Galway Harbour Company

Galway Harbour Extension

Environmental Impact Statement

Chapter 15

Mitigation Measures & Monitoring Proposals

TABLE OF CONTENTS

15 MITIGATION MEASURES..... 15-1

15.1 INTRODUCTION 15-1
15.2 ENVIRONMENTAL MANAGEMENT FRAMEWORK..... 15-1
15.3 MITIGATION BY DESIGN 15-1
15.4 CONSTRUCTION MITIGATION..... 15-2
15.5 OPERATION MITIGATION..... 15-4
15.6 MONITORING 15-5
15.7 REPORTING 15-7

TABLES & FIGURES

TABLES

No table of figures entries found.

FIGURES

No table of figures entries found.

15 MITIGATION MEASURES

15.1 INTRODUCTION

The mitigation measures set out in each of the EIS Chapters are summarised in this Chapter 15. In addition, an Environmental Management Framework sets out additional measures, monitoring standards, thresholds and best practice guidelines for the preparation and implementation of the Environmental Management Plan.

15.2 ENVIRONMENTAL MANAGEMENT FRAMEWORK

The Environmental Management Framework included at Appendix 4.2 forms the basis for a full Environmental Plan [EMP] for the construction of the Galway Harbour Extension. The information contained in the Environmental Management Framework and in due course the developed EMP will be supplemented by the contractor's Environmental Implementation Plan [EIP]. It will contain the specific action plans of the contractor regarding the requirements of the EMP such that the environmental issues and regulatory requirements are properly addressed.

15.3 MITIGATION BY DESIGN

- The layout and footprint of the proposed development have evolved over the course of the design processes with a view to minimising the impact on Natura 2000 sites and their qualifying interests.
- The reduction in scale of the development over the design process and the re-arrangement of elements of the development has helped to reduce its visual impact.
- The layout, orientation and positioning has minimized the requirement for rock removal.
- The proposed design incorporates a beneficial re-use of dredged sediments for fill and surcharge. The design facilitates the re-use of all dredged soils for land reclamation purposes. Rock excavated within the site will be incorporated into the construction of lagoon walls and quays and access ways.
- The unsatisfactory junction arrangement at the entrance to the Galway Harbour Extension [adjacent to the Galway Harbour Hotel] will be upgraded to a signalised junction at the commencement of the project.
- Improvement works to the horizontal and vertical alignment of the road at Lough Atalia Road Rail Bridge and along by Forthill Cemetery will be undertaken as an enabling contract at commencement.
- Semi-vertical breakwaters have been proposed to mitigate seal predation on salmonids by avoiding the formation of potential new seal haul-outs adjacent to the route of salmon runs.
- Lighting plan designed to prevent uplighting, reduce sky glow and minimize lighting of water body.
- Storm water is controlled by using valved outfall lines with petrol interceptors and silt traps.
- Surface area of oil quay designed to manage spillages.
- Provision made for collection and retention of contaminated firewater.
- The use of textured construction material will enhance settlement by algae and invertebrates.
- Landscape plan largely using native species evolved to provide:-
    - screening of the central cargo area and general harbour operations

  - softening of the hard elements of the harbour extension proposal
  - greening, to reflect the landscape backdrop of the eastern environs of the City.

- The selection of neutral malt colours for the various buildings will lessen their visual impact.
- A Mobility Management Framework will be implemented to promote alternative methods of transport to the private car for employees or customers at the Galway Harbour Extension and that heavy goods vehicles avoid conflict with peak traffic.

15.4 CONSTRUCTION MITIGATION

The mitigation measures as detailed in the various Chapters of the EIS are summarised below:-

Environmental Management Framework.

- Implementation of Best Practice construction methods and Environmental Management Plan.

Drilling, Blasting and Pile Driving

- Blasting and piling will be limited to the period 1st August to 31st March inclusive to avoid the April to July principal run of Atlantic Salmon and other anadromous species.
- Trial blasting will be carried out prior to the commencement of production blasting to confirm the optimum blast ratio for the process, to test the effectiveness of the proposed mitigation measures and to provide initial monitoring data for the blasting events.

  The mitigation measures proposed are based on international best practice in particular that adopted by the Canadian authorities (Anon), and the American authorities (Anon 1991), (Anon 2006) and British Standard 5607 *Code of practice for the safe use of explosives in the construction industry.*
- All drilling and blasting will require the preparation of detailed method statements by the appointed specialist contractors prior to commencement.
- All blasting will take place in daylight hours and sea state 0 to sea state 3. Where possible blasting will take place at low tide conditions.
- The maximum instantaneous charge permitted in any blast will be 10 Kg of explosive.
- All pile driving will take place in daylight hours.
- Blasting and pile driving will not be permitted if cetaceans or seals are sighted within one kilometre of the blast site; this area is defined as the exclusion area. Marine Mammal Observers will take up position before a day's blasting begins. They will be equipped with binoculars, telescopes and tripods with which to watch for the animals, and two-way radios with which to communicate with each other and the explosives engineers. Blasting will not occur if a seal or cetacean is sighted within one kilometre of the blast site, or for a period of 30 minutes after one has been sighted within the 'exclusion area'. Observers will use Mutton Island and Hare Island as watch points. A Marine Mammal Watch Plan giving full details of the methodology and standard operating procedures for the blasting watches in accordance with the NPWS *"Draft Guidance to manage the risks to Marine Mammals from Man-made Sound Sources"* will be carried out before blasting works begin.

  The IWDG runs a national strandings scheme that covers Galway Bay. The project team will arrange with IWDG to receive news of any strandings that occur in the area during the construction period. It is further proposed that:

  i. after episodes of blasting a search party will be sent out in a RIB to search the area around the blast site for dead or injured seals or cetaceans.

ii. a public awareness campaign will be launched in which members of the public are encouraged to report dead or injured seals in the inner Galway Bay via a designated phone line.

- The use of acoustic deterrent devices (ADDs) to deter seals from entering blast areas will be considered if seals are often present in these areas and significant disruption to blasting activities occurs.
- Underwater noise levels will be monitored prior to commencement of development and during construction, with particular emphasis on the presence of seals and during the smolt and eel migration period.
- A rigid inflatable boat [RIB] will be used to deter bird species from areas of blasting activity.

Dredging

- Dredging work will be limited to the period 1st August to 31st March inclusive, to avoid the April to July principal run of Atlantic Salmon and other anadromous species.
- Dredged material will be used as fill material for land reclamation, thus completely eliminating disposal at sea during construction.
- Dredging activity within 800m of the entrance to Lough Atalia will be restricted to periods of ebb tide.
- Measures and controls will be required on board dredgers to include the elimination of overflow and the avoidance of spillage from open barges and hoppers.
- The design of the proposed development includes the use of geotextiles to line the fill areas between bund walls and also incorporates the continuous gradual release of filtered dredge transport water.
- Bilge water will be collected from vessels and disposed of by licensed operators.
- Disposal of ballast waters will be regulated under International Maritime Organisation.
- Barges with ducted propellers will be fitted with mesh screens to prevent seal entry to ducts.

Use of Concrete

- Normal best construction practice with regard to the use and pouring of concrete will be adhered to. If concrete cannot be poured in dry protected areas away from water until full curing has taken place, particular attention will be paid to the quality and security of the shuttering used for pouring. Pre-cast concrete elements will be used wherever possible and these will be designed to allow for enhanced settlement of flora and fauna as reported in recent scientific papers (Fifth 2013, Chapman and Brown 2011, Martins and Thompson, 2009). Any wash water contaminated with concrete will not be allowed to enter the marine environment and will be disposed of appropriately. Contaminated equipment *(e.g.* concrete delivery trucks, pumping equipment and tools) will be cleaned at a location where there is no possibility of the drainage of wash water to the marine environment. The mitigation by design from using sheet pile and rock armour has ensured a minimal underwater concrete requirement. While the main quays will be concrete, these will be above tide level.

Spillages

- All machinery used in the construction of the proposed development will be checked to ensure that it is well maintained and not likely to leak fuel, lubricating oils, greases etc. into the aquatic environment. Any onsite refuelling or maintenance will be carried out on securely bunded temporary hard standing areas. All oily wastes generated will be stored in leak-proofs tanks for removal by a licensed operative holding a valid Waste Collection

Permit. Dredgers will be re-fuelled at sea using best available practice to ensure no spillages into the designated sites.

Dust and Odour

- Transport of material to the site will be by means of trucks on the public roads. Roads within the site will be hard surfaced with a base coat of asphalt as soon as practicable to minimise haul road dust within the site. The internal roads will be maintained and cleaned on a regular basis. A self-contained mechanical wheel wash will be installed on site and relocated to appropriate locations during the construction phase. This water will be disposed of appropriately and will not be released untreated into the marine environment. If required during periods of dry weather a water bowser will be utilised to dampen the road surface.
- Where fine material is imported to site such materials will be carefully placed to minimise fugitive dust emissions. Temporary cover using materials such as coarse or damp soil, clay or geotextile cover will be used where appropriate. The exposed area of fine material will be minimised to an appropriate maximum size.
- Settlement ponds / lagoons for dredged sediments will have a wetted surface, supplemented by water sprays during dry weather and post pumping to minimize dust emissions.
- A dust and odour management plan will be implemented during the construction phase, using resident data, meteorological data and site operator knowledge to investigate any dust or odour complaints and implement remedial action.
- H_2S and methane release will be controlled by alternating lagoons and damping down surfaces. On excavation of silts, strong odours are given off by decomposing organic matter. These odours, although initially quite pungent, rapidly reduce as soil aerates. Discharge points for suction dredged materials will be established at a number of locations to facilitate the distribution of materials within the lagoons.

Archaeology

- All groundworks associated with the upgrade of the roadway, footpath and construction of the bicycle lane at Forthill Graveyard and at the entrance to the Galway Harbour Enterprise Park will be archaeologically monitored under archaeological licence issued from the National Monuments Service.
- All groundworks associated with the road reduction measures beneath the eye of Lough Atalia underbridge will be archaeologically monitored under archaeological licence issued from the National Monuments Service.
- All underwater dredging works and other excavation works from the shore area and other associated areas by land based mechanical machinery will be archaeologically monitored by experienced, licensed maritime archaeologists with a proven track record in equivalent, similar type work. The lagoons receiving the dredged sediments, when sufficiently dried, will be archaeologically tested to recover any potential archaeological artefacts in the sediment. The archaeological testing will involve a program of sieving and licensed metal detection thus maximising artefact recovery.

15.5 OPERATION MITIGATION

The mitigation measures as detailed in the various Chapters of the EIS with regard to the operational phase are summarised below:-

- Mitigation for impacts of lighting during the operational phase has been provided through the use of energy efficient lighting in a configuration designed to provide the minimum lighting level required for safety. The lights used will be of a design that casts light

downwards only and the lamp standards will be positioned in such a way that they will shine directly onto newly reclaimed land only.

- The storm water from the existing Phase 1 of the Galway Harbour Park currently discharges from three discharge points. It is proposed that these three discharge points will be linked up, as part of the proposed development, so that there will be only one discharge point from the existing GHEP. This new system will divert storm water to petrol interceptors fitted with silt traps prior to its discharge to sea. In the event of an oil or other spill entering the storm water system, the discharge of contaminated water will be prevented by the use of control valves.
- A detailed spill response plan has been prepared. This will limit the negative effects of any spills. In addition, Galway Harbour Company has an Environmental management policy to ensure that there are no spillages to the sea.
- Maintenance dredging will be limited to the period of 1st August to 31st March inclusive. Spoil from maintenance dredging will be disposed of to an EPA permitted site located outside Natura 2000 sites.
- Commercial vessels approach Black Head at *ca* 12 knots and at the Outer Margaretta Buoy, have reduced this to 6 knots. Pilot transfer takes place at 3.5/4 knots and vessels enter the docks at a velocity of *ca* 3 knots.
- Ship unloading will be carried out in a manner that minimises cargo spillage. All loading/unloading will be subject to appropriate operation specific control and containment protocols. Operatives will undergo training on spillage reduction measures and emergency spill containment and clean-up measures. Such training will be documented and updated on a regular basis.
- The port will be equipped with infrastructure to support the installation of shore-side electricity for vessels using the port. This will provide essential services for the vessels and eliminate the requirement for ships engines to run continuously while in port.
- Many of the industries envisaged for the enterprise park will require licences from the Environmental Protection Agency to operate. Where a licence is not required, the Harbour Company will require site leases to include environmental protection conditions equivalent to those required in Environmental Protection Agency licences.

15.6 MONITORING

- Intertidal annual seasonal sampling will commence pre-construction and for one year post-construction at the following locations: Ballyloughan, Lough Atalia, Renmore Lough, east and west of the causeway and at an agreed control site to record macrofaunal assemblages and sediment granulometry at High, Mid and Low water. Sampling will incorporate quadrates, cores and photography (including Sediment Profile Imagery). Post-completion, the additional 1 year's data can be reviewed to see if seasonal sampling is still required or if it can be reduced to once a year.
- Annual benthic sampling will be commenced pre-construction at the following sites: south of Ballyloughan Beach, Lough Atalia, Renmore Lough, east and west of the caseway, south of Mutton Island and at an agreed control southwest of the Margaretta using a 0.1 sqm grab and a 1 mm sieve. 3 faunal samples and 1 sediment sample will be collected and analysed using the same techniques as were used in the EIS. Sediment Profile Imagery will also be incorporated into the monitoring methodologies. The sampling will continue for at least 3 years post-completion.
- Suspended solids levels will be continuously monitored at a number of points in the vicinity of the works as part of the Environmental Management Plan.
- A site dust monitoring programme will be put in place during the construction phase with secure monitoring locations to ensure compliance with dust deposition limits. A dust

management plan will be implemented during the construction phase, using resident data, meteorological data and site operator knowledge to investigate any dust complaints/potential dust complaints and implement remedial action using a developed common sense strategy.

- The acoustic tagging study of salmon smolts that was carried out as part of the EIS will be carried out again post the construction period to document changes in patterns of migration routes that the smolts undertake.

- Monitoring of common seal populations prior to, during, and for at least two years post construction, will be completed as part of ecological monitoring of the development. This will follow a similar methodology to that employed as part of the baseline surveying, using similar techniques and haul out locations to allow for comparative analysis with baseline information.
- Survey for otter holt sites will be completed immediately prior to construction phase and on two occasions annually post construction phase, following a similar methodology to that employed as part of baseline surveys. During the construction phase, observation surveys for otter activity will be made and notes from marine observers and bird surveyors will also be included as part of the dataset.
- Monitoring of bird populations prior to, during and for at least two years post construction will be completed as part of ecological monitoring of the development. This will follow a similar methodology to that employed as part of the baseline surveying, using similar techniques and point count locations to allow for comparative analysis with baseline information.
- Underwater noise levels will be monitored prior to commencement of development, with particular emphasis on the presence of seals and during the smolt and eel migration period.
- As the proposed development has the potential to alter salinity regimes in the area, *in situ* monitoring of salinity will commence prior to construction at the following sites: at the mouth and within Lough Atalia, Renmore Lough, off Ballyloughan, south of Mutton Island and southwest of the Margaretta. This monitoring will continue for at least two years post-construction.
- Appropriate measuring devices will be deployed pre-construction to measure current speeds and wave heights at the following sites: south of Ballyloughan, east of the existing shipping channel, south of Mutton Island and southwest of the Outer Margaretta buoy.
- Prior to commencement of construction, instrumentation will be installed to monitor the response of the alluvium to the construction processes. Instrumentation will include piezometers, inclinometers, settlement plates and sediment traps. Instruments will be installed within the lagoons in a grid pattern and outside lagoon bunds prior to commencement of construction works. The measurements taken will facilitate the safe construction of the works and enable a comparison between design geotechnical parameters and the actual response of the soils to the works.
- The areas adjacent to the Galway Harbour will be monitored on an on-going basis to record the occurrence of invasive non-native species. If noted, Galway Harbour Company will devise and implement measures to control the spread of such species.
- An Environmental Management System complying with ISO 14000 or equivalent will be developed for the harbour and Enterprise Park developments.
- On-going monitoring through Static Acoustic Monitoring [SAM] of small cetaceans using C-PODs will be carried out, during and after construction in accordance with the Before-After-Control-Impact [BACI] approach.

15.7 REPORTING

Monthly / quarterly environmental audit reports will be compiled as part of the Environmental Management Framework. These will provide summary information on monitoring completed with annual reports compiled for the duration of the construction phases of the development, and following two years from the completion of the project.

Reports will be submitted to the local Planning Authority and other authorities as deemed appropriate e.g. EPA etc.