

**PORT OTAGO LIMITED  
PROJECT NEXT GENERATION  
ENVIRONMENTAL MANAGEMENT PLAN**

**1 April 2011**

# TABLE OF CONTENTS

## SECTION A ENVIRONMENTAL MANAGEMENT PLAN OVERVIEW

Introduction	1
Outline of the Project	2

## SECTION B ENVIRONMENTAL MANAGEMENT PLAN GENERAL

Consent Conditions	2
Adaptive Management	2
Project Staging and Work Schedule	4
Key positions and points of contact	4
Project Consultation/Communication	5
Project Consultative Group	5
Manawhenua Consultative Group	7
Complaints Procedure	9
Quality Assurance Procedures	10
Health and Safety	10

## SECTION C MONITORING AND ADAPTIVE MANAGEMENT

Water Quality	11
Verification of Dredging Plant Operations and Hydrodynamic Model	13
Bathymetric Surveys	15
Tide and Current Measurement	16
Dredge Material Characteristics	17
Birdlife	17
Aquatic Communities	18
Noise	20
Use of Explosives	22
Mammals and Cetaceans	23
Light Spill	24

## **SECTION A ENVIRONMENTAL MANAGEMENT PLAN OVERVIEW**

### **INTRODUCTION**

1. The dredging and disposal of materials generated through the Incremental as well as the Major Capital dredging programmes, the extension of the wharf and the fishing platform and the placement of rock will result in environmental effects of varying degrees.
2. These effects will either be short term and/or localised in terms of the site locations such as for the disposal sites or where in a particular part of the channel the widening and deepening is being carried out.
3. The Assessment of Environmental Effects documents dated May 2010 and the associated documentation describes the detailed analysis and the background to the deepening and disposal of materials and also indicates the nature, scale and extent of the predicted effects.
4. The resource consents with their conditions, issued by the Otago Regional Council, are attached as Appendix 1 and this plan is to be read in conjunction with those conditions. The plan has therefore been formulated to monitor the key environmental effects and establish steps to manage and where possible mitigate any significant effects that may arise from the intended works.
5. The scale of the effects will vary and will be differentiated by the two options (Incremental Capital and Major Capital) available to Port Otago to undertake the capital dredging. The type of operation has an effect on the level and intensity of turbidity and deposition both within the harbour and the disposal sites. It is noted that the large contract dredge used for Major Capital dredging will be confined to discharging at disposal Site A0 only.
6. For the maintenance and the Incremental Capital dredging programmes using the smaller item of dredging plant, generating volumes of 450,000 and 1 M cubic metres of materials per annum respectively, the impact on the suspended sediment concentrations and deposition rates has been assessed as being substantially lower, by an order of magnitude, to those related to the Major Capital dredging programme. This difference is a function of dredging capability including dredging rates and

hopper volumes, steaming time, rate of disposal and dispersal of sediments which tend to vary proportionally to the sediment discharge rates.

7. The New Era has a hopper capacity of 600 cubic metres as against a typical mid sized contract dredge with a hopper capacity of 10,800 cubic metres. This is covered in more detail by Bell (2010).
8. Irrespective of the level of effects Port Otago intends to actively manage the project activities thereby minimising any potential adverse environmental effects.

### **Outline of the Project**

9. The Project is comprehensively described in the following documents:
  - a. Project Next Generation Applications and Assessment of Environmental Effects.
  - b. *(Additional/alternate references to be added at later stages of design/construction/programming)*
10. The Project can be divided into the following main components:
  - a. Deepening and widening the Otago Harbour channel, swinging areas and berths through dredging,
  - b. Disposal of dredge material at sea,
  - c. Construction of multipurpose wharf and fishing platform,
  - d. The placement of a rock revetment and toe support beneath the berths.

## **SECTION B ENVIRONMENTAL MANAGEMENT PLAN GENERAL**

### **Consent Conditions**

11. As part of this Project Port Otago will be required to comply with consent conditions. This Environmental Management Plan ('EMP') describes the details of the general management approach to be taken during the delivery of this project. Otago Regional Council's consent conditions have informed the development of the adaptive management responses contained within this EMP. Both the EMP and consent conditions are integral to the Project. However it is an essential part of the EMP that consent conditions must be followed. Consent conditions are attached in Appendix 1.

## **Adaptive Management**

12. Port Otago will implement an adaptive management approach, the basis of which will be an EMP. The adaptive management approach involves monitoring the effects of the Project on key resources and implementing a management strategy, in response to the monitored effects that avoids, remedies or mitigates adverse effects that could become more than minor. There will be various types and scales of mitigation responses that can be implemented to address potential adverse effects. The exact type and mix of mitigation options to be utilised will be adapted to suit the circumstances that exist for each site specific issue.
13. Port Otago will adaptively manage the monitoring and mitigation that will be implemented as part of the Project. This EMP will identify how environmental 'trigger levels' will be defined and monitored, to ensure any adverse effects are identified, and will establish the mitigation measures to be investigated to minimise any adverse effects.
14. The primary goals of this EMP are to:
  - a. Describe what actions will be taken in the event of a range of events occurring during dredging and disposal operations as part of the Project Next Generation ("the Project")
  - b. Describe the methodology proposed for dredging and disposal operations and the programme scheduled for each component of the Project.
  - c. Provide a list of key positions and points of contact during the Project.
  - d. Describe how stakeholders will be kept informed during dredging and construction and how any complaints will be managed.
15. At this stage the EMP is in draft form. More detail will be added once Contractors are selected to undertake portions of the works, with the Contractors using and developing specific methodologies and programmes for their portion of work. Even after this stage, changes to the work programme during the Project will mean that the EMP will require updating. This EMP document should be thought of as a 'live document' that will be reviewed, updated and referred to throughout the Project.
16. The environmental limits and monitoring programmes have been developed with a team of independent experts, and are based on industry best practice. The approach

taken in the EMP is designed to identify and monitor the effects from the dredging and disposal operations when monitoring against the environmental limits.

17. An up to date copy of this EMP will be maintained at Port Otago Limited's main office throughout the Project. It will also be available in electronic form from the Project's public website : [www.portotago.co.nz](http://www.portotago.co.nz) > Next Generation >

## **PROJECT STAGING & WORK SCHEDULE**

*(Port Otago intends prepare a dredging methodology that will be included in this section of the EMP)*

18. Port Otago will:
- a. provide Maritime Safety NZ and the Otago Harbourmaster copies of all Dredging and Disposal Schedules prepared.
  - b. Make copies of all Dredging and Disposal Schedules prepared available on the Port Otago website; and
  - c. Place notices in the Otago Daily Times advising the availability of any Dredging and Disposal Schedule prepared.

## **KEY POSITIONS AND POINTS OF CONTACT**

### **Introduction**

19. As the project develops a number of key positions will be identified in terms of operating this EMP and for the life of the Project. Those roles, along with contact details for the specific person in that role, will be added into the EMP once known. These people will be first point of contact for the public, or other organisations, in each of the key areas identified.

*[Further contact details & roles such as Contractor, Engineer to Contract, etc will be added as positions are filled.]*

### **Port Otago Contact**

20. The person with responsibility for the overall Project, including community consultation, technical matters and environmental compliance will respond to and manage the environmental aspects of issues during the Project. In doing this he must ensure that all environmental consent conditions are met and that the environmental requirements of the EMP are adhered to at all times during the Project.

Name	Lincoln Coe
Postal Address	c/- Port Otago Ltd, PO Box 8 , Beach St, Port Chalmers
e-mail:	lcoe@portotago.co.nz
Phone:	03 472 7890
Cell Phone:	021 229 8884

## **PROJECT CONSULTATION/COMMUNICATION**

21. Effective communication with the community is essential during the project. Project consultation is to be maintained through the establishment of two consultation groups.
22. These Consultative Groups have the role of ensuring effective communication actually takes place. The groups have representatives from the Dunedin City Council, Port Otago Limited, the Contractor, representatives from the local community, representatives of local hapu and iwi groups.

### **Project Consultative Group**

23. The community Project Consultative Group ("PCG") has a range of roles associated with communication between the various project parties and the community.

### **Objectives of the Project Consultative Group**

24. Within three months of the commencement of resource consent for the Project Port Otago will invite a cross section of the lower Harbour and Otago coastal communities and organisations, generally as described below, to form the PCG.
25. The purpose of the PCG is to facilitate consultation between the wider users of Otago Harbour and its surrounds and Port Otago during the Incremental Capital and Major Capital dredging and disposal works. The objectives of the PCG are, generally, to:
  - a. Build effective working relationships and mutual trust between the local community and Port Otago (and its Contractors) especially during the Project.
  - b. Promote free flow of information in all directions between the local community and Port Otago, the Contractor and the Regional Council with an aim of anticipating and resolving any potential issues before they arise.
  - c. Discuss the results of monitoring activities on a periodic basis.

- d. Receive information about any community complaints.
26. The PCG may include representatives from the following groups who participated in project pre-consultation and who may want to participate in the PCG:
- a. Aramoana League
  - b. Blue Water Products Limited
  - c. Careys Bay Residents Association
  - d. Chalmers Community Board
  - e. Department of Conservation
  - f. Dunedin City Council – Consents
  - g. Dunedin City Council – Planning Policy
  - h. Harbour Cycle Network
  - i. Harrington Point Community Society (Inc)
  - j. Kati Huirapa Runaka ki Puketeraki
  - k. Monarch Wildlife Cruises
  - l. NZ Marine Studies Centre
  - m. Otago Chamber of Commerce
  - n. Otago Coast Guard
  - o. Otago Peninsula Community Board
  - p. Otago Regional Council
  - q. Otago Yacht Club
  - r. Otakou Runanga
  - s. Port Chalmers Fishermen's Co-op Society
  - t. Port Chalmers Yacht Club
  - u. Port Environment Liaison Committee
  - v. Port Otago Limited
  - w. Quarry Beach Surf Boards
  - x. Recreational Fishing
  - y. Residents of Port Chalmers, Blueskin Road, Dunedin and Harwood-as individuals
  - z. South Coast Board Riders
  - aa. Southern Clams Limited
  - bb. Surf Break Protection Society
  - cc. University of Otago – Department of Marine Science
  - dd. Yellow-Eyed Penguin Trust



27. Note that Community representative roles can be modified as appropriate.
28. The PCG shall meet on at least one occasion every twelve months during Incremental Capital Works and monthly during Major Capital Works.
29. The final copies of reports prepared in accordance with all reporting required under the resource consents shall be provided to the Consent Authority and such other PCG members as may express an interest in receiving them.

#### **Manawhenua Consultative Group**

30. The Manawhenua Consultative Group ("MCG") has responsibilities associated with communication between the various project parties and representatives of the local hapu and iwi.

#### **Objectives of the Manawhenua Consultative Group**

31. Within three months of the commencement of the resource consent, Port Otago shall invite representatives of the local hapu and iwi to join the MCG.
32. The purpose of the MCG, the meetings that will be held with the MCG, and Port Otago's obligations to the MCG are designed to:
  - a. Facilitate consultation between the MCG and Port Otago during the Incremental and Major Capital dredging and disposal works.
  - b. Consult the MCG on the design of the monitoring programmes, including the development of cultural health indicators for key species of importance to Kāi Tahu.
  - c. Review monitoring reports during and after completion of the Incremental and Major Capital dredging Works. If necessary, technical expertise will be made available by Port Otago to assist the MCG to interpret the monitoring data.
  - d. Identify methods to avoid, remedy or mitigate any adverse effects of the Project on the cultural values, interests, and associations of the MCG with the Otago Harbour and Te Tai o Arai Te Uru (Otago Coastal Marine Area).
33. The MCG includes representatives from:
  - a. Port Otago Limited
  - b. Project Contractor (*insert name when available*)
  - c. Otakou Runanga,

- d. Kati Huirapa Runaka ki Puketeraki,
  - e. Manawhenua Working Group
  - f. Te Runanga o Moeraki
  - g. East Otago Taiapure Management Committee
  - h. Karaitiana, RL Karaitiana & Taituha Trust
  - i. Koraki Karetai Trust
  - j. KTKO Consultancy Ltd
34. Note that additional Maori representative roles can be added as necessary, following MCG input.
35. The MCG shall meet on at least one occasion every twelve months during Incremental Capital Works and monthly during Major Capital Works.
36. The final copies of reports prepared in accordance with all reporting required under the resource consents shall be provided to the Consent Authority and such other MCG members as may express an interest in receiving them.
37. Port Otago shall, at least once per calendar year, invite representatives of the Otago Regional Council Consent Authority and the MCG to a meeting to discuss any matter relating to the exercise and monitoring of the resource consents. At this time Port Otago shall, in addition to any matters relating to the exercise and monitoring of the consents use its best endeavours to inform the MCG of the likely dredging to be undertaken in the following year.
38. Port Otago shall keep minutes of the meetings and shall forward them to all attendees.
39. The meetings need not occur if the MCG notify Port Otago that the meeting is not required.
40. Port Otago shall provide final copies of any reports prepared during the project to the MCG concurrently with them being submitted to the Otago Regional Council.

### **Complaints**

41. Port Otago will establish and operate a Community Complaints Procedure during Project Next Generation and operation of consented activities.

42. Port Otago will have a clearly nominated and publicly communicated contact person within its own organisation, or within one of its local agents, who will be known as the 'Community Relations' contact.
43. The Community Relations contact will be the point of contact between the community (or other public) and Port Otago. They will be responsible for receiving and responding to any complaints during the Project.
44. Port Otago will operate a 24 hour freephone number for the community to call if they have any concerns or complaints during the Project. The freephone number and complaints procedure will be advised to local residents within the area potentially affected by the Project and shall be advertised in the Otago Daily Times and on the Port Otago website within 1 month of commencement of consent, before any Major Capital works are commenced, before any blasting is commenced, and at regular periods during the Project.
45. Port Otago will maintain a log of all complaints received including the following:
  - a. date.
  - b. time.
  - c. complainant name and contact details (if provided).
  - d. nature of the complaint including the cause and effect if known.
  - e. record of action taken to address or mitigate the complaint.
46. Port Otago, via the Community Relations contact, will acknowledge receipt of complaints to the complainant and Otago Regional Council as soon as it is practicable but no later than 2 working days and shall log the action that it intends to take in response to the complaint.
47. Port Otago will use best endeavours to take action in respect of a complaint, if any action is necessary, within one week of a complaint being received. The response time will depend upon the nature of the complaint, the scale of any investigation required, and the type of mitigation action undertaken. In many circumstances a response will be quicker than five working days/one week but in some circumstances it may necessarily be slower.

48. Port Otago, via the Community Relations contact, will communicate with the complainant about actions taken.
49. Port Otago will document any other longer term actions to be taken as a result of any complaint.
50. Once every twelve months Port Otago will present a complaints summary to the meetings of the PCG (in the event it is established), the MCG (in the event it is established) and to the Otago Regional Council for review.
51. Port Otago will make the Complaints log available to Otago Regional Council on request.

#### **QUALITY ASSURANCE PROCEDURES**

52. The requirements for material and plant quality assurance procedures will be detailed in a construction specification. The Contractor will be required to prepare specific testing procedures to meet the specified requirements, and actions that will be taken if specified requirements are not achieved.

#### **HEALTH AND SAFETY**

53. A health and safety plan will be prepared by the Contractor before the start of dredging and disposal operations. This will be written to fulfil the requirements of the Health and Safety in Employment Act (1992) and to ensure the safety of people working on the Project.

**SECTION C MONITORING AND ADAPTIVE MANAGEMENT (ENVIRONMENTAL MANAGEMENT PLAN)****Water Quality** (*Refer to Conditions 4-8 of Consent Number: 2010.195*)**Water Quality**

54. For the first six months of Incremental Capital dredging, Port Otago will undertake fixed turbidity monitoring at locations described in Table 1 and as shown on Plan A1.11251 dated 11 February 2011 (attached). For this period a fixed turbidity meter used as a control site will be located as shown on this plan.
55. The results from the turbidity measuring of Incremental Capital dredging works will be reviewed by an Expert to assess the need to continue with this fixed turbidity monitoring programme.
56. Should the results from the fixed turbidity meters prove that ongoing monitoring is not required, Port Otago may from time to time undertake measurements using mobile turbidity meters. These measurements will be undertaken to verify that turbidity from Incremental Capital dredging works remains within the Environmental Limits.
57. If the results from the fixed turbidity meters indicate further monitoring is required this is to be undertaken for a minimum of 6 months.
58. Turbidity monitoring undertaken for Major Capital dredging will commence three months prior to the Major Capital dredging and will continue three months post completion of Major Capital dredging, and be undertaken in locations described in Table 1 and as shown on Plan A1.11251 dated 11 February 2011. For this period a fixed turbidity meter used as a control site will be located as shown on this plan.
59. Port Otago shall be responsible for obtaining such consents as are necessary for the fixed turbidity meters.

Table 1

Monitoring	Environmental Limit	Response Limits		Management Action	
		1	2	Response Limit 1 reached	Response Limit 2 reached
Turbidity meter placed in a location in the <b>Harbour seagrass beds</b> in the location shown on Plan A1.11251 dated 11 February 2011 (attached).	25 NTU (6 hourly average)  15 NTU (2 week moving average)	12 NTU (6 hourly average)	17 NTU (6 hourly average)	Notify ORC within 24 hours of exceedance.  Check equipment/data accuracy to verify exceedance.	Undertake all actions as set out when Response 1 limit is reached  Undertake management of dredging process to reduce turbidity.
Turbidity meter placed in a location adjacent to the <b>Aramoana Ecological area</b> in the location shown on Plan A1.11251 dated 11 February 2011 (attached).	35 NTU (6 hourly average)	19 NTU (6 hourly average)	24 NTU (6 hourly average)	Review natural events and areas of dredging activity with expert advisor.  Assess impact of ongoing dredging operation.	This could include:  § Relocation of dredge § Reduce dredging frequency
-Turbidity meters placed in locations shown on Map Plan A1.11251 dated 11 February 2011 (attached); at  § <b>Quarantine or Pudding Island</b> § <b>Wellers Rock/Omate Beach</b>	35 NTU (6 hourly average)	19 NTU (6 hourly average)	24 NTU (6 hourly average)	Assess need for additional monitoring	§ Suspend dredging § Operate dredge in non overflow mode
Turbidity meter placed in location as shown on Plan A1.11251 dated 11 February 2011 (attached) in <b>intertidal cockle beds</b> opposite Acheron Head.	70 NTU (6 hourly average)	35 NTU (6 hourly average)	50 NTU (6 hourly average)		

## Verification of Dredging Plant Operation and Hydrodynamic Model

### OBJECTIVE

To verify the modelling predictions associated with various items of dredging plant used for the dredging and disposal works, Port Otago will undertake the following monitoring and management actions.

### MONITORING

Port Otago will undertake monitoring of Incremental Capital and Major Capital dredge works within the Inner Harbour, and at the commencement of disposal at Site A0. For each item of plant Port Otago will:

- Measure suspended sediment of dredge plume, once when the dredge is working a load of predominantly sand and once when the dredge is working a load of predominantly silt.
- Measurements will include sampling using mobile turbidity meters, and also light attenuation along the centreline of the plume for up to 1km downstream.
- For clarity, monitoring will be undertaken of the same load dredged from the Inner Harbour and subsequently disposed of at Site A0.
- Measurements will be compared to a control site so as to establish background turbidity and light attenuation levels.
- Concurrently with the measurements, vertical aerial photographs may be taken to assist interpretation of results.

### MANAGEMENT ACTION

Measurements and photographs will be reported and assessed by a suitably qualified expert. Although not anticipated, should there be a significant variance from the hydrodynamic model predictions then the following steps should be taken :

- Assessment of the appropriateness of the turbidity monitoring locations.
  - Assessment of what mobile turbidity measurements may be required.
  - Assessment of the active management of the dredging and disposal works may be required to be undertaken as set out in the Water Quality Table 1.
-

**MONITORING**

Port Otago will undertake monitoring of Major Capital dredge plant disposing at Site A0 to include:

- Deploy for two separate one month periods (ideally over two different seasons) self-recording turbidity meters. One will be located near the surface and the other near the seabed at the north-east corner of Site A0.
- Consider the use of archived MODIS satellite images to assist in the interpretation of the turbidity meter data.

Be responsible for obtaining such consents as are necessary for turbidity meters.

**MANAGEMENT ACTION**

Measurements (and satellite images if any) will be reported and, using hindcast wave data and wind data, assessed by a suitably qualified expert. Although not anticipated, should there be a significant variance from the hydrodynamic model predictions then active management of the Major Capital dredging disposal will be considered in consultation with expert advisors. Active management actions may include:

- Modifications to the location of sediment disposal within the A0 site.
- Investigating vessel speed during disposal.
- Adjusting direction of travel during discharge.



**Bathymetric Surveys** (Refer to Conditions 10, 11 of Consent Number: 2010.198, Condition of Consent Number 2010.193, Condition 11 and 12 of Consent Number 2010.1940.)

#### **MONITORING**

##### **Inner Harbour**

Port Otago will carry out annual bathymetric surveys of the Lower Harbour areas identified in Plan A4.1120612 (attached).

The bathymetric surveys should be of sufficient detail to enable an assessment of the volume of material dredged, and the changes in the seafloor and intertidal flats.

Port Otago shall also undertake beach and nearshore profiling in the areas of Shelley Beach, Te Rauone, and the Aramoana Sand Flats to determine any morphological change.

#### **MANAGEMENT ACTION**

##### **Inner Harbour**

Port Otago will compile these survey results into an annual report and provide it to the Otago Regional Council, the PCG and the MCG.

#### **MONITORING (Refer to Conditions 9 and 10 of Consent Number: 2010.198.)**

##### **Site A0**

Port Otago will carry out bathymetric surveys of the Site A0 as follows :-

- Prior to, and annually during, and within 6 months of completion of Incremental Capital Dredging. This is to be in accordance with the low intensity survey Plan B.
- Immediately prior to, every 6 months during, and within 6 months of completion of Major Capital Dredging. This is to be in accordance with the High Intensity Survey Plan A.

The bathymetric surveys should be of sufficient detail to enable an assessment of changes in the disposal mound profile, volumes & direction of bed load. The survey locations and intensity of survey are identified in Plan A1.11206 dated 11 February 2010 (attached). Surveys are identified as either Low or High intensity.

At a similar time to each of the bathymetric surveys at A0, bed surface grab samples will be obtained at five locations for grain size analysis.

#### **MANAGEMENT ACTION**

Port Otago will compile these survey results into an annual report and provide it to the Otago Regional Council, the PCG and the MCG.

Review of the spatial extent and frequency of surveys may be reviewed on an annual basis.

### **Tide and Current Measurement (Refer to Condition 12 of Consent Number 2010.193.)**

#### **MONITORING**

Port Otago will take tidal height measurements from existing gauging stations at Dunedin, Port Chalmers and Spit throughout the Incremental and Major Capital dredging works and for at least one year following completion of capital dredging.

Port Otago will take tidal current measurements at or near the Port Chalmers swinging basin area and also at beacon Pile 1A opposite Harington Pt at the Otago harbour entrance. These measurements should be taken at the commencement of Incremental Capital dredging, throughout Major Capital dredging works and periodically for at least one year following completion of dredging.

Port Otago will be responsible for obtaining such consents as are necessary for these meters.

#### **MANAGEMENT ACTION**

A report summarising the tidal height and phasing changes, as well as the changes in currents shall be prepared on a maximum 5 yearly basis during Incremental Capital dredging and following completion of Major Capital Dredging.

Port Otago will continue to provide tidal data to Land Information NZ Hydrographic Services.

The tide and current monitoring results shall be provided to the Otago Regional Council on request.

### **Dredge Material Characteristics (Refer to Condition 22 of Consent**

**Number 2010.193.)**

**MONITORING**

For the duration of the project Port Otago will collect and record data on the characteristics of the material dredged and disposed including:

- § Make up of each load (e.g. sand, silt, clay, rock),
- § Volumes of dredged material for each run,
- § Location of dredge sites (GPS or chart reference),
- § Cumulative total volumes of dredged material disposed.
- § Disposal ground used and location within the disposal ground.

**MANAGEMENT ACTION**

The data collected on Dredge material characteristics will be included in annual reporting associated with the Incremental Capital and Major Capital dredging.

**Birdlife (Refer to Condition 9 of Consent Number 2010.193).**

**MONITORING**

On an annual basis between 1 February to 31 March, the presence of the migratory godwit population may be monitored in conjunction with the Department of Conservation and/or a suitably qualified expert.

**MANAGEMENT ACTION**

If the annual monitoring indicates that commencement of dredging operations before 31 March would not adversely effect the godwit population, Port Otago may report the outcome of the assessment to the Department of Conservation, Dunedin branch, and may seek approval to commence operations earlier than consented. Otherwise dredging in the vicinity of the Aramoana Sand Flats is to be undertaken when the tide height is above half tide (>1m above Chart Datum).

**Aquatic Communities** (*Refer to Conditions 13 of Consent Number 2010.195, Conditions 12-16 of Consent Number 2010.198*).

**MONITORING**

Port Otago will commence a baseline biological monitoring programme at least six months prior to commencement of dredging works in the Lower Harbour or disposal at Site A0.

For Incremental Capital dredging works using equipment such as New Era, it is expected that an ongoing biological monitoring programme will include broadscale surveys at three yearly intervals until three years following the completion of the dredging and disposal work.

For Major Capital dredging works it is expected that the biological monitoring programme will include one pre-dredge or pre-disposal survey and post-dredging or post-disposal surveys completed annually for a period of three years following the completion of the Major Capital dredging works.

The scope and methodology of these 3 yearly broadscale surveys will be prepared and shall include, but is not limited to, a survey and assessment of any effects on species diversity and a survey and assessment of any effects on species abundance and community composition. They shall however include as a minimum:

- Assessment of effects on benthic habitats along transects downstream of the Site A0 to cover wider Blueskin Bay as well as control sites. Sampling would be expected to involve sidescan to map seabed changes, video and splashcam to assess epifauna and grab sampling for infauna and sediment characteristics.
- Broadscale Harbour survey

The methodology shall be approved by a suitably qualified expert, and provided to the Otago Regional Council annually.

In addition to the broadscale 3 yearly surveys, an annual (unless otherwise indicated) ongoing biological monitoring programme shall be determined by a suitably qualified person and is expected to include:

- Quarterly monitoring of seagrass beds (quarterly frequency) with a minimum of 4 sites at each location. Aerial cover, distribution, height and shoot density will be used as

indicators of health. Further larger scale distribution assessment will be based on aerial photography, ground truthing and established transects.

- Aramoana salt marshes monitored with pre-assessment of % cover and distribution from aerial photographs and transects.
- Assessment of cockle beds at a minimum of 4 sites (such as opposite Pulling Point, opposite Acheron Head, Te Ngaru and Te Rauone). Surveys to include cockle population, density, size structure, biomass and condition.
- Rocky Shores monitored at a minimum of 2 locations.
- Invasive species would be included in these surveys.

The frequency of the portions of survey will be annually unless stated otherwise.

#### **MANAGEMENT ACTION**

The ongoing biological monitoring survey methodology, approved by a suitably qualified expert, shall be provided to the Otago Regional Council on request.

The results from the ongoing biological monitoring programme surveys will be progressively reported to the Otago Regional Council when completed.

Monitoring results will be reviewed after 3 years by a suitably qualified expert, and recommendations made as to the ongoing frequency and scope of further surveys.

## Noise

### MONITORING

Prior to the commencement of the Major Capital dredging works Port Otago will establish a noise monitoring programme. This programme will confirm actual noise levels compared with the predictions contained in the acoustic evidence provided. This will allow individual properties exposed to noise levels in excess of 45 dBA to be identified under certain conditions.

### MANAGEMENT ACTION

The results of the noise monitoring programme will be made available to the Otago Regional Council on request.

Once exposed dwellings are identified individual property owners will be consulted. A range of mitigation options will be investigated in consultation with each of those property owners so affected.

The mitigation options agreed with individual property owners can be made available to the Otago Regional Council on request.

Using soundpower level information matched to meteorological conditions, and in consultation with a noise expert, before dredging works commence Port Otago shall prepare a 'Noise Restricted Operating Areas' plan. This will allocate areas to be dredged during specific times and under certain wind conditions so as to remain within the NZS6803:1999 Acoustics Construction Noise Standard.

The Plan will be provided to the Otago Regional Council once completed.

During all dredging works Port Otago will ensure that best practice equipment and management techniques are employed to manage the noise emissions from the dredging and disposal vessels. This shall include as a minimum:

- Ensuring that the dredging and disposal vessels are equipped in accordance with industry best practice to minimise noise from the machinery and its operation.

- Ensuring all plant is maintained in accordance with industry best practice.
- Regular monitoring of vessel noise is carried out to ensure noise levels remain at levels similar to those measured at the commencement of the operation.
- Ongoing education and communication with staff to retain a high level of awareness as regards noise issues, particularly in relation to impact noises.
- Foghorns or other warning devices used by dredging and disposal activities will only be used in instances of genuine maritime emergency in all areas of the lower harbour channel

Port Otago will ensure that these best practice techniques are included in specifications provided for all dredging plant, to ensure all dredging operators follow them.

### **MONITORING**

During Major Capital dredging works Port Otago will from time to time take noise measurements at appropriate locations to verify compliance with NZS6803:1999 Construction Noise Standard.

### **MANAGEMENT ACTION**

A log will be kept of all noise measurements which will include the following details:

- Date and time
- Location
- Noise measurement
- Description of activity being undertaken at time of measurement
- Steps taken (if any required) to mitigate noise

Port Otago will make the noise measurement log available to the Otago Regional Council upon request.

If any noise measurements exceed levels permitted by the consent Port Otago will immediately:-

- Report the exceedance to the Otago Regional Council.

Alter work practices or machinery to ensure that the requirements are met.

**Use of Explosives (Refer to Condition 14 of Consent Number 2010.193).**

**MONITORING**

Port Otago will prepare and implement a blasting methodology, which shall be approved by a suitably qualified expert. The blasting methodology will include details of the programme and include requirements to:

- Carry out an underwater survey of benthic community prior to blasting commencing in the immediate vicinity of the area to be blasted.
- Remove and relocate resident fish (crayfish) to the extent practicable.
- Undertake visual observations (mammal watch) prior to detonation of explosives. Where required, blasting to be delayed until mammals are outside an immediate blast area set at 1000 metres.
- Prior to detonating explosives deploy a noise generating device to scare fish away from the blast site.
- Carry out visual observation and keep records of fish mortality, and remove dead fish immediately post blast. Report results in annual report.

Adopt best practice in terms of the management and use of explosive materials.

**MANAGEMENT ACTION**

The blasting methodology will be provided to the Otago Regional Council at least one month before blasting commences. The Otago Regional Council is to be notified at least one month prior to each blasting campaign, including advising expected dates of commencement and duration.



## Marine Mammals

### OBJECTIVE

To avoid harm to mammals from the effects of dredging or disposal operations Port Otago will adopt the following approach:-

### MONITORING

Maintain watch for any marine mammal within 300m of dredging equipment. If sighted record sighting and take appropriate action to avoid harming the animal.

### MANAGEMENT ACTION

Implement appropriate procedures when navigating dredging vessels, including:

- Avoiding approaching marine mammals head on;
- Maintaining a constant speed when within 300m of a mammal;
- Avoiding sudden changes in direction.

Port Otago will include these procedures in specifications provided for all dredging plant, to ensure all dredging operators follow them. Training in regards the procedures and actions will be provided for all dredging equipment operators by a suitably qualified person.

Any specific steps undertaken to avoid affecting marine mammals must not compromise the safety of vessels or personnel.

Sightings of marine mammals as well as management actions taken by dredging or disposal vessels are to be recorded and reported on an annual basis.

## Light Spill

### OBJECTIVE

To minimise the effect of light spill from dredging and disposal operations Port Otago will adopt the following approach :-

### MONITORING & MANAGEMENT

Port Otago will (except where lighting is required for the health and safety of the vessel and/or personnel):

- Use best practice equipment and management techniques for lighting of all dredging and disposal vessels. This will include shielding of lights to minimise light spill away from the vessel.
- Use only essential navigation lights when passing Taiaroa Heads.

Port Otago will include these management actions in specifications provided for all dredging plant, to ensure all dredging operators follow them.