maintenance	-	50,000	50,000	On -going	High	
WQ1.3. Install new Stormwater Quality improvement Devices (SQIDs) at priority locations taking into account current best practice technologies.		MC (NR & C&US)	SQIDs installed	150,000	-	150,000	Within 3- 4 years	Medium	
WQ1.4. Install pit inserts in litter hotspots throughout the study area.		MC (C&US)	Pit inserts tried and installed in hotspots	30,000	15,000	45,000	Within 2 years	Medium	
WQ 2 Reduce sewage discharges from sewage overflows within the catchment									
WQ2.1. Confirm, with Sydney Water, the presence of all sewage overflow points within the Clontarf / Bantry Bay study area including the five known ones.		Sydney Water, MC (NR)	All overflow points known and mapped	-	-	Staff time	Immediate	High	
WQ 3 Ensure that faecal coliform and enterococci levels at designated public swimming enclosures comply with standard recommendations.									
WQ3.1. Work with relevant agencies to minimise faecal coliforms and enterococci levels at all three public swimming enclosures.		Harbour Watch, Sydney Water, MC (NR)	Bacterial contamination managed & water quality improved	2,000	10,000	12,000	On-going	High	
WQ3.2. Investigate & seek to address possible sources of high faecal coliforms and enterococci levels in Sangrado swimming enclosure.		Sydney Water, MC (NR)	Investigation Report	0	2,000	2,000	Immediate	High	
WQ 4 Ensure sustainable use of different sources of water									
WQ4.1. Undertake a comprehensive study on Clontarf groundwater aquifer to identify present extraction rate, recharge and other relevant issues.		MC (NR), DWE	Study Report completed	0	45,000	45,000	Immediate	Medium	
WQ4.2. Monitor extracted groundwater for salinity and other parameters for early signs of contamination.		MC (NR)	Salinity & other parameters monitored	0	9,000	9,000	Within 2 years	Medium	
WQ4.3. Assess current grey water direct diversion (GDD) uptake within Manly Council (including the study area) through undertaking a residential survey.		MC (S&C, NR & CEP)	Survey Report completed	0	10,000	10,000	Immediate	Medium	Student project
WQ4.4. Make rainwater tank and associated infrastructure purchases by residents more attractive and thereby facilitate reduced stormwater generation.		MC (CEP), Sydney Water, SMCMA	Increased use of Rainwater tank rebate	-	-	Existing program	On-going	Medium	
WQ 5 Continue water quality and waste management education programs									
WQ5.1. Introduce Manly Council's Seachange (integrated pollution prevention) program in the study area to educate sustainable stormwater management & pollution prevention		MC (CEP)	Number of Educated increased	0	40,000	40,000	On-going	Medium	
(AH) AQUATIC/INTERTIDAL HABITAT CONSERVATION & MANAGEMENT									
Goal: Restore and maintain a healthy and diverse mix of aquatic and intertidal habitats that will maintain and improve biodiversity and ecological functions of the estuary.									
AH 1 Preserve and maintain existing seagrass beds.									
AH1.1. Encourage NSW DPI to prepare periodic up-to-date seagrass distribution maps.		NSW DPI, MC (NR)	Updated seagrass map	-	-	Staff time	On-going	Medium	
AH1.2. Encourage NSW Maritime and NSW DPI to increase the enforcement of boating restrictions over seagrass beds. Develop interpretative signage to notify seagrass beds as protected areas.		NSW DPI, NSW Maritime, MC (NR), SMCMA	Enhanced community awareness, signage installed	0	10,000	10,000	Immediate	High	

¹ AHO – Aboriginal Heritage Office; CPS – Corporate Planning & Strategy (of MC); C & US – Civic & Urban Services (of MC); DADU – Development Assessment & Determination Unit (of MC); DECC – Department of Environment & Climate Change; DWE – Department of Water & Energy; NSW DPI – NSW Department of Primary Industries; GO- Greenhouse Office; SCCG – Sydney Coastal Councils Group; P&R – Parks & Reserves (of MC); MEC – Manly Environment Centre (of MC); WS – Waste Services (of MC); MC – Manly Council; P&S – Planning & Strategy (of MC); NR – Natural Resources (of MC); SMCMA – Sydney Metropolitan Catchment Management Authority.



CLONTARF / BANTRY BAY ESTUARY MANAGEMENT PLAN

Objectives	Management Options	Responsible Agency (ies)	Performance target	Estimated Cost			Time Frame	Priority	Remarks
				Capital	Operational	Total			
AH 2 Eradicate where possible or bring under control <i>Caulerpa taxifolia</i> from within and around Middle Harbour.									
AH2.1. NSW DPI to continue to keep NSW Maritime, Manly Council and community informed of the updated information on distribution of <i>Caulerpa taxifolia</i> .		NSW DPI, NSW Maritime, SMCMA, SCCG, MC (NR)	Updated information distributed regularly	-	-	Staff time	On-going	Medium	
AH2.2. Encourage NSW DPI to continue implementing the 'Control Plan for <i>Caulerpa taxifolia</i> in NSW'.		NSW DPI, SMCMA, SCCG, MC (NR)	Control Plan implemented	-	-	Staff time	On-going	Medium	
AH 3 Maintain areas of key intertidal ecosystems and investigate possibility of its expansion.									
AH3.1. Protect existing mangroves and carry out regeneration activities.		MC (P&R), DPI	Mangrove population maintained or enhanced	-	4,000	4,000	On-going	Medium	
AH3.2. Design and implement the Fisher Bay Mangrove Expansion program.		MC (P&R), NSW DPI	Mangrove expansion Program implemented	30,000	15,000	45,000	Immediate	Medium	
AH3.3 Identify, map, protect and enhance saltmarsh habitat within the study area		MC (P&R), DPI, SMCMA	Saltmarsh areas maintained and enhanced	0	0	0	Within 2 years	Medium	
AH 4 Ensure all areas of ecological significance are properly protected and conserved.									
AH4.1. Encourage DECC and NSW DPI to continue to enforce declared protected areas of ecological significance through various means of legal to voluntary measures.		MC (NR), DECC, NSW DPI, SMCMA	Areas protected through increased patrol	-	-	Staff time	On-going	Medium	
AH4.2. Encourage DECC to undertake a study of possible penguin nest sites in Middle Harbour and community to report penguin sightings		DECC, MC (NR), Precincts	Study completed	-	-	Cost to DECC Staff time	Within 2 years	Low	
AH4.3. Support volunteer groups to facilitate conservation and protection of aquatic and intertidal habitats.		MC (CEP)	Volunteer groups supported	0	10,000	10,000	On-going	Medium	
AH4.4. Work with NSW DPI to disseminate information brochures outlining the importance of aquatic habitats and the penalties involved in harming them.		MC (CEP) NSW DPI	Brochure disseminated	-	-	Staff time	Within 2 years	Medium	
AH 5 Define factors affecting areas of high ecological value and develop and implement measures to address them.									
AH5.1. Continue to collate, analyse recent knowledge and study factors affecting degradation of ecologically important/critical habitats.		MC (NR)	Updated knowledge collated & studies undertaken	-	-	Staff time	Within 2 years	Low	
AH5.2. Investigate best practice beach raking in other Councils and incorporate that knowledge for possible implementation at Clontarf. Improve Council staff knowledge regarding eco sensitivities in beach raking and other services.		MC (CS), SCCG	Knowledge gained & applied	-	-	Staff time	Within 2 years	Low	
AH5.3. Retain rocky foreshores and cliff-lines as important coastal habitat. Where new upgrading or building of seawalls needed, ensure to incorporate recent knowledge on seawall restorations supporting ecological habitat		MC (CS, US & NR)	Knowledge gained & utilized	-	-	Staff time	Within 3-4 years	Low	
(TH) BUSHLAND/TERRESTRIAL HABITAT CONSERVATION & MANAGEMENT Goal: Protect and enhance urban bush land and native vegetation areas									
TH 1 Continue to manage Council's bushland management program.									
TH1.1. Prepare a comprehensive bushland management plan and develop a staged implementation program.		MC (P&R)	Bushland Management Plan prepared	0	40,000	40,000	Within 3-4 years	Medium	
TH1.2. Prepare management plans for the six identified SEPP 19 bushlands, to fulfill		MC (P&R)	Management Plans	0	60,000	60,000	Within 2	Medium	



CLONTARF / BANTRY BAY ESTUARY MANAGEMENT PLAN

Objectives	Management Options	Responsible Agency (ies)	Performance target	Estimated Cost			Time Frame	Priority	Remarks
				Capital	Operational	Total			
statutory requirement.			prepared			Staff time	years		
TH1.3. Identify adhoc tracks from private properties entering bushlands and approach property owners to ensure their safety and continued maintenance at an appropriate and specified standard.		MC (P&R)	Tracks identified and owners contacted	-	-	Staff time	Immediate	Medium	
TH1.4. Council to continue to be an active participant in the Die-Back Working Group		MC(P&R), SCCG	Contributory & active participant	-	-	Staff time	On-going	Medium	
TH1.5. Involve the Precinct to discuss the issue of view maintenance with property owners.		MC (P&R), Precincts	Meetings held as required	-	-	Staff time	On-going	Medium	
TH 2 Establish native vegetation corridors linking natural bushland areas.									
TH2.1. Investigate possibility of establishing corridors linking different bushlands and assess their ecological significance.		MC (P&R)	Assessment Report	0	5,000	5,000	On 5 th or later year	Medium	
TH2.2. Continue and reassess Council's Street Tree Planting Program within the study area.		MC (P&R)	Recommended list prepared & Program continued	-	-	Staff time, existing program	On-going	Low	
TH 3 Encourage and establish community participation in bush regeneration program and in native plants on public and private lands									
TH3.1. Continue Community Bush Care Volunteers program in the study area.		MC (P&R)	Program supported & continued	0	25,000	25,000	On-going	Medium	
TH3.2. Continue publication of 'Bushland News' and circulate widely in the community		MC (P&R)	Publication continued	0	15,000	15,000	On-going	Medium	
TH3.3. Continue annual 'Native Plant Giveaway' program to support residents in maintaining native vegetations on private properties.		MC (P&R, CEP)	Program continued	0	30,000	30,000	On-going	Medium	
(SE) SEDIMENTATION & BEACH EROSION									
Goal: Manage erosion and sedimentation to reduce their impact on the natural environment and recreational amenity									
SE 1 Generate comprehensive understanding on estuarine sediment transport patterns of the area									
SE1.1. Carry out a comprehensive study on estuarine sediment transport patterns		MC (NR), DECC	Study Report	0	50,000	50,000	Immediate	High	Grant funding obtained
SE 2 Mitigate foreshore accretion/erosion processes at priority areas.									
SE2.1. Define and implement mitigation measures for erosion prone sites.		MC (NR, US)	Mitigation measures implemented	20,000	80,000	100,000	Within 3-4 years	High	
SE2.2. Define and implement measures to address siltation at the Clontarf swimming enclosure.		MC (NR, US)	Mitigation measures implemented	0	60,000	60,000	Within 2 years	High	
(HR) HAZARDS & RISKS INCLUDING CLIMATE CHANGE									
Goal: Assess, minimize and mitigate risks from natural hazards including climate change									
HR 1 Identify existing and potential hazards and establish mitigation measures									
HR1.1. Commission a geotechnical study for specific sections of foreshore areas to identify and prioritise risks, and establish risk based management options.		MC (NR, US)	Geotechnical Study Report	0	50,000	50,000	Within 3-4 years	Medium	
HR1.2. Undertake inspections to assess stability of seawalls protecting public lands. If upgrading is required, promote eco- friendly sea walls.		MC (US & NR)	Regular Inspection Reports	0	0	0	Immediate	Medium	Study combined with SE1.1
HR1.3. Work with the State Emergency Services (SES) and other agencies to continuously update Emergency Action Plan including evacuation procedures in the event of storm surges and tsunami.		SES, MC (CS & NR)	Emergency Action Plan updated	0	10,000	10,000	Within 2 years	Medium	



CLONTARF / BANTRY BAY ESTUARY MANAGEMENT PLAN

Objectives	Management Options	Responsible Agency (ies)	Performance target	Estimated Cost			Time Frame	Priority	Remarks
				Capital	Operational	Total			
HR 2 Consider the potential implications of sea level rise on the estuary and its surrounds as a result of climate change.									
HR2.1. Assess impact of climate change on areas of ecological significance and devise adaptive measures		MC (NR), SCCG,	Ecological impact map	0	20,000	20,000	Within 3-4 years	Medium	
HR2.2. Work with the Sydney Coastal Councils Group to develop a regional/ local level climate change model considering protection provided by existing seawalls and rocky foreshores.		SCCG, DECC, MC (NR)	Model Results & Impact Report	-	-	Staff time, SCCG project	Within 2 years	Medium	
HR2.3. Collaborate with the Sydney Coastal Councils Group/ Macquarie Uni /CSIRO project investigating climate change adaptations in Manly.		SCCG, DECC, MC (NR)	Adaptation Action Plan	-	-	Staff time	On-going	Medium	
HR2.4. Revise/Update Council's policy and strategy documents incorporating federal and/or state guidelines/recommendations regarding climate change adaptations		MC (CPS)	New or revised policy documents to accommodate CC	-	-	Staff time	Within 2 years	High	
(EU) ESTUARY USE									
Goal: Improve and meet the environmental, socio-economic and recreational needs of estuary use									
EU 1 Create safe, sustainable and enjoyable public areas for diverse user groups.									
EU1.1. Ensure safe public access to foreshores including maintenance of natural vegetation.		MC (P&R)	Safety of access paths improved	0	50,000	50,000	Within 2 years	Medium	
EU1.2. Install adequate garbage and waste recycling stations in public places.		MC (WS)	Recycling stations installed	30,000	25,000	55,000	On-going	High	
EU1.3. Liaise with relevant state authorities regarding the consolidation of existing signage with signage more sympathetic to the area.		MC (CEP, NR)	Signage replaced with new ones	0	20,000	20,000	Within 3-4 years	Medium	
EU1.4. Promote natural features of 'Clontarf - Sandy Bay- Fisher Bay – Ellery's Punt Reserve' parts of the study area.		MC (NR), Tourism NSW	Brochure prepared	0	10,000	10,000	Within 3-4 years	Medium	
EU1.5 Develop & implement Pickering Point Landscape Development Program		MC (D&T, P&R, NR)	Development program implemented	0	50,000	50,000	Within 3-4 years	Medium	Landscape Plan immediately
EU1.6. Promote community events and education programs to achieve sustainable use of the estuary.		MC (CEP), NSW Maritime & NSW DPI	Community events & Education programs promoted	0	30,000	30,000	On-going	Medium	
EU 2 Encourage boating use including kayaking within the estuary that minimises its social and environmental impact, whilst not compromising the amenity or safety.									
EU2.1. Facilitate and encourage non-motorised boating activities (kayaking, wind surfing etc) in the waterways.		MC (CEP, NR), NSW Maritime	Facilities created	-	25,000	25,000	On-going	Medium	
EU2.2. Encourage NSW Maritime to enforce current speed limits and mooring restrictions by increased patrolling.		NSW Maritime	Patrolling increased	-	-	Staff time	On-going	Medium	
EU2.3. Encourage NSW Maritime to consider a designated 'boat exclusion zone' at Clontarf to ensure safety of swimmers.		NSW Maritime, MC (NR)	Proposal prepared and considered	-	-	Staff time	Within 2 years	Medium	
EU2.4. Support continuation of jetski (PWC) ban		MC (NR)	Ban supported	-	-	Staff time	On-going	High	
EU2.5. Continue program, with NSW Maritime & Council's Starboard Right & Green (SR&G) program, to educate boat owners about waterway etiquettes and possible impact on marine environment.		MC (CEP)	Education program continued	-	25,000	25,000	On-going	Medium	
EU 3 Support sustainable recreational fishing in the estuary									
EU3.1. Support continuation of ban on commercial fishing.		MC (NR), SCCG,	Ban supported	-	-	Staff time	On-going	High	
EU3.2. Encourage NSW DPI & NSW Health to monitor Dioxin levels in Sydney Harbour		NSW DPI, NSW	Dioxin Level monitored	-	-	Staff time	Within 2	Medium	



CLONTARF / BANTRY BAY ESTUARY MANAGEMENT PLAN

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				Capital	Operational	Total			
waters.		Health, SCCG					years		
(AC) ACCESS									
Goal: Ensure safe public accessibility of waterways, foreshores and other areas of the estuary.									
AC 1 Maintain Manly Scenic Walkway (MSW) regularly and continuously improve its use value									
AC1.1. Enhance maintenance schedule and retain and enhance the native vegetation along the Manly Scenic Walkway.		MC (P&R)	Maintenance enhanced	0	100,000	100,000	On-going	Medium	
AC 2 Increase disabled access (where practically possible) to parks and bays in the study area									
AC2.1. Audit disability access of all parks and bays within the study area.		MC (P&S)	Audit completed	-	-	Staff time	Within 2 years	Medium	
AC3 Facilitate dog-walking including possibility of establishing off-leash dog areas.									
AC3.1. Assess, in consultation with nearby residents, possibility of declaring Sandy Bay tidal flats as off-leash dog area.		NSW Maritime MC (P&R)	Off-leash dog area continued	-	10,000	Staff time	Within 2 years	Low	
AC3.2. Install adequate dog faeces bins and bag dispensers.		MC (WS)	Facilities established	0	20,000	20,000	On-going	High	
(FI) FORESHORE INFRASTRUCTURE									
Goal: Improve social amenity through rationalisation of foreshore structures which are sympathetic to social and ecological needs and manage public risks.									
FI 1 Rationalise mooring places to minimise the impact on ecologically important seagrass beds.									
FI1.1. Work with NSW Maritime to introduce seagrass friendly moorings		NSW Maritime, SCCG, SMCMA	Moorings introduced	-	-	Staff time	Within 2 years	Medium	
FI1.2 Work with NSW Maritime to realign and maintain the same number of permanent moorings in front of Clontarf beach for the safety of swimmers and protection of seagrass beds.		NSW Maritime, MC (NR)	Moorings realigned	-	-	Staff time	Within 2 years	Medium	
FI 2 Facilitate public boat landing facilities at suitable sites within the study area									
FI2.1. Construct a public floating pontoon beside Sangrado swimming enclosure and encourage NSW Maritime to assess for other boat landing facilities within the study area.		MC (US), NSW Maritime	Pontoon constructed and assessment made	50,000	20,000	70,000	Immediate	Medium	Grant funding obtained
FI 3 Establish dinghy and kayak storage facilities at suitable locations within the study area									
FI3.1. Install horizontal dinghy and kayak storage racks at Sandy Bay in consultation with nearby residents and dinghy owners.		MC (US, Design & Technical)	Storage rack	7,000	4,000	11,000	Immediate	High	
FI3.2. Install rods/poles at Gurney Crescent & Castle Circuit to tie dinghies & kayaks and educate owners regarding protection of trees & middens, and decrease erosion of foreshore		MC (CEP), Precincts	Rods/poles installed & Education program initiated	2,000	900	2,900	Immediate	High	
FI4 Maintain and improve usability of public swimming enclosures of the study area									
FI4.1. Assess and implement options to restore collapsed Sangrado swimming enclosure		MC (US)	Sangrado swimming enclosure restored	150,000	-	150,000	Immediate	High	
FI.5 Better general amenities, traffic and safety at foreshore areas, public reserves and beaches									
FI5.1 Enhance general amenities such as public toilets, street lights etc. at convenient locations		MC (Urban Services)	Facilities enhanced	-	75,000	75,000	On-going	High	
FI5.2 Improve and facilitate traffic management around public reserves and beaches		MC (Urban Services), RTA	Improved traffic management	0	16,000	16,000	Within 3-4 years	Medium	
(HC) HERITAGE CONSERVATION									
Goal: Ensure that all Aboriginal, natural and cultural and heritage items in the area are preserved and protected in consultation with appropriate bodies.									



CLONTARF / BANTRY BAY ESTUARY MANAGEMENT PLAN

Objectives	Management Options	Responsible Agency (ies)	Performance target	Estimated Cost			Time Frame	Priority	Remarks
				Capital	Operati onal	Total			
HC 1 Ensure that all 22 sites of Aboriginal heritage significance are properly identified, recorded and protected under the applicable State and Federal legislations.									
HC1.1. Review Aboriginal Site Management Report for Manly Council (2006) and associated reports to prioritize management needs and develop a plan of implementation.	AHO, MC (P&S)	Prioritisation done	-	-	Staff time	On-going	Medium		
HC1.2. Construct boardwalk type structure where MSW bisects Aboriginal midden at Sandy Bay.	MC (P&R), AHO	Boardwalk installed	-	-	-	Immediate	High	Implemented already	
HC1.3. Prevent damage to Aboriginal middens in critical condition.	AHO, MC (P&S, US, P&R)	Physical protection done	0	40,000	40,000	On-going	High		
HC1.4. Confirm and prepare a number of Aboriginal sites suitable for public visitation.	AHO, MC (P&S)	Brochure on selected sites	0	6,000	6,000	On-going	Medium		
HC2 Ensure that all sites of natural and cultural heritage are identified and registered under the relevant legislation and in Council planning instruments.									
HC2.1. Assess heritage significance of 'Laura Street Wharf' and propose its inclusion in the heritage list.	MC (P&S)	Assessment made	-	-	Staff time	Within 2 years	Low		
HC2.2. Interpret old tram line near the Spit Bridge to signify historical past.	MC (P&S)	Feasibility study & implementation	0	5,000	5,000	Within 2 years	Low		
HC3 Increase community awareness of the significance of Aboriginal, natural and cultural heritage through adequate signage.									
HC3.1. Organise awareness campaign to highlight heritage conservation including heritage talk to school children	AHO, MC (P&S, CEP)	Regular campaign organised	0	25,000	25,000	On-going	Medium		
HC3.2. Develop management guidelines for sites that are located within private properties.	AHO	Guidelines prepared	0	15,000	15,000	Within 3-4 years	Medium		
(M0) MONITORING									
Goal: Measure the condition and usage of the estuary to gauge the effectiveness of the Estuary Management Plan in achieving its goal and management objectives									
MO 1 Develop and implement a Monitoring Program (including key indicators) to assess improved management of the estuary									
MO1.1. Develop a comprehensive monitoring program including key indicators and mechanisms of monitoring in consultation with relevant organisations.	MC (NR, Environmental Health)	Monitoring Program made	0	30,000	30,000	Within 2 years	Medium		
MO1.2. Monitor the environmental health of the estuary, including water quality, erosion/accretion, bush lands, ecological diversity and abundance.	MC (Environmental Health, NR, P&R)	Monitoring initiated and continued	50,000	80,000	130,000	Within 2 years	High		
MO2 Monitor the public usage of Clontarf/Bantry Bay estuary and its surrounds.									
MO2.1. Monitor use of the Manly Scenic Walkway.	MC (P&R)	Monitoring initiated and continued	0	10,000	10,000	Immediate	Medium		
MO2.2. Monitor the use of waterways at different points of the estuary.	MC (CEP), NSW Maritime	Monitoring initiated and continued	0	9,000	9,000	Within 2 years	Medium		
MO3 Assess possibility of establishing participatory monitoring by the community									
MO3.1. Establish participatory monitoring and encourage community participation	MC (CEP), MEC	Concept developed & discussed	0	5,000	5,000	Within 2 years	Medium		
MO4 Update, refine and revise the Estuary Management Plan.									
MO4.1. Review monitoring results and revise/update management options.	MC (NR)	Results reviewed & Options revised	-	-	Staff time	Within 3-4 years	Medium		

Options addressing Heritage Conservation

A total of eight management options are proposed (Table A) to address three objectives: protection of all 22 sites of Aboriginal heritage significance, identification of all sites of natural and cultural heritage and increased community awareness.

Two high priority management options relate to construction of protection structure to an Aboriginal midden at Sandy Bay and prevention of damage to Aboriginal middens in critical conditions. Four management options are categorised in medium priority.

Four of the management options are on-going activities. One option that has been proposed for immediate implementation relate to construction of protection structure to an Aboriginal midden at Sandy Bay.

Options addressing Monitoring

A total of six management options are proposed (Table A) to address four objectives: development and implementation of a Monitoring Program, monitoring public use of the estuary, establishing community monitoring and use of monitoring results to revise the EMP.

Only one high priority management option relates to monitoring the environmental health of the estuary. The remaining five management options are categorised in medium priority.

None of the management options are on-going activities. One option that has been proposed for immediate implementation relate to monitoring of use of the Manly Scenic Walkway.

Funding Requirements

The total cost of implementing (including 1-5 years of operation and maintenance) the 85 management options addressing 10 key management issues is approximately \$2.10 million (**Table B**). An estimated \$ 406,000 will be required to implement 15 options proposed for immediate implementation.

Table B: Summary of estimated cost

Management Issues	Number of Management Options	Estimated Cost (\$)			
		High priority	Medium Priority	Low priority	Total
Water Quality	12	134,000	299,000	0	433,000
Aquatic Habitat	14	10,000	59,000	0	69,000
Terrestrial Habitat	10	0	175,000	0	175,000
Sedimentation & Erosion	3	210,000	0	0	210,000
Hazards & Risks	7	0	80,000	0	80,000
Estuary Use	13	55,000	210,000	0	265,000
Access	4	20,000	100,000	0	120,000
Foreshore Infrastructure	8	383,900	86,000	0	469,900
Heritage Conservation	8	40,000	46,000	5,000	91,000
Monitoring	6	130,000	54,000	0	184,000
	85	982,900	1,109,000	5,000	2,096,900

Some actions require an on-going commitment from existing staff rather than the outlay of expenditure and this is noted as 'Time'. Some recommended actions require significant capital costs, especially where large-scale works are involved such as restoring collapsed swimming enclosure and foreshore protection structures.

As indicated elsewhere, implementation responsibility of all proposed management options rests with a number of agencies including Manly Council. Hence, adoption of this EMP does not commit Council to allocate immediate funding. Funding from different alternative sources will be pursued. These include but are not limited to:

- Council's Environment Levy (subject to a budget bid process);
- Council's General Revenue Budget (subject to a budget bid process);
- State Government's Estuary Management Program (50% subsidy funding subject to a submission process);
- NSW Coastal Catchments Initiative; and



CLONTARF / BANTRY BAY ESTUARY MANAGEMENT PLAN

- Other Commonwealth and State Government funded programs.

Implementation Plan

Agencies involved: Manly Council (MC) is the principal implementation/management agency of the Clontarf/Bantry Bay Estuary Management Plan. Responsibility for implementing the options is spread across local government (planning, management and works staff), state government agencies and volunteer community groups (**Table C**). The following agencies will be involved in implementation of one or more relevant management options either in the main or supporting roles.

- Department of Environment and Climate Change (DECC);
- NSW Maritime;
- Department of Primary Industries (DPI);
- Sydney Water;
- Department of Water & Energy;
- Sydney Coastal Councils Group (SCCG);
- Aboriginal Heritage Office (AHO);

Other agencies likely to be involved are Sydney Metropolitan Catchment Management Authority (SMCMA), SES and RTA.

Implementation Time frame: Of 85 management options proposed in this EMP, 32 options are on-going activities of the Council and/or other agencies. Among newly proposed 53 options, 15 have been proposed for immediate implementation (**Table D**), 25 within two years, 12 within 3-4 years and only 1 on 5th or later years.

To be incorporated into the Manly Plan: The management options proposed in this Estuary Management Plan will gradually be mainstreamed in to the rolling three year Manly Plan. The Manly Plan is the key planning document driving the operations of Council. Efforts will be made to incorporate priority options in to the next Manly Plan 2008 – 2011 and subsequent Plans.

Collaborative Partnership with other agencies and neighbouring Councils: Manly Council, as being the main implementor of the EMP, plans to conclude collaborative partnership agreements with other relevant agencies and neighbouring Councils either specifically for this EMP or for overall LGA. Manly Council has signed a Memorandum of Understanding 'Manly Council and Sydney Water Partnership' in July 2000 to work together to achieve, within the framework of Total Catchment Management and Ecologically Sustainable Development. Similar agreements can be initiated with other agencies.

Manly Harbour Foreshores Management Committee to coordinate: Manly Harbour Foreshores Management Committee, from which the Clontarf/Bantry Bay Estuary Management Working Group was formed, will co-ordinate implementation of the EMP. The Committee, reconstituted to accommodate a number of Coastal/Estuary Management Committees/Working Groups will be serviced by the Coastal Management Team of Council

Opportunities for community involvement: Many of the management strategies adopted for Clontarf/Bantry Bay estuary offer opportunities for community involvement particularly activities such as revegetation projects, participatory monitoring programs and environmental education, as well as general monitoring of plan implementation and effectiveness.

Reporting through three mechanisms: Reporting on implementation of the EMP will be achieved through four mechanisms: internal Council reporting process, Annual Reports to the community, Council website and regular Harbour Foreshore Committee meetings.

EMP to be reviewed every 5 years: The Estuary Management Plan will be reviewed every 5 years to accommodate priorities of the period, requirements of new/amended legislations and Council's policies and guidelines. During the process, there will be a mechanism to identify new issues and conflicts concerning the estuary management and ensure their incorporation into a revised plan. A program for the following 5 years will



be developed by designating priority to any new actions and reassigning priority to the remaining actions. These programs should be fed back into and form the revised EMP for the next 5 years.

Table C: Roles of different agencies in implementation of proposed management options

Agency	Management Options with Implementation Responsibilities	
	Main	Supportive
Manly Council*	WQ1.1#, WQ1.2, WQ1.3, WQ1.4, WQ2.1, WQ4.1, WQ4.2, WQ4.3, WQ4.4, WQ5.1, AH3.1, AH3.2, AH3.3, AH4.1, AH4.2, AH4.3, AH4.4, AH5.1, AH5.2, AH5.3, TH1.1, TH1.2, TH1.3, TH1.4, TH1.5, TH2.1, TH2.2, TH3.1, TH3.2, TH3.3, SE1.1, SE2.1, SE2.2, HR1.1, HR1.2, HR2.1, HR2.4, EU1.1, EU1.2, EU1.3, EU1.4, EU1.5, EU1.6, EU2.1, EU2.4, EU2.5, EU3.1, AC1.1, AC1.2, AC2.1, AC3.2, FI3.1, FI3.2, FI4.1, FI5.1, FI5.2, HC1.3, HC2.1, HC2.2, MO1.1, MO1.2, MO1.3, MO2.2, MO3.1, MO4.1,	WQ3.1, WQ3.2, AH1.1, AH1.2, AH2.1, AH2.2, HR1.3, HR2.2, HR2.3, EU2.3, AC3.1, FI1.2, FI2.1, HC1.1, HC1.2, HC1.4, HC3.1, TH3.3, HC3.1,
NSW Maritime*	AH1.2, EU2.2, EU2.3, AC3.1, FI1.1, FI1.2, FI2.1	AH2.1, EU1.6, EU2.1, AC3.2, MO2.2
NSW DPI*	AH1.1, AH2.1, AH2.2, AH4.4, EU1.6, EU3.2	AH1.2, AH3.1, AH3.2, AH3.3, AH4.1
DECC*	WQ3.1	AH4.1, AH4.2, SE1.1, HR2.2, HR2.3
Sydney Water	WQ2.1, WQ3.2	WQ3.1, WQ4.4,
DWE	-	WQ4.1
SCCG	HR2.2, HR2.3	AH2.1, AH2.2, AH5.2, TH 1.4, HR2.1, EU3.1, EU3.2, FI1.1
AHO*	HC1.1, HC1.2, HC 1.3, HC1.4, HC3.1, HC3.2	
SMCMA	-	WQ4.4, AH1.2, AH2.1, AH2.2, AH3.3, AH4.1, HR1.2, FI1.1
SES	HR1.3	
RTA		FI5.2

* Members of the Clontarf/Bantry Estuary Management Working Group and participated in the development of the EMP
 # WQ = Water Quality, AH = Aquatic Habitat, TH = Terrestrial Habitat, SE = Sedimentation & Erosion, HR = Hazards & Risks, EU = Estuary Use, FI = Foreshore Infrastructure, AC = Access, HC = Heritage Conservation and MO = Monitoring



CLONTARF / BANTRY BAY ESTUARY MANAGEMENT PLAN

Table D: Management Options proposed for immediate implementation

Sl. No.	Management Options	Responsible Agencies	Estimated Cost (\$)			Remarks
			Capital	Operational	Total	
	High Priority					
1	SE1.1. Carry out a comprehensive study on estuarine sediment transport patterns (Study to be combined with HR 1.2)	MC (NR), DECC	0	50,000	50,000	50% DECC grant approved
2	FI3.1. Install horizontal dinghy and kayak storage racks at Sandy Bay in consultation with nearby residents and dinghy owners.	MC (US, Design & Technical)	7,000	4,000	11,000	
3	FI4.1. Assess and implement options to restore collapsed Sangrado swimming enclosure.	MC (US)	150,000	0	150,000	
4	AH1.2. Encourage NSW Maritime and DPI (Fisheries) to increase the enforcement of boating restrictions over seagrass beds. Develop interpretative signage to notify seagrass beds as protected areas.	DPI (Fisheries), NSW Maritime, Manly Council-NR, SMCMA	0	10,000	10,000	
5	FI3.2. Install rods/poles at Gurney Crescent & Castle Circuit to tie dinghies & kayaks and educate owners regarding protection of trees & middens, and decrease erosion of foreshore	MC (US, CEP), Precincts	2,000	900	2,900	
6	WQ3.2. Investigate & seek to address possible sources of high faecal coliforms and enterococci levels in Sangrado swimming enclosure.	Sydney Water, MC (NR)	0	2,000	2,000	
7	WQ2.1. Confirm, with Sydney Water, the presence of all sewage overflow points within the Clontarf / Bantry Bay study area including the five known ones.	Sydney Water, MC (NR)	0	0	0	Already implemented
8	HC1.2. Construct boardwalk type structure where MSW bisects Aboriginal midden at Sandy Bay.	MC (P&R), AHO	0	0	0	Already implemented
	Medium Priority					
9	WQ4.1.Undertake a comprehensive study on Clontarf groundwater aquifer to identify present extraction rate, recharge and other relevant issues.	MC (NR), DWE	0	45,000	45,000	
10	WQ4.3. Assess current greywater direct diversion (GDD) uptake within Manly Council (including the study area) through undertaking a residential survey.	MC (S&C, NR & CEP)	0	10,000	10,000	Student project
11	HR1.2. Undertake inspections to assess stability of seawalls protecting public lands. If upgrading is required, promote eco- friendly sea walls.	MC (US & NR)	0	0	0	HR 1.2 and SE1.1 will be a combined study
12	FI2.1 Construct a public floating pontoon beside Sangrado swimming enclosure and encourage NSW Maritime to assess for other boat landing facilities within the study area	MC (US), NSW Maritime	50,000	20,000	70,000	Partial funding received from NSW Maritime
13	MO2.1. Monitor use of the Manly Scenic Walkway.	MC (P&R)	0	10,000	10,000	Student project
14	AH3.2. Design and implement, the 'Fisher Bay Mangrove Expansion Program'.	MC (P&R), DPI (Fisheries)	30,000	15,000	45,000	
15	TH1.3. Identify adhoc tracks from private properties entering bushlands and approach property owners to ensure their safety and continued maintenance at an appropriate and specified standard.	MC (P&R)	0	0	0	Staff time
	Total		239,000	166,900	405,900	