East Tip Remediation Project, Haulbowline, Co Cork

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RPS

East Tip Remediation Project, Haulbowline, Co Cork

Appropriate Assessment (AA) Screening Report and Natura Impact Statement (AA Stages 1 and 2)

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EXECUTIVE SUMMARY

This document comprises the Appropriate Assessment (AA) Screening Report and Natura Impact Statement prepared by RPS in accordance with the Habitats Directive (*92/43/EEC)* for the remediation of East Tip, Haulbowline Island, Co. Cork on behalf of Cork County Council, who is acting on behalf of the Minister for Agriculture, Food and the Marine.

The East Tip is a 9ha area of reclaimed land located on Haulbowline Island within Cork Harbour, between Ringaskiddy and Cobh. The land was reclaimed using processed slag and other wastes from a former steelworks site on the island.

The proposed works at the East Tip are located close to a number of designated protected sites including Cork Harbour Special Protection Area (SPA), which at its closest point at Lough Beg is 1.4km to the south of Haulbowline and 600m south from the associated proposed road works in Ringaskiddy. Great Island Channel candidate Special Area of Conservation (cSAC) is located 4.2km to the north of the East Tip.

The purpose of the assessment is to examine the possibility that the proposed works, either individually or in combination with other plans and projects, may result in significant negative effects on the designated sites.

Due to the distance of the designated sites from the East Tip, no direct impacts are anticipated. However, indirect impacts could result in a release of contaminants during the construction stage. Such a release could potentially result in adverse effects on the designated sites in either of the following ways:

a) By contamination of food chains in the immediate vicinity of the East Tip (for example at the Common Tern feeding area of Spit Bank); and/or

b) By transport of contaminants via oceanic currents to habitats within the boundary of the SPA.

Robust and effective mitigation measures have been proposed in the EIS for the avoidance of any impacts affecting water quality within all relevant Natura 2000 sites. Specific mitigation measures have been proposed for the prevention of impacts to all species. Likewise, precautions will be taken in relation to non-native invasive species during the construction phase.

The mitigation measures will form the backbone of the detailed construction method statements. Exact implementation details in the Construction Method Statements will be agreed with the relevant state body and NPWS representatives prior to the commencement of works.

The conclusion of the Appropriate Assessment Natura Impact Statement is that there will be no potential for cumulative impacts arising in combination with any other plans or proposals, with the implementation of best practice and the recommended mitigation measures.

1 INTRODUCTION

Haulbowline Island is located within Cork Harbour, between Cobh to the north and Ringaskiddy to the south. It is connected to the mainland at Ringaskiddy via a bridge which traverses Rocky Island. The Headquarters of the Irish Naval Service is situated on the western portion of the Island with the Naval Dockyard to the east. Separating these is the site of former Irish Ispat Steelworks. To the east of the Naval Dockyard is the East Tip, an area of land reclaimed from the Spit Bank by infilling with processing waste from the steelworks.

The objective of this project is the remediation of the East Tip, which is approximately 9 hectares in size. The entire East Tip area is owned by the Minister for Agriculture, Food and the Marine.

An Environmental Impact Statement (EIS) will be prepared to support the necessary applications for planning approval (to An Bord Pleanála) and waste licensing (to the Environmental Protection Agency). Any necessary foreshore consents will also be sought from the Department of the Environment, Community & Local Government.

The approach to the waste licence application for the East Tip will differ from that of a conventional waste licence application in that the waste facility is technically in-situ and thus a licence is being sought to approve a proposed design solution to remediate the site.

The proposed development will consist of the construction of a perimeter engineered structure around the waste body and an engineered capping system on top of the waste body. The resulting area will be landscaped to facilitate use of the site for amenity purposes. The scheme also proposes the upgrade of an existing access road on the island to provide separate carriageways to access the Naval Dockyard and the proposed amenity area, road improvements approaching the site pre and post construction and footpath improvements on the private access road to the island.

The proposed works at East Tip are located close to a number of designated protected areas including Cork Harbour Special Protection Area (SPA) (site code: 004030), designated under the EU Birds Directive (79/409/EEC and 2009/147/EC) and Great Island Channel candidate Special Area of Conservation (cSAC) (site code: 001058) designated under the provisions of the Habitats Directive (92/43/EEC). Cork Harbour SPA is comprised of several non-contiguous areas around the Harbour, the closest of which to Haulbowline is at Lough Beg 1.4km to the south and 600m south from the road works in Ringaskiddy; and Great Island Channel candidate Special Area of Conservation (cSAC) (site code: 001058) which is located 4.2km to the north of Haulbowline. See Figure 1 Appendix A for Location of Proposed Works and Natura 2000 Sites.

This report presents a summary of the Stage 1Screening (refer to Section 3) and the Stage 2 Appropriate Assessment (AA) (refer to Section 4) for the proposed works as required under Article 6 of the EU Habitats Directive (*Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora*) and includes assessment of potential impacts on Annex IV species as required under Article 12 of the Directive. The Habitats Directive Article 12 Screening Assessment is contained in Appendix B, the Coastal Process Study which has informed the assessment is contained within Appendix C and the AA Screening Report is contained within Appendix D.

The purpose of the assessment is to examine the possibility that the proposed works, either individually or in combination with other plans and projects, may result in significant negative effects on the Conservation Objectives and the integrity of any Natura 2000 site.

2 ASSESSMENT METHODOLOGY

2.1 REQUIREMENTS OF ARTICLE 6 OF THE HABITATS DIRECTIVE

The requirement for Appropriate Assessment (AA) (also known as 'Habitats Directive Assessment') of plans or projects originates from Article 6 (3) and (4) of *European Union (EU) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora*, commonly known as the 'Habitats Directive', which is implemented in Ireland through the European Communities (Natural Habitats) Regulations of 1997. The wording of Article 6 (3) of the Directive is as follows:

> '*Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public*.'

The wording of Article 6 (4) of the Directive is as follows:

> '*If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.*'

Appropriate Assessment Guidelines for Planning Authorities were published by the Department of the Environment Heritage and Local Government in February 2010 (DoEHLG, 2010). The AA process in the Republic of Ireland should be conducted in full consultation with the National Parks and Wildlife Service. In addition to the advice available from NPWS, the EU has published a number of documents which provide guidance on the requirements of Appropriate Assessment, including, *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites - Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, (EC, 2002), which sets out the principles of how to approach decision making during the process and these have been followed as closely as possible. The assessment is prepared with reference to the following additional guidelines:

- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg (EC, 2000);
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission; (EC, 2007);
- European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1989 – 2001; and
- Interpretation Manual of European Union Habitats. Version EUR 27. European Commission 2007.

2.2 ARTICLE 6 APPROPRIATE ASSESSMENT METHODOLOGY

If necessary, the Appropriate Assessment process progresses through four stages. If at any stage in the process it is determined that there will be no significant effect on any Natura 2000 site, the process is effectively completed. The four stages are as follows:

- Stage 1 – Screening of the proposed project or plan (See Section 3 and Appendix D);
- Stage 2 – Appropriate Assessment of the proposed project or plan (See Section 4);
- Stage 3 – Assessment of alternative solutions; and
- Stage 4 – Assessment of compensatory measures.

Stages 1 and 2 relate to Article 6(3) of the Habitats Directive; Stages 3 and 4 to Article 6(4).

Stage 1: Screening

The aim of Stage 1, 'Screening' is to determine whether or not Stage 2, the Appropriate Assessment, is required, i.e. to determine whether or not the proposed project or plan is likely to negatively affect the conservation objectives on any Natura 2000 site. This is done by examining the design of the proposed project or plan and the Conservation Objectives of any Natura 2000 sites that might potentially be affected.

Stage 2: Appropriate Assessment

The aim of Stage 2, the 'Appropriate Assessment' proper, is to identify any significant negative impacts that the project or plan might have upon Natura 2000 sites and to propose changes to the project design or plan that will avoid any such negative impacts. The project design or plan should then be amended accordingly, thereby avoiding the need to progress to Stage 3, which would require the proponents of the project or plan to implement measures to compensate for the identified negative impacts on Natura 2000 sites; and to demonstrate that no alternative solutions are available.

A key consideration of Appropriate Assessment is that the plan or project under consideration must take account of potential impacts on Natura 2000 sites 'in combination' with other plans or projects. Such impacts are termed 'Cumulative Impacts' and are discussed in Section 3.6.4.

Stage 3: Assessment of Alternative Solutions

It is an objective of the AA process to avoid the need to progress to Stage 3, which can be achieved by implementing the avoidance and mitigation measures determined during Stage 2. If however it is not possible to reduce impacts to acceptable, non-significant levels by avoidance and mitigation, Stage 3 of the AA process must be undertaken, which is to objectively assess whether alternative solutions exist by which the objectives of the plan or project can be achieved. Implicitly, this means alternative solutions that do not have negative impacts on the conservation objectives of the Natura 2000 site.

This stage of the AA process involves identifying the key objectives of the plan or project, identifying alternative solutions to achieving those objectives and then assessing each alternative against the criteria used in Stage 2 of the AA.

Fundamentally, there are two pre-conditions that must be met before the Competent Authority can grant permission for a development that negatively impacts upon the conservation objectives of a Natura 2000 site, and it is at this stage of the AA process that the first of these is determined: that 'no alternatives exist' (the second precondition relates to 'over-riding public interest' and 'human health and safety considerations' and is determined in Stage 4). It should also be noted that EU guidance on this stage of the process states that, 'other assessment criteria, such as economic criteria, cannot be seen as overruling ecological criteria'. In other words, if alternative solutions exist that do not have negative impacts on Natura 2000 sites; they should be adopted regardless of economic considerations.

Stage 4: Assessment Where no Alternative Exists and Where Adverse Impacts Remain

As stated above, this Stage of the AA process is undertaken when it has been determined that negative impacts on the Conservation Objectives of a site will result from a plan or project, but that no alternatives exist. At this Stage of the AA process, it is the characteristics of the plan or project itself that will determine whether or not the Competent Authority can allow it to progress. This is the determination of 'over-riding public interest'.

It is important to note that in the case of negative impacts on 'Priority' habitats or species within Natura 2000 sites, as defined in Appendices 1 and 2 of the Directive, the demonstration of 'over-riding public interest' is not sufficient, and it must be demonstrated that the plan or project is necessary for 'human health or safety considerations'.

Where plans or project meet these criteria, they can be allowed, provided adequate compensatory measures are proposed. Stage 4 of the process also defines and describes these compensation measures.

3 STAGE 1 – SCREENING

A Stage 1 Screening Report was submitted to the Development Applications Unit (DAU), Department of the Arts, Heritage and the Gaeltacht and the National Parks and Wildlife Service (NPWS) on the 18th January 2013 (refer to Appendix D: AA Screening Report). This Screening Report is based on the Project Description described in Section 3.4 below. A summary of the AA Screening is also provided below in Section 3.1-3.7 and the conclusions are presented in Section 3.8.

3.1 INTRODUCTION TO THE SCREENING PROCESS

This stage of the AA process involves establishing whether or not the project is likely to have a significant effect on the conservation objectives of any Natura 2000 site. The screening process requires an initial review of the project to identify any elements of construction, end use, aftercare and maintenance or decommissioning that might potentially have impacts upon Natura 2000 sites; and a review of the Qualifying Features and Conservation Objectives of all Natura 2000 sites that could potentially be subject to the impacts that have been identified. Whether or not impacts are likely to be of significance is then determined.

3.2 STAGE 1 SCREENING METHODOLOGY

3.2.1 SCREENING OF NATURA 2000 SITES

Clearly a key variable that will determine whether or not a particular Natura 2000 site is likely to be negatively affected is its physical distance from the project site, and it will generally, but not necessarily, be the case that the greater the distance the lower the possibility of impacts. The *Guidelines for Planning Authorities* (DoEHLG, 2010) state that the Screening should include the following Natura 2000 sites:

1. Any Natura 2000 sites within or adjacent to the plan or project area.

The closest Natura 2000 site to the East Tip site is *Cork Harbour* SPA at Lough Beg (see 2. below), located approximately 1.4km from the proposed works site, and hence not adjacent. No sites are therefore included under this criterion.

2. Any Natura 2000 sites within the likely zone of impact of the plan or project. A distance of 15km is currently recommended in the case of plans, and derives from UK guidance (Scott Wilson *et. al.*, 2006). For projects, the distance could be much less than 15km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects.

Two Natura 2000 sites are located within Cork Harbour; *Cork Harbour* SPA (site code 004030), which is comprised of several non-contiguous areas around the Harbour, the closest of which to Haulbowline are at Lough Beg 1.4km to the south and at Monkstown Creek 2.2m to the west; and *Great Island Channel* candidate Special Area of Conservation (cSAC) (site code: 001058) which is located 4.2km to the north of Haulbowline. It is considered that both potentially lie within the zone of influence of the proposed works and the potential for adverse effects on the Conservation Objectives of these sites is therefore considered in this Screening Assessment.

3. Natura 2000 sites that are more than 15km from the plan or project area depending on the likely impacts of the plan or project, and the sensitivities of the ecological receptors, bearing in mind the precautionary principle. In the case of sites with water dependent habitats or species, and a plan or project that could affect water quality or quantity, for example, it may be necessary to consider the full extent of the upstream and/or downstream catchment.

The next closest Natura 2000 site to the proposed works at Haulbowline is *Ballycotton Bay* SPA (site code 004022), 17km to the east and impacts on this and other more remote coastal SPAs and cSACs are not considered possible due to the large distances from the proposed works and the large areas of deep oceanic water that lie between the works location and the sites, which would buffer and dilute any possible contaminating chemical to such an extent that significant toxic effects could not be anticipated. Hence, it is not considered that further AA Screening of these sites, or of any other Natura 2000 sites, is required. **Table 3.1** presents details of the Natura 2000 sites considered further in this Screening Report.

Table 3.1: Natura 2000 Sites Included in this Screening Assessment

Site Name	Designat-ion Type	Site Code	Approximate Location Relative to Proposed Works
Cork Harbour	SPA	004030	Haulbowline site is 1.4km to the north of Lough Beg section; and 2.2km to the east of Monkstown Creek section of the SPA.
Great Island Channel	cSAC	001058	Haulbowline site proposed road rehabilitation works is 4.2km to the south of the cSAC in a direct overland line and 5.9km by a route over the sea

Article 12 of the Habitats Directive are aimed at the establishment and implementation of a strict protection regime for animal species listed in Annex IV(a) of the Directive within the whole territory of Member States, i.e. in locations outside protected areas as well as inside their boundaries. An Article 12 Assessment was conducted and the findings are provided in full on Appendix B.

The conclusion of the Article 12 Assessment is that whilst the proposed works could result in localised and temporary avoidance of the immediate vicinity of the East Tip site by marine mammals and terrestrial mammals, the proposed works will have no significant effects to mammal populations and the site and environs do not represent an important habitat for these species. Remediation of the site, if it includes the establishment of permanent fresh water features such as ponds within the end use landscape design, may encourage otters and bat species to use the area more frequently.

3.3 PROJECT DESCRIPTION

This Section presents a summary of the proposed works, which are not "directly connected with or necessary for the management of" any Natura 2000 site, and are not therefore exempt from Appropriate Assessment under the Article 6(3) of the Habitats Directive (see **Section 2.1** of this Report). Following completion of the AA Screening Report there were some modifications to the project and these changes were considered in the Stage 2 NIS and are outlined in Section 4.1 of this Report.

3.3.1 SITE DESCRIPTION

Further to European Court of Justice Ruling 494/01, Cork County Council, on behalf of the Irish State, is currently managing the regularisation of the East Tip on Haulbowline Island, which will entail an application for a waste licence, planning application and any foreshore consents required.

Haulbowline Island is located within Cork Harbour, between Cobh to the north and Ringaskiddy to the south. It is connected to the mainland at Ringaskiddy via a bridge which traverses Rocky Island. The Headquarters of the Irish Naval Service is situated on the western portion of the Island with the Naval Dockyard to the east of it, in the central part of the island. Separating these is the site of former Irish Ispat Steelworks. The eastern part of the island is occupied by the East Tip, an area of land reclaimed from the Spit Bank by infilling with processing waste from the steelworks. The objective of this project is the remediation of the East Tip, which is approximately 9 hectares. The entire East Tip area is owned by the Minster for Agriculture, Food and the Marine. The East Tip comprises wastes that were largely associated with the steel making process.

3.3.2 PROPOSED WORKS

The primary objective of this project is to remediate the East Tip thereby ensuring that potential risks to humans and the wider environment are minimised. The following sections describe the proposed remediation works and the other works associated with the end use of the site, which include widening the access road and construction of a slipway and floating pontoon[1].

3.3.2.1 Remediation Works

It is proposed that the waste at the site will be contained by constructing an engineered capping system on top of the waste and a perimeter engineered structure around the waste body. The capping system will consist of the placement of a 600mm depth of clay (or equivalent e.g. geosynthetic clay liner) on top of an impermeable liner such as LLDPE, above which is placed a geocomposite drainage layer followed by approximately 1m of subsoil and topsoil (topsoil depths will range from 150mm to 300mm). The liner(s) will be placed in an anchor trench around the edge of the site while the geocomposite drainage layer will feed into drains to take away surface water drainage from the 1m subsoil/topsoil material i.e. rainwater collected within the capping system.

[1] It should be noted that the slipway and floating pontoon no longer form part of the proposal (refer to Section 4 for update on revised project proposal).

The perimeter engineered structure will be constructed around the bulk of waste body to the north, south, east and west of the waste body. The structure will consist of an engineered berm and/or trench, which will tie into the underlying alluvium layer. Rock armour will be placed on the foreshore side of the berm and/or trench to provide protection against long term coastal erosion. Given that the level of the foreshore around the site varies, the width of the toe of the berm and associated rock armour protection will also vary up to an anticipated maximum width at the base of approximately 25m.

It is proposed that works to construct the perimeter engineered structure will be undertaken within tidal cycles. Where works are subject to tidal inundation, it is proposed that the works will be protected by possible use of sheet piles or other temporary retaining structure. At the western boundary of the East Tip adjacent to the Naval Dockyard, a perimeter engineered structure will also be installed, but such works will not impinge on the foreshore area. Prior to the construction of the capping system at East Tip, the following activities will be required on site, which will not require access to the foreshore, which include the following;

- The demolition of the existing buildings which include a shed and a gantry crane.
- Potential removal from the site of some existing stockpiles of material e.g. mill scale.
- Reprofiling of the existing waste body to facilitate the capping of the site. This will require the excavating of waste, including rock breaking, to create the new profile for the amenity end use.
- Potential on-site processing of slag material from the site using crushers and on-site storage of this material for reuse in construction of the perimeter engineered structure. The use of this material in the construction of the berm has yet to be confirmed. If this is not possible, then suitable material will instead be imported to the site.

In addition, to the above works, it is proposed that some clean-up of waste i.e. scrap metal will be removed from outside the existing waste mass i.e. in the foreshore area. This will require surface picking by hand and the use of plant to remove heavier waste material. The exact extent of these works in the foreshore around the East Tip has yet to be ascertained. It is understood that existing waste on the old causeway to the south east of the site will be cleaned up in this way. At this stage, no other works are proposed on the spit/causeway.

Surface water control during the works will be managed by filtrating surface water discharges through the waste body. There will be no direct discharge points for surface water control during the construction stage, however clean surface water may also be diverted to certain discharge points during the construction stage. Once the capping system has been constructed a number of clean water discharge points will exist at various points around the site.

3.3.2.2 Road Widening & Footpaths

It is proposed that the existing access road on Haulbowline Island between the bridge and the entrance to East Tip be widened to allow for two additional lanes and footpaths on either side. Security fencing with security gates will also be required along sections of this access road and the existing security hut and barriers will be moved just north of their current location. These works will not encroach upon the foreshore. Drains taking surface water from the upgraded access road will discharge to the harbour at a point yet to be determined. Any material requiring excavation for the proposed road infrastructure will be excavated and disposed of appropriately.

3.3.2.3 Floating Pontoon and Slipway

Directly west of East Tip, along the southern boundary of the access road, it is proposed to construct a slipway, approximately 60m long and 10m wide, by land reclamation and use of a piled structure with the use of rock armour as required. It is proposed that the floating pontoon would facilitate the future use by passenger ferries and leisure boats[2].

3.3.2.4 End Use; Recreation / Amenity

Once the remediation solution has been constructed, it is proposed that the East Tip will be landscaped for amenity and recreational purposes, which will include the following:

- A soil based pitch in and beyond the area where the existing pitch (formerly used by the Navy) is located. Floodlighting is not proposed.
- The profiling of the site will allow for the potential creation of an area that would be suitable for future events, in the north of the site. Flood lighting is not proposed for the amphitheatre.
- Running/walking tracks may be installed around the site.
- Recreational areas i.e. green fields which will allow picnicking, etc.
- Car Park for approximately 50 cars at the site entrance.
- Bird watching areas. It is proposed that benches placed behind wooden screens will be placed at various points around the site to allow for bird watching. Bird watching hides are currently not proposed.
- Creation of landscaped areas including areas that will screen the site from any sections of the foreshore area that are found to be used by birds for feeding and roosting (bird survey work is on-going, January 2013; details will be discussed in the NIS and EIA).
- Security Fencing will be erected at the western site perimeter between the East Tip and Naval Dockyard.

3.3.2.5 Construction Programme

It is proposed that works will take approximately 18 months to 24 months to construct, however certain elements of the landscaping may extend beyond this time to allow for planting etc., subject to seasonal requirements; the availability of suitable capping material may also result in a longer construction programme.

3.3.2.6 Aftercare Requirements

The Waste Licence for the site will set out requirements for aftercare monitoring. Therefore there will be an ongoing requirement for access to monitoring wells on the site and to take water samples from the surrounding marine environment.

Maintenance works for the upkeep of the site for recreational use will also be required on an ongoing basis. It is not anticipated that any major maintenance works will be required for the upkeep of the engineered remediation solution.

[2] It should be noted that the slipway and floating pontoon no longer form part of the proposal (refer to Section 4 for update on revised project proposal).

3.3.2.7 Invasive Species

All material imported into the East Tip site for the purposes of capping or for landscaping or other end-uses, will be sources from suppliers who guarantee that the material is not contaminated with any invasive alien plant species material, particularly Japanese Knotweed, but also any other species listed under Third Schedule of the 2011 Natural Habitats Regulations.

3.4 GENERAL DESCRIPTION OF THE NATURA 2000 SITES

3.4.1 GREATISLAND CHANNEL CSAC (SITE CODE 001058)

Great Island lies between the cSAC to the north and Haulbowline Island to the south. The cSAC covers the channel between the north coast of Great Island from Little Island to the west and Midleton to the east. Whilst the distance between the East Tip site and the cSAC boundary is only 4.2km at its closest point, the distance between the two via a route over the sea is 5.9km.

Great Island Channel, compared to the rest of Cork Harbour, is relatively undisturbed. Within the site is the estuary of the Owennacurra and Dungourney Rivers. These rivers, which flow through Midleton, provide the main source of freshwater to the North Channel.

The main habitats of conservation interest are the sheltered tidal sand and mudflats and Atlantic salt meadows. Owing to the sheltered conditions, the intertidal flats are composed mainly of soft muds. Cordgrass (*Spartina*spp.) has colonised the intertidal flats in places, especially at Rossleague and Belvelly. The salt marshes are scattered through the site and are all of the estuarine type on mud substrate.

The site is extremely important for wintering waterfowl and is considered to contain three of the top five areas within Cork Harbour, namely North Channel, Harper's Island and Belvelly-Marino Point. Shelduck are the most frequent duck species with 800-1000 birds centred on the Fota/Marino Point area. There are also large flocks of Teal and Wigeon, especially at the eastern end. Waders occur in the greatest density north of Rosslague, with Dunlin, Godwit, Curlew and Golden Plover the commonest species. A population of about 80 Grey Plover is a notable feature of the area. All the mudflats support feeding birds; the main roost sites are at Weir Island and Brown Island and to the north of Fota at Killacloyne and Harper’s Island. Ahanesk supports a roost also but is subject to disturbance. The numbers of Grey Plover and Shelduck, as given above, are of national importance.

While the main land use within the site is aquaculture (Oyster farming), the greatest threats to its conservation significance come from road works, infilling, sewage outflows and possible marina developments.

3.4.2 CONSERVATION OBJECTIVES OF GREATISLAND CHANNEL CSAC

The following generic text relating to the Conservation Objectives of *Great Island Channel* cSAC and to all other Natura 2000 sites is taken from the NPWS website (see:www.npws.ie/protectedsites).

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two

designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing; and
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis."

Conservation Objectives specific to *Great Island Channel* cSAC are as follows:

Objective 1: To maintain the favourable conservation status of the Qualifying Interests of the SAC; the Annex I habitats:

- Mudflats and sandflats not covered by seawater at low tide (1140); and
- Atlantic salt meadows (*Glauco-Puccinellietaliamaritimae*) (1330).

Objective 2: To maintain the extent, species richness and biodiversity of the entire site.

Objective 3: To establish effective liaison and co-operation with landowners, legal users and relevant authorities.

3.4.3 CORK HARBOUR SPA (SITE CODE 004030)

The SPA is comprised of several non-contiguous areas around the Harbour including Lough Beg, which is located1.4km to the south and Monkstown Creek, which is located 2.2km to the west of the East Tip site.

Cork Harbour is a large, sheltered bay system, with several river estuaries, principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour. Owing to the sheltered conditions, the intertidal flats are often muddy in character. Cordgrass (*Spartina*spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Some shallow bay water is included in the site. Rostellan Lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds.

Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in the country. The two-year mean of summed annual peaks for the entire harbour complex was 55,401 for the period 1995/96 and 1996/97. Of particular note is that the site supports internationally important populations of Black-tailed Godwit and Redshank. At least 18 other species have populations of national importance, as follows: Little Grebe, Great Crested Grebe, Cormorant, Grey Heron, Shelduck, Wigeon, Teal, Pintail, Shoveler, Red-breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Dunlin, Bar-tailed Godwit, Curlew and Greenshank. The Shelduck population is the largest in the country (over 10% of national total). Cork Harbour is a nationally important site for gulls in winter and autumn, especially Black-headed Gull, Common Gull and Lesser Black-backed Gull. A range of passage waders occurs regularly in autumn, including such species as Ruff, Spotted Redshank and Green Sandpiper.

Cork Harbour has a nationally important breeding colony of Common Tern (3-year mean of 69 pairs for the period 1998-2000, with a maximum of 102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower between Great Island and Fota Island, 5.16km to the northwest of the East Tip site. In 2012 between 40 and 45 pairs of Common Tern nested at this location.

In 2011 and 2012 (and perhaps also in 2010), Common Terns established a sub-colony at the Deep Water Port in Ringaskiddy, 1.79km to the southwest of the East Tip site. In 2012 between 45 and 50 pairs of Common Tern nested at this location.

3.4.4 CONSERVATION OBJECTIVES OF THE NATURA 2000 SITES

The following generic text relating to the Conservation Objectives of *Cork Harbour SPA* and to all other Natura 2000 sites is taken from the NPWS website (See: www.npws.ie/ protectedsites).

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing; and
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis."

Conservation Objectives specific to *Cork Harbour* SPA are as follows:

Objective 1: To maintain the favourable conservation status of the Qualifying Interests of the SPA; the bird species:

- Wintering Little Grebe (*Tachybaptusruficollis*) (species code: A004)
- Wintering Great Crested Grebe (*Podicepscristatus*) (A005)
- Wintering Cormorant (*Phalacrocoraxcarbo*) (A017)
- Wintering Grey Heron (*Ardeacinerea*) (A028)
- Wintering Shelduck (*Tadornatadorna*) (A048)
- Wintering Wigeon (*Anaspenelope*) (A050)
- Wintering Teal (*Anascrecca*) (A052)
- Wintering Pintail (*Anasacuta*) (A054)
- Wintering Shoveler (*Anasclypeata*) (A056)
- Wintering Red-breasted Merganser (*Mergusserrator*) (A069)
- Wintering Oystercatcher (*Haematopusostralegus*) (A130)
- Wintering Golden Plover (*Pluvialisapricaria*) (A140)
- Wintering Grey Plover (*Pluvialissquatarola*) (A141)
- Wintering Lapwing (*Vanellusvanellus*) (A142)
- Wintering Dunlin (*Calidrisalpina*) (A149)
- Wintering Black-tailed Godwit (*Limosalimosa*) (A156)
- Wintering Bar-tailed Godwit (*Limosalapponica*) (A157)
- Wintering Curlew (*Numeniusarquata*) (A160)
- Wintering Redshank (*Tringatotanus*) (A162)
- Wintering Black-headed Gull (*Chroicocephalusridibundus*) (A179)
- Wintering Common Gull (*Laruscanus*) (A182)
- Wintering Lesser Black-backed Gull (*Larusfuscus*) (A183)
- Breeding Common Tern (*Sterna hirundo*) (A193)

And the Qualifying Feature:

Great Crested Grebe, Cormorant, Black-headed Gull, Common Gull, Common Tern. A range of other species are also recorded in the area on occasion.

- Wetlands & Waterbirds (A999)

Objective 2: To maintain the extent, species richness and biodiversity of the entire site.

Objective 3: To establish effective liaison and co-operation with landowners, legal users and relevant authorities.

3.5 ELEMENTS OF THE PROJECT THAT MAY AFFECT NATURA 2000 SITES

The purpose of this Section of the Screening is to examine the possibility that the proposed works, either individually or in combination with other plans and projects, may result in significance negative effects of on the Conservations Objectives and the integrity of the Natura 2000 sites discussed in Section 4; *Great Island Channel* cSAC or *Cork Harbour* SPA.

If there is deemed to be potential for significant effects or if this is considered to be a possibility or is uncertain, then the AA process must either proceed to Stage 2 (Appropriate Assessment) or Stage 1 Screening must be repeated on a modified proposal.

3.5.1 POTENTIAL DIRECT IMPACTS ON NATURA 2000 SITES

The Lough Beg section of *Cork Harbour* SPA is located 1.4km to the south of the Haulbowline East Tip site. No direct impact will therefore occur within the boundary of any Natura 2000 site as a result of the proposed works.

3.5.2 POTENTIAL INDIRECT IMPACTS ON CORK HARBOUR SPA

3.5.2.1 Construction

It is considered that there are six mechanisms by which an adverse effect on the Conservation Objectives of the SPA might potentially occur during construction activity, as follows:

a) Disturbance to birds, outside the SPA boundary, but having effects within the SPA;

b) Contamination of harbour water by release of harmful substances from disturbed waste contaminating food chains outside the SPA boundary, but having effects within the SPA;

c) Contamination of harbour water by release of harmful substances from disturbed waste contaminating habitats within the SPA;

d) Contamination of harbour water by release of harmful substances from disturbed sediments contaminating food chains outside the SPA boundary, but having effects within the SPA;

e) Contamination of harbour water by release of harmful substances from disturbed sediments contaminating habitats within the SPA; and/or

f) Disturbance of invasive alien plant species at the site, or introduction to invasive plant species to the site, which could result in their spread to locations within the SPA.

3.5.2.2 Possible Disturbance to Birds

Haulbowline Island is located centrally within Cork Harbour and is in a busy location that is subject to high levels of human activity and of disturbance. Sources of disturbance to birds and other wildlife include the main Cork Harbour shipping lane immediately to the north; nearby port activity at Cobh, Rushbrooke and Ringaskiddy; naval activity on the western part of Haulbowline; boat-based fishing activity and recreational boating activity on all sides; and the busy town of Cobh to the north. Hence birds using the waters and shorelines around the East Tip site are habituated to relatively high levels of noise and visual disturbance.

Construction works at the East Tip will be conducted using both land-based and shore-based vehicles and machinery including excavators, dumpers, trucks, compactors, rollers, a crusher, a screener and a piling rig. It is likely that birds using the shoreline and waters immediately adjacent to the East Tip will be displaced from the area during construction activity, however displacement beyond the immediate area of the works, to an expected maximum distance of 100 metres, is highly unlikely to occur given the high levels of disturbance that already exist in the area. The shoreline of the East Tip site is not heavily used by birds, with the total number of waders, herons and others using the site recorded being in only single figures during high tide surveys in the autumn and early winter of 2012. Such numbers are substantially too small for their displacement to the SPA to have significant negative effects within the SPA in terms of resource depletion. Similarly, whilst some birds feed within the inshore waters close to the East Tip site, and may be displaced by construction works, including Common Terns in the summer months; and Shags, Cormorants and gulls throughout the year, the numbers involved are far too small to have any impact on broader populations or to have knock-on effects within the SPA.

Hence, whilst disturbance and resulting displacement of birds from the immediate vicinity of construction works at the East Tip is likely to occur, it is not considered possible that this could have any adverse effect on the Conservation Objectives of *Cork Harbour* SPA.

3.5.2.3 Possible Contamination of Food Chains and SPA Habitats Resulting from Disturbance of Waste

Details of the profile of the waste at the East Tip are presented in Cork County Council's 'Factual Report' on the site (Cork County Council, 2012). A further risk assessment has been carried out by Cork County Council in 2012.

The waste samples collected at East Tip in investigations in 2008 by White Young Green and previous investigations identified that the process waste materials consists largely of non-hazardous slag and refractory waste together with scrap metal. The composition of the materials encountered is characteristic of materials derived from a metal industry and could include contaminants such as chromium, chromium VI, copper, lead, limited cadmium, zinc and PAHs. The composition of this material was confirmed by further site investigation in

2013 (results presented in Appendix B of the Environmental Impact Statement, 2013) and the intertidal samples collected as part of the faunal survey, which did not record elevated levels of these contaminants at the site, though aluminium and manganese were recorded in slightly elevated levels, (approaching the lowest effect threshold as defined by Cronin et al, 2004), though at levels consistent with other sediments in Cork Harbour.

It is considered possible that a number of elements of the proposed construction plan might result in a release of contaminants. Two elements of the construction programme appear to have specific potential to disturb 'hot spots' of contaminants within the waste, which could then become susceptible to lateral migration as a result of heavy rainfall and or tidal flows, potentially contaminating the waters of Cork Harbour, these are:

a) Reprofiling and/or pulling back of the waste mass at the edge of the waste body during construction of the perimeter engineered structure;

b) Reprofiling of the existing waste body to facilitate the capping of the site and its use as an amenity. This will require the excavating of waste including rock breaking to create the new profile for the amenity end use.

Hence, whilst it is considered unlikely to occur, and mitigation measures to tackle any such situation are currently being developed, the possibility that the works could potentially result in a release of contaminants to the waters of Cork Harbour cannot be entirely ruled out at present. Such a release could potentially result in adverse effects on the Conservation Objectives of *Cork Harbour* SPA in either of the following ways:

a) By contamination food chains in the immediate vicinity of the East Tip (for example at the Common Tern feeding area of Spit Bank); and/or

b) By transport of contaminants via oceanic currents to habitats within the boundary of the SPA.

In summary, it is considered that Stage 2 Appropriate Assessment is required to investigate this possibility further and to allow for the further development of mitigation measures to ensure avoidance of any such significant release of contaminants during construction.

3.5.2.4 Possible Contamination of Food Chains and SPA Habitats Resulting from Disturbance of Sediments

The extent of sediment disturbance that will occur during construction works has been minimised in the project design. During the majority of the construction period and during all works in the intertidal and sub-littoral parts of the site, the coffering (or other containment measures) will effectively eliminate the possibility of re-suspension of sediment or the escape of solutes from sediments from within the works areas. However a small amount of sediment disturbance is unavoidable during processes such as surface scraping to remove waste beyond the perimeter containment system; pile-driving for construction of coffering; and removal of the piles and the coffering and construction of the slipway[3].

It is therefore considered that Stage 2 Appropriate Assessment is required to further investigate the possibility that a significant release of contaminants from sediments to harbour water could occur during construction works at the site, which could potentially result in

[3]It should be noted that the slipway no longer forms part of the proposal (refer to Section 4 for update on revised project proposal).

adverse effects on the Conservation Objectives of *Cork Harbour* SPA; and to further develop mitigation measures to ensure that no significant releases can occur.

3.5.2.5 Possible Spread of Invasive Species

The possibility that the works could potentially cause the spread of invasive alien species to the SPA has been considered. The East Tip site was surveyed by ecologists from RPS on the 14th of August 2012. The site was examined for the presence of Japanese Knotweed (*Fallopia japonica*) or other invasive alien flora species that could potentially be spread or otherwise benefited by construction works.

A number of non-native plant species are present at the site including Canadian Fleabane / Bilbao Fleabane (*Conyzacanadensis / C. bilbaoana*) and / or hybrids of the two species (which is abundant); Biting Stonecrop (*Sedum acre*) (which is abundant) and Buddleia (*Buddleia davidii*) (which is occasional). However, no Japanese Knotweed or other invasive alien plant species listed under the Third Schedule of the 2011 Natural Habitats Regulations were found.

Measures are included in the Project Description to ensure that no invasive alien plant species will be imported into the East Tip site during either capping works or during development of end-use landscaping.

It is not considered that the proposed construction works have any potential to result in the spread of Japanese Knotweed or any other invasive alien plant species listed under the Third Schedule of the 2011 Natural Habitats Regulations (See Section 3.2.7 and 5.3.1.2 of the AA Screening Report in Appendix D).

3.5.2.6 End-Use, Aftercare and Maintenance Works

The end -use, aftercare and maintenance activity at the site will be very limited, involving only routine maintenance works for the upkeep of the site for recreational use. It is not anticipated that any major maintenance works will be required for the upkeep of the engineered remediation solution. Hence, no indirect impacts will occur during end use, aftercare and maintenance of the site at any location remote from the site itself, including locations within the boundary of *Cork Harbour* SPA.

The small scale, infrequent and short-term nature of routine landscaping maintenance works such as grass cutting, and so on, are such that birds which are Qualifying Features of the SPA but are using areas outside the SPA, in the vicinity of Haulbowline, will not be significantly disturbed or otherwise affected.

Hence, no adverse effects on the Conservation Objectives of the SPA as a result of any on-going end use, aftercare and maintenance works at the site are anticipated at any time following the completion of construction works.

3.5.3 POTENTIAL INDIRECT IMPACTS, GREATISLAND CHANNEL CSAC

3.5.3.1 Construction

It is considered that there are two mechanisms by which an adverse effect on the Conservation Objectives of the SPA might potentially occur during construction activity, as follows:

a) Contamination of harbour water by release of contaminants released from disturbed waste contaminating habitats within the cSAC; and/or

b) Disturbance of invasive alien plant species at the site could result in their spread to locations within the cSAC.

3.5.3.2 Possible Contamination of cSAC Habitats

Great Island lies between the cSAC to the north and Haulbowline Island to the south. Whilst the distance to between the East Tip site and road improvement works and the cSAC boundary is 4.2km at its closest point the distance between the two via a route over the sea is 5.9km; this is the distance that any water borne contaminant or suspended sediment would have to travel from the site to reach the cSAC. Furthermore, the cSAC is 'upstream' of the East Tip site along the main marine channel of the River Lee, so in general, very little, if any, water travels from the vicinity of Haulbowline to the cSAC.

Sections 5.2.1.2 and 5.2.1.3 of Appendix D: AA Screening Report discuss the possibility of the works resulting in the release of contaminants from the East Tip to the Waters of Cork Harbour. The data presented in those Sections indicates that contamination at locations as remote from Haulbowline as the Great Island Channel cSAC is not a possibility due to the anticipated small volumes of contaminants potentially involved

3.5.3.3 Possible Spread of Invasive Species

The possibility that the works could potentially cause the spread of invasive alien species to the cSAC has been considered. The East Tip site was surveyed by ecologists from RPS on the 14th of August 2012. The site was examined for the presence of Japanese Knotweed (*Fallopia japonica*) or other invasive alien flora species that could potentially be spread or otherwise benefited by construction works.

A number of non-native plant species are present at the site including Canadian Fleabane / Bilbao Fleabane (*Conyzacanadensis / C. bilbaoana*) and / or hybrids of the two species (which is abundant); Biting Stonecrop (*Sedum acre*) (which is abundant) and Buddleia (*Buddleia davidii*) (which is occasional). However, no Japanese Knotweed or other invasive alien plant species listed under the Third Schedule of the 2011 Natural Habitats Regulations were found.

Measures are included in the Project Description to ensure that no invasive alien plant species will be imported into the East Tip site during either capping works or during development of end-use landscaping (see Section 3.2.7 of Appendix D: AA Screening Report).

It is not considered that the proposed construction works have any potential to result in the spread of Japanese Knotweed or any other invasive alien plant species listed under the Third Schedule of the 2011 Natural Habitats Regulations.

3.5.3.4 End-Use, Aftercare and Maintenance Works

End-useactivity at the site will be very limited, involving only routine maintenance works for the upkeep of the site for recreational use. It is not anticipated that any major maintenance works will be required for the upkeep of the engineered remediation solution. Hence, no indirect impacts will occur during end use, aftercare and maintenance of the site at any location remote from the site itself, including locations within the boundary of *Great Island Channel* cSAC.

Hence, no adverse effects on the Conservation Objectives of the cSAC as a result of any ongoingend use, aftercare and maintenance works at the site are anticipated at any time following the completion of construction works.

3.5.4 POSSIBLE CUMULATIVE IMPACTS WITH OTHER PLANS AND PROJECTS IN THE AREA

As part of Stage 1 Screening, in addition to the proposed project, other relevant projects and plans in the relevant region must also be considered. This step aims to identify at this early stage any possible significant effects on the Natura 2000 sites of the proposed works in-combination or cumulative with other plans and projects.

Sections 3.4.2 and 3.4.4 above discuss the potential for impacts on the Conservation Objectives of *Great Island Channel* cSAC and *Cork Harbour* SPA and respectively. The information presented in these Sections indicates that the only possible source of impacts on Natura 2000 sites derives from the possibility of a release of contaminants from waste or sediments at the East Tip site affecting birds that are Qualifying Features of *Cork Harbour* SPA (see Section 3.4.4 above). Hence, possible contributors to in-combination effects will be limited to other sources of contaminants that might enter the food chains on which these birds depend.

Cork Harbour is a densely populated and heavily industrialised area, and a number of IPCC licences, waste licences and discharge licences are in effect for facilities that discharge to the water of Cork Harbour. It is considered that the possibility of cumulative or in-combination effects resulting from such discharges, or from other sources, cannot be ruled out.

The channel to the north of the site is maintained by Port of Cork as an approach for navigation purposes, and therefore maybe subject to maintenance dredging in 2013 or 2014. The Maintenance Dredging licence of the Port of Cork expired at the end of 2012, and the level of future dredging is subject to additional licensing. This activity could contribute to increased sedimentation in the surrounding waters, or remobilisation of contaminated sediments which could have 'in-combination' effects with the proposed works at East Tip, however, as far as possible such activities would not be scheduled to occur concurrently with site works.

Hence, it is considered that there is a possibility that contaminants released from waste or sediment during construction activity on the current project could potentially act in combination with other contaminants released elsewhere in Cork Harbour and thereby result in adverse effects on the Conservation Objectives of Cork Harbour SPA. This possibility therefore is examined further in this report (see Section 4Stage 2 Appropriate Assessment Natura Impact Statement). A full review is being undertaken of, published water quality data; existing IPCC licences, waste licences and discharge licences within the relevant portion of Cork Harbour; and of information presented in the EIS for this project relating to soils, geology, marine ecology and water quality.

3.6 ARTICLE 6 SCREENING CONCLUSIONS

3.6.1 CONSTRUCTION

It is considered that there are two possible pathways by which adverse effects on the Conservation Objectives of *Cork Harbour* SPA might occur. The two possible sources are:

a) A release of contaminants from the waste at the East Tip during construction (see Section 3.2.1.2 of Appendix D: AA Screening Report); and / or
b) A release of contaminants from sediments in intertidal and sublittoral areas around the site during construction (see Section 3.2.1.3 of Appendix D: AA Screening Report).

Either source could potentially result in adverse effects on the Conservation Objectives of Cork Harbour SPA via one of two pathways, as follows:

a) Contamination of food chains outside the SPA boundary, but having effects within the SPA; and/or

b) Contamination of habitats within the SPA.

It is not considered that adverse effects on any other Natura 2000 site are possible as a result of construction or end-use, aftercare and maintenance of the proposed works at the East Tip site.

It is not considered possible that disturbance of waste or sediment at the site during construction activity could result in a sufficient release of contaminants that contamination of waters could occur at locations as distant from Haulbowline as *Great Island Channel* cSAC, and hence no impacts are considered possible at this site or at any other more remote Natura 2000 sites outside Cork Harbour.

3.6.2 END USE, AFTERCARE AND MAINTENANCE WORKS

End-useactivity at the site will be very limited, involving only routine maintenance works such as grass cutting, and so on, for the upkeep of the site for recreational use. Hence, no indirect impacts will occur during end use, aftercare and maintenanceof the site at any location remote from the site, including locations within the boundary of *Cork Harbour* SPA, *Great Island Channel* cSAC or any other Natura 2000 site. The small scale, infrequent and short-term nature of routine landscaping maintenance works are such that birds which are Qualifying Features of the SPA but are using areas outside the SPA in the vicinity of Haulbowline, will not be significantly disturbed or otherwise affected. Hence, no adverse effects on the Conservation Objectives of any Natura 2000 site as a result of any ongoing end use, aftercare and maintenance works at the site are anticipated at any time following the completion of construction works.

3.7 SUMMARY OF ARTICLE 6 SCREENING CONCLUSIONS

It is considered that two issues require Stage 2 Appropriate Assessment: the possibility of a release of contaminants to the waters surrounding Haulbowline Island during construction activity. It is considered that such a release could potentially result in adverse effects on the Conservation Objectives of *Cork Harbour* SPA in two ways:

a) Contamination of food chains outside the SPA boundary, but having effects within the SPA; and/or

b) Contamination of habitats within the SPA.

Hence, it is considered that Stage 2 Appropriate Assessment is required to examine further the possibility that construction works might cause a release of contaminants to waters surrounding Haulbowline Island, potentially resulting in an adverse effect on the Conservation Objectives of *Cork Harbour* SPA.

In addition, it is considered that there is a possibility, albeit very unlikely, that contaminants released from waste or sediment during construction activity on the current project could potentially act in combination with other contaminants released elsewhere in Cork Harbour and thereby result in adverse effects on the Conservation Objectives of Cork Harbour SPA. This possibility therefore needs to be examined further at Stage 2 Appropriate Assessment. Section 4 overleaf comprises the Stage 2 Appropriate Assessment.

4 STAGE 2 APPROPRIATE ASSESSMENT: NATURA IMPACT STATEMENT

4.1 INTRODUCTION

Section 3 of this report, the Stage 1 Screening Assessment, has concluded that Stage 2 Appropriate Assessment is required to examine further the possibility that construction works might cause a release of contaminants to waters surrounding Haulbowline Island, potentially resulting in an adverse effect on the Conservation Objectives of *Cork Harbour* SPA.

Since submittal of the AA Screening Report in January 2013 the project has been subject to some modifications. These are largely due to changes in the design requirements necessary to remediate the site, development of construction methodology proposals in order to facilitate this preliminary design solution and recommendations of the various specialist assessments undertaken as part of the iterative process.

The current proposal comprises the following updates to those outlined in Section 3 above, which should be noted:

1. PES – Cork Harbour Boundary

Some possible methods to facilitate the construction of the PES are outlined below but it should be stated that this list is not exhaustive. These include:

- Installation of a permeable/semi permeable control berm with geo-textile wrapping at a level between mean LWM and LWMS. The height of this berm will be set at a level between mean HWM and HWMS. It is the intention that the tide will pass through this berm as opposed to overtopping the berm. The use of this temporary works method will require the Contractor to work with the tidal cycle. Construction works for the installation of the PES may be undertaken during low water. During high water the work may have to be abandoned. Prior to being abandoned the works would be made good to ensure that there would be no deterioration of the works or significant mobilisation of sediments as a result of the tidal inundation. The geotextile wrapped berm would protect against wash-out and sediment release as the tide goes out. This method would also require the management of water originating from elevated water levels within the East Tip where necessary.

- Use of silt screens or turbidity curtains where necessary to prevent the release of sediments into the Cork Harbour area.

- Use of temporary barriers, such as geotubes to facilitate working in the dry from the perspective of tidal inundation and cut off drains with pump sumps to control water originating from elevated waters levels within the East Tip where necessary.

- Installation of sheet piles to facilitate working in the dry from the perspective of tidal inundation and cut off drains with pump sumps to control water originating from elevated waters levels within the East Tip where necessary.

All temporary works will be required to be removed post completion of the works with the exception of the temporary berm. Some elements of the temporary berm may be re-profiled to achieve the final PES and associated rock armour facing of same.

2. Roads Improvements Pre-Construction

In addition to the new access road described in Section 3.3 above it is also proposed that sections of the road between the NCMI and the access bridge to Haulbowline Island will be subject to remedial works prior to the commencement of the main remediation works. An assessment of the pavement prior to and during construction will be required to monitor any changes to the condition of the road and as the various stages of the construction phase progress. Such remedial works will typically be in areas which begin showing signs of significant distress as a result of construction traffic. Remedial works could involve the cold milling (planing) of some sections (or strips) of the existing surface and relaying with an appropriate bound material as described in Chapter 5 'Project Description' of the EIS.

3. Road Improvements Post Construction

In addition to the new access road described in Section 3.3 and road improvements required prior to construction as described above (Item 2) road improvements will also be required post construction to ensure the road is restored to a fit state for end users to the site and navy personnel. These works will include an overlay surface along some of the access road but full pavement reconstruction will be required where the new footprint is outside the existing footprint (i.e. the widened section) and where the existing footprint is deemed to be of particularly poor quality that an overlay would not suffice. Pavement overlay will involve the cold milling (planing) of the upper layer(s) of the existing surface to a predetermined depth (generally 100mm – 200mm) and replacing with an appropriate regulating layer (50 – 150mm) and surface layer (50mm). Further details on the proposed access road widening are provided in Chapter 8 'Traffic and Transport'.

4. Footpaths

To improve pedestrian access to the East Tip, it is proposed to upgrade existing footpaths and provide new footpaths as detailed on Figure 5.6and Chapter 8 'Traffic and Transport' of the EIS. Under this application a new footpath will be provided from the existing public car park to the southern end of the access bridge to Haulbowline Island (along the private road depicted in blue on Figure 5.6 of the EIS). The footpath will have a maximum width of 2.0m (minimum width of 1.5m). An uncontrolled pedestrian crossing will be provided to link this public car park to this new footpath (See Figure 5.6 of the EIS). A low wall across the road from the public car park (located where the road turns north towards Haulbowline Island) will also be partly removed to accommodate the footpath. The existing kerb along this private road, from the car park to the southern end of the bridge, is in very poor condition and will be replaced. Footpaths will also be provided along the new access road from the security gates (at the northern end of the bridge) to the East Tip site entrance (See Figure 5.3 of the EIS).

The improvements outlined above will provide continuous safe access for pedestrians from the L2545 as far as the East Tip site. Uncontrolled crossing points will include dropped kerbs and tactile paving and will be located so to be visible to oncoming traffic

5. Structures on site

To clarify, the demolition of the existing buildings on the site, will include demolition of a shed and demolition of all existing structures within the remediation area of the East Tip (refer to Appendix G of the EIS for the Inventory of Structures to be Demolished).

6. Floating Pontoon and Slipway

The floating pontoon and slipway is no longer included as part of the remediation project and therefore has been removed from the scope of works. The feasibility of such a proposal may be revisited at a later stage by Cork County Council and will be subject to a separate AA Screening and NIS if required.

The conclusion (Section 3) of this report, the Stage 1 Screening Assessment, still however remains the same in that a Stage 2 Appropriate Assessment is required to examine further the possibility that construction works might cause a release of contaminants to waters surrounding Haulbowline Island, potentially resulting in an adverse effect on the Conservation Objectives of *Cork Harbour* SPA. The proposed modifications to the scope of works do not result in any likely significant effects to any other Natura 2000 site and therefore Cork Harbour SPA is the only site considered in this NIS.

In particular the NIS will address the likely impacts associated with the works which are now in closer proximity to this SPA than previously anticipated given the change to the scope of work construction works. The minor works on the approach road to Haulbowline Island would be located within 600m of the Cork Harbour SPA at Lough Beg and 1.9km east of the Monkstown Creek section.

It is considered that the issues which require Stage 2 Appropriate Assessment are as follows;

1. The possibility that contaminants released from waste or sediment to the waters surrounding Haulbowline Island during construction activity on the current project could potentially act in combination with other contaminants released elsewhere in Cork Harbour and thereby result in adverse effects on the Conservation Objectives of Cork Harbour SPA. The two possible sources are:

    a) A release of contaminants from the waste at the East Tip during construction (see Section 4.4); and / or

    b) A release of contaminants from sediments in intertidal and sublittoral areas around the site during construction (see Section 4.4).

2. It is considered that such a release could potentially result in adverse effects on the Conservation Objectives of *Cork Harbour* SPA in two ways:

    c) Contamination of food chains outside the SPA boundary, but having effects within the SPA; and/or

    d) Contamination of habitats within the SPA.

Hence, it is considered that Stage 2 Appropriate Assessment is required to examine further the possibility that construction works might cause a release of contaminants to waters surrounding Haulbowline Island, potentially resulting in an adverse effect on the Conservation Objectives of *Cork Harbour* SPA.

This section comprises the 'Natura Impact Statement' to facilitate the Appropriate Assessment of the East Tip Remediation Project by the Competent Authority.

4.2 DESCRIPTION OF NATURA 2000 SITE

4.2.1 CONSERVATION OBJECTIVES OF CORK HARBOUR SPA

A broad description of the SPA and of its qualifying features is presented in Section 3.4.3 and 3.4.4 of this Report and summarised below:

Conservation Objectives specific to the *Cork Harbour SPA* are as follows:

- To maintain or restore the favourable conservation condition of the bird species and features listed as Special Conservation Interests for this SPA.

The integrity of the site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives.

The threats to the integrity of Cork Harbour SPA have been extracted from the Status of EU Protected Habitats and Species in Ireland, NPWS (2008) and Ireland's Wetlands and their Waterbirds: Status and Distribution (2005)

The Key Conditions Required to Support the Sites' Integrity includes the following;

- Protection of site from disturbance,
- Protection of estuarine habitats upon which birds are dependant for feeding and roosting,
- Protection of food resources for summer breeding species, and
- Protection of breeding sites of Common Tern.

4.3 BASELINE ENVIRONMENT

The Screening presented in Section 3 of this Report has identified the possibility that construction works might cause a release of contaminants to waters surrounding Haulbowline Island, potentially resulting in an adverse effect on the Conservation Objectives of *Cork Harbour* SPA.

Following completion of the AA Screening a number of surveys and assessments including Bird surveys, Baseline Soil/Waste Contamination and Hydrographic Modelling were conducted in order to collect data suitable for the completion of an assessment of the risk that this might occur from the proposed remediation solution.

4.3.1 BIRD SURVEY RESULTS

In order to examine the likely magnitude and possible significance of impacts on bird species, an ornithological study was conducted. The field survey comprised a series of bird surveys at the site in August 2012 and between October 2012 and January 2013.

4.3.1.1 Breeding Birds within the East Tip Site

The site provides suitable breeding habitat for a very limited number of bird species. Table 4.1 presents details of the bird species recorded at the site during the site visit on the 14th August

2012, and includes species which were not recorded during the site visit but for which potentially suitable breeding habitat is present at the site. The conservation status of these birds is also provided, whether the species is on the BoCCI List or listed on Annex I of the Birds Directive (2009/147/EC). Birdwatch Ireland (BWI) and the Royal Society for the Protection of Birds (RSPB), have compiled a list of bird species suffering decline in the Irish/European and global context. These Birds of Conservation Concern in Ireland are published in a list known as the BoCCI List. In this BoCCI List, birds are classified into three separate lists (Red, Amber and Green), based on the conservation status of the bird and hence conservation priority. The Red List birds are of high conservation concern, the Amber List birds are of medium conservation concern and the Green List birds are not considered threatened.

Table 4.1 Bird Species Recorded During Field Survey, 14th August 2012; and Bird Species Likely to Breed at the Site

Common name	Scientific name	Level of Protection / Conservation Status	Number Recorded 14/08/12	Likely breeding status
Ringed Plover	*Charadriushiaticula*	Amber-listed	0	Possible but unlikely breeding species in spoil areas
Feral Pigeon	*Columbialivia*var.*domestica*	Green-listed	0	Likely breeding species in buildings
Rock Pipit	*Anthuspetrosus*	Green-listed	0	Shoreline provides suitable breeding habitat, possible breeding species
Meadow Pipit	*Anthuspratensis*	Green-listed	0	Possible breeding species in better vegetated spoil areas and around sports field
Pied Wagtail	*Motacilla alba*	Green-listed	1	Likely breeding species in buildings and in spoil areas
Swallow	*Hirundorustica*	Amber-listed	1	Likely breeding species in buildings
Dunnock	*Prunellamodularis*	Green-listed	0	Possible breeding species around the sports field
Robin	*Erithacusrubecula*	Green-listed	0	Possible breeding species around the sports field
Wren	*Troglodytes troglodytes*	Green-listed	0	Likely breeding species around the sports field, buildings and possibly in spoil areas
Wheatear	*Oenantheoenanthe*	Amber-listed	2	Possible but unlikely breeding species in spoil areas
Stonechat	Saxicolatorquata	Green-listed	0	Possible breeding species in vegetated spoil areas and around the sports field
Song Thrush	*Turdusphilomelos*	Green-listed	0	Possible breeding species around the sports field
Blackbird	*Turdusmerula*	Green-listed	0	Possible breeding

Common name	Scientific name	Level of Protection / Conservation Status	Number Recorded 14/08/12	Likely breeding status
				species around the sports field
Jackdaw	*Corvusmonedula*	Green-listed	0	Likely breeding species in buildings and other structures
House Sparrow	*Passer domesticus*	Amber-listed	0	Likely breeding species in buildings and other structures
Starling	*Sturnus vulgaris*	Amber-listed	30	Likely breeding species in buildings and other structures
Linnet	*Cardueliscannabina*	Amber-listed	12	Possible breeding species around sports field
Goldfinch	*Cardueliscarduelis*	Green-listed	20	Unlikely to breed

The breeding bird community of the site consists of common bird species of lowland Ireland; the site does not support habitats that are suitable to be of importance to any breeding bird species listed on Annex I of the Birds Directive (2009/147/EC), of high conservation concern or of limited range.

4.3.1.2 Breeding Birds from Outside the East Tip Site

Cork Harbour has a nationally important breeding colony of Common Tern. Common Tern (*Sterna hirundo*) is an Annex I species of the Birds Directive (2009/147/EC) and is one of the qualifying interests of *Cork Harbour SPA*. The birds have nested in Cork Harbour since about 1970, and since 1983 have nested on various artificial structures, notably derelict steel barges which were removed approximately ten years ago.

Common Terns breed at both the Deep Water Port at Ringaskiddy and at the Martello Tower between Fota Island and Great Island feed in the vicinity of Great Island, particularly to the east at Spit Bank. Breeding Common Terns are present in the area during the period between early April and late August each year. The waters around Haulbowline Island, particularly the shallow waters over Spit Bank to the east, are an important feeding area for breeding Common Terns in the area.

Other bird species which breed locally and on occasion use the area around Haulbowline Island for feeding include Grey Heron and Little Egret.

4.3.1.3 Non-breeding Birds

During autumn and winter, and to a lesser extent at other seasons, Cork Harbour supports Internationally Important populations of non-breeding waterbirds. The shoreline of the site provides limited feeding habitat for various species of gulls, waders and other waterbirds; however the relatively undisturbed and remote situation of the shoreline around site makes it potentially suitable as a high tide roost location for these species. This possibility was investigated by conducting a series of high tide surveys of the shoreline of the East Tip between October 2012 and January 2013. Table 4.2 presents results of these surveys.

Table 4.2 Usage of Haulbowline East Tip site by Waterbirds during Winter 2012 / 2013

Species	Scientific name	Level of Protection / Conservation Status	23rd Oct	9th Nov	23rd Nov	4th Jan
Grey Heron	*Ardeacinerea*	Green-listed	0	1	3	0
Little Egret	*Egrettagarzetta*	Green-listed	0	3	0	0
Sanderling	*Calidris alba*	Green-listed	2	0	0	0
Snipe	*Gallinagogallinago*	Amber-listed	0	0	5	0
Redshank	*Tringatotanus*	Red-listed	0	3	0	0

Results of the survey indicate that very small numbers of birds roost along the shoreline of the site, and indeed, all of the Grey Herons and one of the Little Egrets that were recorded were feeding rather than roosting. Hence, it is concluded that the site is not currently of any importance to roosting waterbirds (waders, gulls, ducks, herons, cormorants, etc) of high conservation concern or of limited range.

The open water areas around Haulbowline are used for feeding by a range of species including, Great Northern Diver, Gannet, Mediterranean Gull, Kittiwake, Herring Gull, Lesser Black-backed Gull, Great Black-backed Gull, and Sandwich Tern. A number of the qualifying species of *Cork Harbour SPA* are also recorded in the area including most frequently, Great Crested Grebe, Cormorant, Black-headed Gull, Common Gull, Common Tern and a range of other species are also recorded in the area on occasion.

4.3.1.4 Baseline Soil/Waste Contamination

Details of the site investigation, environmental monitoring and risk assessment are contained in the Detailed Quantitative Risk Assessment (DQRA) prepared by WYG (2013) and included in Appendix A Volume 3of the EIS.

Extensive characterisation of the waste has been conducted at the East Tip as described in the DQRA (WYG 2013). The DQRA is an extensive document and should be read in parallel with the NIS. The waste body is described below-

- The presence of the East Tip on an island location with a substantial portion of the waste body located beneath harbour water level in the surrounding harbour. The majority of the waste body is saturated with saline water of similar chemistry to sea water.
- The distribution of contaminants of concern (CoC), their mobility, fate and transport in groundwater and the environment. Although significant solid concentrations of metal contaminants are present within the waste, the vast majority of these are relatively immobile in the groundwater environmental conditions present within the waste and the underlying natural geological units.
- The heterogeneity of the waste which has been deposited on the East Tip due to successive phases of emplacement without any apparent subdivision and the reworking that has occurred during earlier remediation attempts.

Several rounds of groundwater quality data have been collected from the East Tip during the most recent investigations in 2012, including:-

- High and low tide sampling in June –July 2012, and
- Repeat sampling in November 2012 (majority at low tide).

The first round of data collected in (June-July) had relatively high laboratory method detection limits (MDL) for some of the contaminants (e.g. mercury and chromium VI), which prompted the need for additional data with lower MDL's to complete the risk assessment. All sets of data have been used in the DQRA and are presented in detail within Section 3 of the DQRA (WYG 2013). The November 2012 data are summarised in the subsections below (Tables 4.3 – 4.6) and the reader is referred again to the DQRA for a comprehensive description of contaminants in groundwater.

Table 4.3: Summary Groundwater Concentrations for Boreholes Screened into Waste (November 2012)

Contaminant	WQS (µg/l)	Total No. of Samples	Range (µg/l)	No. Samples Exceeding WQS	Boreholes that Exceed WQS Standard
Chromium	4.6	16	<0.2-18.3	6	BH130, BH306B, BH310A (high and low tide), BH311, BH315
Chromium VI	0.6	16	<2- 33	3	BH310A (low and high tide only)
Copper	5	16	<3-21	2	BH312A (low and high tide)
Zinc	40	16	1.8-45.4	1	BH314 (high tide only)
Manganese	30	16	<0.3-1784	3	BH301A, BH302, BH305
Mercury	0.05	22	<0.003-0.23	3	BH312A (high and low tide) and BH314

Table 4.4: Summary Groundwater Concentrations for Boreholes Screened into Alluvium (November 2012)

Contaminant	WQS (µg/l)	Total No. of Samples	Range (µg/l)	No. Samples Exceeding WQS	Borehole Exceedance of Standard
Arsenic	20	9	<0.9-31.1	1	BH310B
Cadmium	0.2	9	<0.03-0.36	1	BH310B
Manganese	30	9	75.9-4908	9	BH304 (high and low tide), BH306D, BH308, BH309, BH310B, BH312B, BH316 (low and high tide)

Table 4.5: Summary Groundwater Concentrations for Boreholes Screened into Sands and Gravels (November 2012)

Contaminant	WQS (µg/l)	Total No. of Samples	Range (µg/l)	No. Samples Exceeding WQS	Borehole Exceedance of Standard
Arsenic	20	3	3.4 - 25	1	BH313
Cadmium	0.2	3	<0.03-0.65	2	BH313, BH117R
Manganese	30	3	76.2 - 2126	3	BH313, BH117R, BH125R

Table 4.6: Summary Groundwater Concentrations for Boreholes Screened into Limestone (November 2012)

Contaminant	WQS (µg/l)	Total No. of Samples	Range (µg/l)	No. Samples Exceeding WQS	Borehole Exceedance of Standard
Cadmium	0.2	4	0.37-1.78	4	BH122, BH306C, BH310C, BH312C
Manganese	30	4	7-790.5	2	BH306C, BH310C
Zinc	40	4	16.7-95	1	BH310C
Mercury	0.05	4	<0.01-0.07	1	BH306C

4.3.1.5 Seepages and Surface Water Results November 2012

Samples were also collected from the seepages during low tide during the sampling in November 2012. The analysis of the results did not identify concentrations in excess of the WQS. In particular, chromium VI concentrations were less than the laboratory detection limit of 2µg/l. Laboratory analysis results compared to WQS are presented in Appendix L of the DQRA.

4.3.1.6 Marine Water Results

Samples of seawater were collected from 6 locations from around Cork Harbour during low tide in June 2012 and again in November 2012 and analysed for the contaminants of concern (COC). Laboratory analysis results compared to WQS are presented in Appendix L of the DQRA. The sample locations are presented on Figure 12 of the DQRA (refer to Appendix A Volume 3 of the EIS). One sample is from up river of the East Tip (HW01), three are in close proximity to the East Tip (HW02, HW03 and HW04) and two are from the outer harbour (HW05, HW06) down river of the East Tip.

For all samples tested, none of the COC concentrations exceeded relevant WQS, including those taken in close proximity to the East Tip.

4.3.1.7 Marine Water Sediment Results

A series of sediment samples were tested from 7 locations in the outer proximity of the site during the faunal investigation in November 2012 and 3 intertidal sites in October 2012. For all samples tested, none of the concentrations exceeded relevant Marine Sediment Thresholds as defined under Cronin et al, 2004, including those taken in the intertidal East Tip.

Sediments from the north east and eastern areas of the site had baseline manganese and aluminium above the lowest Ecological Effect Levels as defined by Cronin, et al 2004, but were comparable with control samples taken from elsewhere in the Port as part of the 2009 WYG EIS and the Port of Cork sampling for the 2007-2012 Maintenance Dredging Application documentation.

4.3.1.8 Controlled Waters

Following consideration of the chemical results across the East Tip with respect to the screening / assessment criteria for marine water, the DQRA has updated the Conceptual Site Model for the site pre-remediation, which is to say in its baseline condition. A full description of the contaminants and relevance within a Source – Pathway – Receptor framework is presented within Section 6 of the DQRA and the outcomes are summarised in Table 4.7 (and illustrated in Figure 13 of the DQRA).

Table 4.7: Updated Conceptual Site Model – Water & Ecology (based on DQRA)

Source	Pathway	Receptor
Leachable chromium, chromium VI, copper, lead, limited cadmium, zinc and PAHs. Waste types – slag, sludge, refractory, millscale, flue dust, construction and demolition materials	Leaching from unsaturated zone	Shallow groundwater in slag material
	Leaching within tidal zone through wetting and drying	Shallow groundwater in slag material
	Lateral and vertical groundwater migration, preferentially through waste	Cork Harbour waters
	Uptake by flora and fauna	Flora and fauna in Cork Harbour particularly on foreshore
	Erosion and leaching	Cork harbour waters and flora and fauna in Cork Harbour particularly on foreshore
Groundwater contamination associated with waste material, arsenic, chromium, chromium VI, copper, zinc, lead, manganese, nickel and mercury	Lateral and vertical groundwater migration, preferentially through waste	Cork Harbour waters
	Uptake by flora and fauna	Flora and fauna in Cork Harbour particularly on foreshore

The DQRA recognises that a substantial proportion of the waste material beneath the site is in direct hydraulic continuity with the estuarine waters of Cork Harbour, and therefore assesses the risk posed to the receiving water quality of Cork harbour by considering the following:-

- The quantity (mass) of dissolved phase contamination that is generated through tidal inflow and discharged from the site on a daily basis - the contaminant flux (in units of mass/time).

- The dilution of the contaminant flux once it enters the marine water in Cork Harbour surrounding the site and assessing how far this extends with reference to surface water quality (concentration) standards (in units of mass/volume).

A bespoke analytical model was developed to improve the understanding of the likely scale of impact represented by the site by considering the effects of dilution of contaminants in the estuarine waters of Cork Harbour, through what is referred to in the DQRA as a “Tier 4 Assessment” and is described in detail within Section 6 of the DQRA.

The Tier 4 modelling exercise presented within the DQRA seeks to establish a conservative estimate of the mass of dissolved phase contaminant flux potentially leaving the site, and to understand this mass within the context of the daily flux of water passing the site as part of the local tidal regime.

The Tier 4 modelling comprises three distinct steps summarised in Table 4.8.

Table 4.8: Summary of the DQRA Tier 4 Risk Assessment

Step	Methodology / Description	Key Findings/Risk Assessment
1. Contaminant Flux Assessment	1. Quantification of groundwater discharge from the site using Darcy's Law (Q=KIA)[4] 2. Calculation of contaminant mass transport in groundwater flow (based on average contaminant concentrations in groundwater within the waste across the site).	Conservative input parameters for groundwater flow calculation and assumption that average groundwater concentrations discharge from the entire site.
2. Dilution of Contaminant Flux within Cork Harbour	Radial zones surrounding the East Tip have been used to dilute the calculated flux from the site within sequential zones up to 100m from the site.	Majority of contaminants were below the screening/assessment criteria with the exception of:- - Chromium (VI) predicted above surface water quality standard up to and including 25m from shoreline. - Manganese predicted above surface water quality standard up to and including 10m from shoreline.
3. Sensitivity Analysis	The model was run with higher inputs to assess sensitivity of results:- - Maximum contaminant concentrations vs. average values - Increasing the contaminant flux by 50% - Varying the hydraulic conductivity values used within the model - Using a maximum theoretical contaminant flux.	Variation of the hydraulic conductivity was found to be the most sensitive parameter in the model:- - A decrease in the average hydraulic conductivity of the waste by a factor of 10 reduced the predicted impacts below screening/assessment criteria within 10m of the site (under Darcy's Law flux). - A decrease in the average hydraulic conductivity of the waste by a factor of 100 reduced the predicted impacts below screening/assessment criteria within 10m of the site (under maximum theoretical contaminant flux).

It should be noted, that although the Tier 4 Risk Assessment has predicted a potential impact for Chromium (VI) and Manganese, neither of these contaminants have been observed in marine water quality above the surface water quality standard used in the assessment. The input assumptions and parameters used in the model are therefore considered to be conservative and robust for the purposes of developing the remedial solution for the site.

4.3.1.9 Coastal Process Study Modelling Results

Hydrodynamic modelling was undertaken as part of the study to investigate the impact of different potential works on the hydrodynamic regime around Haulbowline Island and on the sedimentation in the area during the dredging (excavation) operations. The modelling was used to examine the effect of:

[4]Where 'Q' is Flow (m3/day) 'K' is Hydraulic conductivity (m/day) 'I' is hydraulic gradient, expressed by hydraulic head over distance of travel (h/l) and 'A' is the cross sectional area through which flow occurs.

- The change in foreshore bathymetry on the tidal flows and water levels, and
- The dispersion and fate of material excavated during the period of the PES construction.

The report is provided in full in Appendix C: Coastal Processes Study of this NIS and Chapter 4 "Project Alternatives" of the EIS outlines in detail the alternative options considered for the remediation of the site. In total two of the foreshore proposals were evaluated in terms of Hydrodynamic and Sediment plume modelling in order to assess alternatives. Those proposals were:

- Model Scenario A - Based on the construction of a rock armour keystone trench to facilitate the construction of the PES and rock armour protection and a protection berm on the landward side of that trench behind which the reprofiling works for the PES would be undertaken.

- Model Scenario B – The removal of contaminated waste material in the foreshore by bulk excavation prior to the construction of the PES.

The modelling has been used to determine the most environmentally sound approach that has no risk of significant impacts on Natura 2000 sites.

The material in the foreshore is consolidated waste from the site, and the removal of this material was considered in the lower shore and shallow sub-tidal area. The majority of the material is oxidised, relatively inert and has been colonised by fucoids and foreshore biotopes. The main risk of impact from the works is the re-suspension of material from the foreshore into the water column and the distribution and therefore exposure from this material if it was spread by prevailing currents.

Model Scenario A

The results of the modelling of this proposed remediation method which includes leaving the lower shore material in situ are presented in the Coastal Processes Study in Appendix C of this NIS (Model Scenario A). This study shows that the proposed works will not affect the overall sediment transport regime in the Harbour and has concluded that the works will not have a significant impact on the coastal processes of the Harbour. Impacts from these works from a sediment suspension and deposition perspective are minimal. Re-suspension of material from these works, in a worst case scenario, is redistributed locally within the site environs. Small volumes below detectable limits may be suspended in the water column and distributed and deposited in the Cork Harbour area. However, the model represents a worst case scenario with no additional sediment abatement included. There is minimal risk of any interaction of these sediments with Natura 2000 areas. This material in situ has been colonised by marine flora and fauna and is comparable to the surrounding sediments. There are no elevated contaminate levels in this material above those detected in the surrounding area. None are above the effects range-median (ERM) or threshold effects levels (TEL) (Cronin et al 2004).

Model Scenario B

The modelling shows in the event of bulk waste removal (Scenario B) from the foreshore, in a worst case scenario without further sediment abatement mitigation that sediments would be distributed over the local estuarine area. Suspended sediments in the vicinity of the site and deposition would result in highly localized smothering of marine organisms in the immediate vicinity of the East Tip site. Small amounts of suspended sediments (<0.1kg/m^3) would be distributed across the Cork Harbour area. Even in a worst case scenario, the suspended and deposited sediments would be minor and not of significant impact outside the environs of the East Tip site. However, there would be the potential for small concentrations of suspended material to enter the Monkstown Creek area. Whilst below detectable limits, this has been

determined as an unacceptable risk given the conservational interest in this area. In addition this proposal would result in the loss of a larger foreshore habitat in the vicinity of the site due to removal and the potential for smothering. The material in situ is already exposed and inert, and is part of the habitat matrix of the area and is supporting marine faunal communities.

The removal of all potential material from the foreshore and shallow subtidal would incur significant risk of re-suspension of material, and exposure of unoxidised material from the site which may include higher levels of potential chemicals of concern, i.e. heavy metals. The concern is related not only to the material associated with the East Tip, but also with the surrounding sediments in Cork Harbour which have elevated levels of contaminates. Where possible any significant subtidal works should be avoided to limit the risk of the redistribution of these sediments. Areas such as Monkstown Creek are already under pressure from the input of such material from elsewhere in the Cork Harbour region due to natural and anthropogenic activities. As a result the risk of this material contributing to a cumulative impact to these habitats, however minor, is not deemed acceptable. The removal of these subtidal sediments, even if contained within the proposed mitigation presents an unacceptable risk of redistribution of this material into areas of sensitivity. As a result the most environmentally sound option is to leave the portion of waste which is proposed to remain outside the PES in-situ. In addition the addendum to the DQRA with regards leaving waste in situ concluded that there was a low risk to human health and Cork Harbour Waters with leaving waste in-situ (See Appendix A:DQRA), This is further supported by the results of marine water sampling and analysis which did not identify contaminant concentrations in excess of relevant WQSs (WYG, 2013).

4.4 POTENTIALLY SIGNIFICANT IMPACTS

The qualifying interests of the European sites are the habitats and species for which the sites have been designated (as described in Section 3.3 and Section 4.2.1 above). When determining the impacts on the qualifying interests of the *Cork Harbour SPA*, the main threats and pressures on these habitats and species as detailed in Section 4.2.1, are taken into account. The key construction and end use, aftercare and maintenance phase impacts on the bird species of the European site are dealt with in this section.

From the conclusions of the AA Screening Assessment, it is considered that there are two possible pathways by which adverse effects on the Conservation Objectives of *Cork Harbour* SPA might occur. The two possible sources are:

a) A release of contaminants from the waste at the East Tip during construction; and / or

b) A release of contaminants from sediments in intertidal and sub littoral areas around the site during construction.

Either source could potentially result in adverse effects on the Conservation Objectives of Cork Harbour SPA via one of two pathways, as follows:

c) Contamination of food chains outside the SPA boundary, but having effects within the SPA; and/or

d) Contamination of habitats within the SPA.

4.4.1 IMPACTS TO DESIGNATED SITES/CORK HARBOUR

4.4.1.1 Direct Impacts

The Lough Beg section of *Cork Harbour* SPA located 1.4km to the south of the Haulbowline East Tip site and the potential road improvement works on the approach road in Ringaskiddy would be located 600m of the Natura 2000 site. Therefore, no direct impact will therefore occur within the boundary of any Natura 2000 site as a result of the proposed works.

4.4.1.2 Indirect Impacts

Indirect effects may include hydrological changes, siltation or turbidity in areas around the site either as a result of excavation operations during construction works at the proposed East Tip development site or as a result in hydrological changes from the completed works (see Appendix C Coastal Processes Study).

During the excavation process there may be some minor redistribution of sediments in the immediate area around the reclamation with some minor accretion in the vicinity of the adjoining land reclamation and the entrance to the Haulbowline Island Basin.

It is not considered possible that disturbance of waste or sediment at the site during construction activity could result in a sufficient release of contaminants that contamination of waters could occur at locations as distant from Haulbowline and hence no impacts are considered at this site or at any other more remote Natura 2000 sites outside Cork Harbour.

4.4.2 IMPACTS TO MARINE WATERBODY

4.4.2.1 Direct Impacts

The possible issues and impacts that could arise during the construction include:

- Increased suspended sediments and sedimentation during construction works.

4.4.2.2 Indirect Impacts

Indirect effects may include changes in siltation, water flow and turbidity in areas around the site either as a result of construction or as a result in hydrological changes from the completed works.

Indirect effects of these changes can lead to changes in food sources for benthic invertebrates and this can lead to changes in community composition.

The nature of the works is such that impacts on habitats or flora outside the site boundary are only possible as a result of water-borne pathways via the surrounding marine waters. It is not considered possible that any non-marine ecosystems or plant species could be adversely affected by any such transport of contaminants or significant quantities of inert sediments. Hence, no indirect impacts on non-marine habitats or flora species of significant ecological value are considered possible as a result of the proposed works at the East Tip.

Model Scenario A of the Coastal Processes Study (Appendix C of this NIS) shows a minimal risk of sediment redistribution beyond the site environs. By the provision of additional site

mitigation measures and site supervision this risk is reduced to negligible levels in relation to Natura 2000 sites.

Marine Invertebrates

Coastal process modelling showed that, for Model Scenario A predicted sediment deposition will be restricted to the immediate vicinity of Haulbowline (see Coastal Processes Study) with a maximum deposition of approximately 50mm in the immediate vicinity of the proposed perimeter area. Increased suspended sediments are likely to be restricted to the area around the East Tip, with maximum increases of 500mg/l extending 0.1km and 0.17km to the north and east of the area respectively. The area surrounding the site outside the proposed works includes some waste material, which in the interests of minimising any re-suspension of this material, is to be left in situ. The material is already colonised with marine invertebrates and this poses the least potential impact.

Any re-suspended site material may include elevated levels of heavy metals or other contaminants whether from the site boundary or sediments in the area. Concentrations are comparable to sediments located in the Cork Inner Estuary and therefore no additional impacts are anticipated. In addition, the contaminants are in most cases likely to remain bound to the particulate matter. There would be no anticipated effects from exposure or ingestion of such material if it occurred in the immediate vicinity of the site. Therefore it s predicted that the works will be of *negligible magnitude and negligible significance* to marine invertebrates in the area.

4.4.3 IMPACTS TO BIRDS

The potential for effects on Common Terns comes from the potential for bioaccumulation of heavy metal in the food chain. Terns feed almost exclusively on shoaling pelagic fish such up to about 10cm in length, typically sand-eel species, small clupeids (particularly sprat), gadoids and rockling fry.

West *et al*., (1975) investigated the breeding season diet of Cormorant at seven coastal colonies in Ireland and found that Wrasse comprised 60% of the diet in terms of biomass, with Eel being the second most important prey item (20%) and salmonids representing 2% of the diet. Roach and Perch are also important prey species.

Fish comprise the major component of the diet of Red Breasted Merganser, predominantly small cod, hake and plaice.

Hence, any effect on these fish populations could potentially have an effect on the food resource of the terns, either in terms of food availability or in terms of contamination of the birds with heavy metals.

4.4.4 END-USE, AFTERCARE AND MAINTENANCE STAGE

The end-use, aftercare and maintenance works proposed at the site will be very limited, involving only routine maintenance works such as grass cutting, drain maintenance and so on, for the upkeep of the site for recreational use. Hence, no indirect negative ecological impacts will occur during end use, aftercare and maintenance of the site at any location remote from the site itself. During the end use, aftercare and maintenance phase of the development, possible issues and impacts may include:

- Change in prey species (i.e. benthic, fish and shellfish species) as a result of change in light levels from the development, change in hydrodynamic regime, colonisation of structures or change in recreational fishing in the area; and
- Disturbance to birds.

Changes in the communities and biotopes in the immediate vicinity of the site are expected to be predominantly limited to intertidal habitats with the construction of rock armour or berms and therefore are not anticipated to affect marine mammal prey distribution. Hydrological modelling has been conducted of the proposed end use, aftercare and maintenance phase and no hydrological changes of concern have been identified. Therefore impacts are predicted to be of negligible magnitude and negligible significance to marine mammal populations in the area.

The small scale, infrequent and short-term nature of routine landscaping maintenance works are such that birds using areas in the vicinity of Haulbowline will not be significantly disturbed or otherwise affected.

4.4.5 POSSIBLE IN-COMBINATION EFFECTS

In-combination effects are those that accrue over time and space from a number of different development activities and projects in geographical proximity to one another. Any effect that arises as a result of incremental changes caused by other developments or impact sources (which are present or reasonably foreseeable) in combination with the effects of the Development is an “in-combination” effect.

The Appropriate Assessment requires consideration of the proposal in combination with other plans or projects, which may give rise to cumulative impacts affecting the European sites within the Natura 2000 network. Plans and projects in place or proposed for the study area are identified below. A number of plans and projects may result in in-combination effects on the Natura 2000 sites in the study area.

For the purposes of considering potential in-combination impacts in the area it was necessary to firstly identify possible other developments which may come on stream in the 2014 – 2016 approximately.

Possible Future Remediation of neighbouring Steelworks Site

Cork County Council is currently in the process of appointing consultants to undertake a Tier 1 assessment of the neighbouring Steelworks site at Haulbowline. Depending on the outcome of the Tier 1 assessment and rate of progression of possible future remediation proposals, achievement of licences and approvals for same etc., it is likely that remediation works at the Steelworks site will follow on at some time from those which are the subject of this current NIS.

Irish Maritime and Energy Resource Centre (IMERC)

The proposed IMERC campus will be located on the mainland at the southern side of Haulbowline Bridge. The IMERC site lies immediately to the west of the access road to the bridge. Already developed and operational at the campus is the National Maritime College of Ireland (NMCI) which is run by Cork Institute of Technology (CIT) and the Irish Naval Service. The Beaufort Laboratory is currently under construction by UCC. It is now proposed to expand the campus and to develop a marine and energy cluster focussing on research, development, commercialisation and innovation. CIT / UCC intend to prepare a masterplan

for the layout and design of this future campus development. In any case between the NMCI and the Beaufort Laboratory the numbers of people attending college or work in the immediate vicinity of Haulbowline Island is due to increase in the short – medium time.

Possible Waste Management Facility by Indaver Ireland

Indaver Ireland is the prospective applicant for a waste management facility comprising a waste-to-energy plant and a waste transfer station at a site opposite the NMCI. This is in close proximity to Haulbowline Island. In 2012 Indaver commenced pre-application discussions with An Bord Pleanala. Permission has previously been refused at this for a similar type development. In the event that a revised proposal can be devised which would address the previous reasons for refusal it is possible that some such waste management facility could be provided here in the coming years.

Hammond Lane Metal Company

Planning permission was granted in 2012 for demolition, new build, upgraded facilities, new processing plant etc at the Hammond Lane Metal Company located at Loughbeg, also close to Haulbowline Island. It is likely that construction of these works will commence in 2013, but if they are delayed they could coincide with works at East Tip.

Port of Cork

Port of Cork Company entered into pre-application consultation with ABP regarding proposed new port facilities at Ringaskiddy in 2011. In the event that a revised proposal could be devised which would address the previous reasons for refusal it is possible that some Port of Cork facilities could be moved to Ringaskiddy in the coming years.

The channel to the north of the site is maintained by Port of Cork as an approach for navigation purposes, and therefore maybe subject to maintenance dredging in 2013 or 2014. The Maintenance Dredging licence of the Port of Cork expired at the end of 2012, and the level of future dredging is subject to additional licensing. This activity could contribute to increased sedimentation in the surrounding waters, or remobilisation of contaminated sediments which could have in-combination effects with the proposed works at the Haulbowline site; however, as far as possible such activities would not be scheduled to occur concurrently with site works.

Spike Island Masterplan

The Spike Island Masterplan envisages use of Spike Island for public events, concerts etc. In the long-term it is hoped that the island could attract 300,000 visitors per annum. The Masterplan also identifies the subject site at Haulbowline as a possible future ferry access point. Fáilte Ireland has allocated funding for the progression of Spike Island Masterplan, as announced on 23rd October 2013. At the time of writing this EIS, it is expected that the funding will be used for the creation of 3 interpretive centres on Spike Island along with the improvement of marine access facilities to the Island. It is expected that these facilities will be completed in 2015.

4.4.5.1 Conclusion of In-Combination Effects

It is considered that the scale of the works and implementation of effective mitigations (Section 4.5 below) to avoid impacts affecting the Cork Harbour SPA there will be no potential

for further cumulative impacts arising in combination with any other plans or proposals and therefore these plans will not adversely affect the integrity of the European sites as no reasonable scientific doubt remains as to the absence of such effects.

4.5 MITIGATION MEASURES

Mitigation is defined in the Commission services interpretation document 'Managing Natura 2000 sites: The provisions of Article 6 of the ''Habitats'' Directive 92/43/EEC' as 'measures aimed at minimising or even cancelling the negative impact of a plan or project, during or after its completion' (paragraph 4.5.2). The research for this guidance document suggests that mitigation measures should be considered in accordance with a hierarchy of preferred options as illustrated in **Figure 4.1** below.

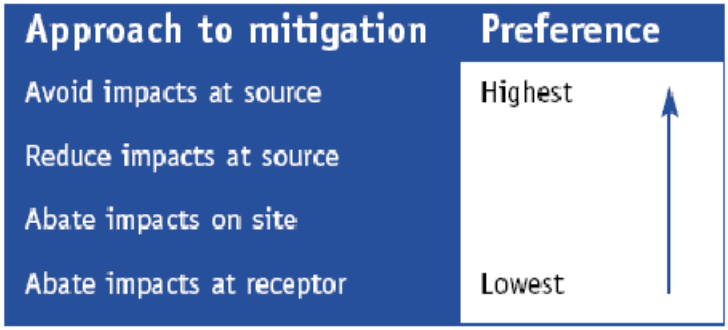

Figure 4.1: Hierarchy of Prefered Options

The mitigation measures proposed in this Section are designed to avoid adverse effects on the integrity of *Cork Harbour SPA*. Indirect impacts potentially affecting the qualifying interests of the European sites are limited to adverse effects on water quality, considered to be a key indicator of conservation value for the sites, and potential introduction/dispersion of alien invasive species.

4.5.1 CONSTRUCTION STAGE

Cork County Council and/or its site agent shall employ an Environmental Clerk of Works (ECoW) who will be based on-site for the duration of the construction works and will form part of the Employer's Site Representative Team. The ECoW shall have suitable qualifications and report directly to Cork County Council and/or the site. The ECoW will also be the Client's Liaison for the purposes of consulting environmental bodies including the National Parks and Wildlife Service. The ECoW shall be responsible for carrying out regular Audits of the Contractor's Environmental Operating Plan on behalf of the Local Authority and site supervision checks. In addition, the ECoW shall be the primary person involved in the monitoring role.

If piling activities are deemed necessary, detailed method statements will be prepared and agreed with NPWS, which will outline measures to avoid and minimise impacts on seabirds, marine mammals and fish. Consideration will be given to the scheduling of the works between the end of May and August, which is a particularly sensitive time for seabirds, marine mammals and fish. For any piling activities required the NPWS 2012 guidance will be followed. A Marine Mammal Observer will be appointed for these works which will occur in daylight hours only, and this mitigation will be checked by the ECoW.

Hydraulic flow model simulations from the Coastal Processes Study (RPS 2013) in Appendix C showed that there were no changes in the flow regime away from the immediate area around the proposed works site. Even the changes in current velocities in the immediate

vicinity of the construction area were predicted to be very small, typically in the range -0.1 to +0.04m/s. The proposed development will have no significant impact on the wave climate in the area and will not affect the overall sediment transport regime in Cork Harbour. Thus it is concluded that the proposed developments at Haulbowline Island will not have a significant impact on the coastal processes of Cork Harbour.

Areas of construction are to be protected from sediment re-suspension by the use of sheet piling, geotextile tubes, sediment screens or other sediment abatement measures (See Chapter 6 'Project Construction' of the EIS). Additional mitigation such as sediment screens will be considered in areas where there is a risk of re-suspension during sheet piling, protective berms or geotextile tube placement as determined by the sediment modelling (Appendix C: Coastal Processes Study). Coastal process modeling showed that predicted sediment deposition for Model Scenario A will be restricted to the immediate vicinity of East Tip with a maximum deposition of approximately 50mm in the immediate vicinity of the proposed perimeter area. In addition increased suspended sediments are likely to be restricted to the area around the East Tip, with maximum increases of 500mg/l extending 0.1km and 0.17km to the north and east of the area respectively. Model Scenario A did not include any of the additional sediment abatement measures as outlined above with respect to the excavation of the rock armour keystone trench. In addition to this Scenario A is considered to be a conservative model as it has assumed that all works in the foreshore are executed over a 1 month tidal cycle as opposed to predicted 9 month period (refer to chapter 6 "Project Construction" of the EIS). As discussed in section 14.2.2.8 Model Scenario A has been referred to in order to assess impacts from the envisaged works.

In order to monitor water and sediment quality associated with the works, two-monthly water quality monitoring and bi-annual sediment monitoring will be conducted at 6 reference sites around the East Tip (see Chapter 13' Soils, Geology and Hydrogeology' Figure 13.2 and Table 13.24). Works containment by sheet piling, protective berm, geotextile tubes or sediment screens are intended to contain all materials within the working site area. In the event any turbidity is observed during works outside this containment, works will cease, and an investigation of the source and deployment of additional screens will be undertaken prior to recommencement (see Site Management below).

Any night working that may be necessary on the site will be conducted only when required (as dictated by tidal working) and of short duration, minimising the need for lighting and reducing potential physical presence effects. Operations predominantly occur in normal working hours and therefore have minimal additional affects to the existing port, naval base and vessel operations in the vicinity, to which any marine mammals present can be assumed to be acclimatised.

Site management will also be present during construction. Management will include observation and direction of dust and sediment abatement as well as enforcement of best practice and guidelines. Whilst mitigation for sediment and noise control is anticipated to mitigate any effects, this will provide further observatory monitoring for any site issues.

4.5.2 END-USE, AFTERCARE AND MAINTENANCE STAGE

An Bord Pleanála, in their submission to Cork County Council of the 4th of January 2013, requested that "*a full programme for measuring impacts during and after reclamation on wildlife shall be included – this shall build upon existing baseline data*."

Whilst negative effects on wildlife during construction are not anticipated, the construction contract will include a requirement for the contractor to complete the following:

- To employ a suitably qualified ecologist who will, in consultation with National Parks and Wildlife Service, develop an appropriate monitoring programme that will be designed to identify any negative effects on wildlife that may occur during the construction period. The monitoring programme will include provision for mechanisms whereby measures can be taken to stop works wherever significant negative effects on wildlife are detected.

The licencee will contract a suitable qualified ecologist, who will, in consultation with National Parks and Wildlife Service, develop an appropriate monitoring programme that will be designed to examine the long-term future usage of the site by wildlife. Specifically, the monitoring will include examination of the usage by wildlife of the features that have been included in the end-use design of the site to be of benefit to wildlife including *inter alia*, the bird roosting area and the wetland area. The monitoring programme should aim to determine whether or not these features have been successful. At minimum this will include regular examination (the timeframe to be agreed with NPWS) of the flora species present in the wetland area; examination of bat usage of the site, and monitoring of the numbers of birds roosting along the shoreline of the site. Where monitoring indicates that measures are 'failing' in their objectives, or that simple modification could readily improve their effectiveness, the licencee will, under recommendation from the contracted ecologist, and in consultation with NPWS, undertake remedial actions to attempt to improve the success of the measures.

4.6 CONCLUSIONS

4.6.1 INTEGRITY OF THE SITE

From the *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (EC, 2002), the meaning of integrity is described as follows;

> '*The integrity of a site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives' (MN2000, paragraph 4.6(3))*'.

4.6.2 INTEGRITY OF CORK HARBOUR SPA

From the information gathered and the predictions made about the changes that are likely to result from the construction and end use, aftercare and maintenance stages of the project, the integrity of site checklist is completed for Cork Harbour SPAin **Table 5.9** below.

Table 4.9: Integrity of Site Checklist for Cork Harbour SPA

Conservation objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
Cause delays in progress towards achieving the conservation objectives of the site?	No	Annex I Bird species: The potential for loss and/or disturbance of key species will be avoided and will not cause delays in achieving the conservation objectives of the site. Required mitigation measures are outlined in Section 4.5.
Interrupt progress towards achieving the conservation objectives of the site?	No	Annex I Bird species: The potential for loss and/or disturbance of key species will be minimised and will not cause delays in achieving the conservation objectives of the site. Required mitigation measures are outlined in Section 4.5.

Conservation objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
Disrupt those factors that help to maintain the favourable conditions of the site?	No	Potential impacts affecting water quality (a key indicator of conservation value) within the localised area of the proposed development will be mitigated against. Likewise, the risk of introduction and/or dispersion of non-native invasive species will be minimised by following the guidelines provided in the NRA 2010 guidelines. Required mitigation measures are outlined in Section 4.5.
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No	Potential impacts affecting water quality (a key indicator of conservation value) within the localised area of the proposed development will be mitigated against. Likewise the risk of introduction and/or dispersion of non-native invasive species will be minimised. Required mitigation measures are outlined in Section 4.5.
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	No	Potential impacts may occur through pollution of marine waterbodies and subsequent contamination of marine invertebrates, the prey specie of Annex I Bird Species during the construction phase. However these impacts can be effectively mitigated. Required mitigation measures are outlined in Section 4.5.
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No	Potential impacts may occur through pollution of the marine waterbody during the construction phase. This could impact on protected species outside designated sites. Required avoidance measures are proposed and mitigation measures are outlined in Section 4.5
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No	Potential impacts may occur through pollution of the marine waterbody during the construction phase. This could impact on protected species outside designated sites. Required avoidance measures are proposed and mitigation measures are outlined in Section 4.5
Reduce the area of key habitats?	No	There will be no direct loss of key habitats within the SPA Natura 2000 sites.
Reduce the population of key species?	No	The potential for effects on protected marine birds from the potential for bioaccumulation of heavy metal in the food chain from potential run-off of pollutants. Mitigation measures to minimise these local impacts are proposed to avoid impacts to the integrity of the site, these measures are outlined in Section 4.5.
Change the balance between key species?	No	Key species include Common Terns, Cormorant and Red Breasted Merganser. There are potential for impacts during the construction period from potential run-off of pollutants and noise disturbance. These impacts can be effectively mitigated and measures are outlined in Section 4.5.
Reduce diversity of the site?	No	The potential for effects on protected marine birds from the potential for bioaccumulation of heavy metal in the food chain from potential run-off of pollutants. Mitigation measures to minimise these local impacts are proposed to avoid impacts to the integrity of the site, these measures are outlined in Section 4.5.

Conservation objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
Result in disturbance that could affect population size or density or the balance between key species?	No	The potential for effects on protected marine birds from the potential for bioaccumulation of heavy metal in the food chain from potential run-off of pollutants. Mitigation measures to minimise these local impacts are proposed to avoid impacts to the integrity of the site, these measures are outlined in Section 4.5.
Result in fragmentation?	No	No impacts have been identified that would result in fragmentation of species or habitats for which the Cork Harbour SPA site has been designated.
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc.)?	No	No key features of Cork Harbour SPA sites will be lost as a result of construction or end use, aftercare and maintenance of the proposed development.

Source: *"Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*"

4.6.3 CONCLUSION STATEMENT

This Natura Impact Statement for the proposed East Tip Remediation Project, Haulbowline, Co Cork has been carried out in accordance with Article 6 (3) of the 'Habitats' Directive 92/43/EEC. This Statement provides a professional scientific examination of the project and the relevant Natura 2000 sites, identifying and characterising any possible implications for the Natura 2000 site in view of the conservation objectives, taking account of in-combination effects.

Robust and effective mitigation measures have been proposed for the avoidance of any impacts affecting water quality within all relevant Natura 2000 sites. Specific mitigation measures have been proposed for the prevention of impacts to all relevant Annex I species. Likewise, precautions will be taken in relation to non-native invasive species during the construction phase.

The mitigation measures outlined in Section 4.5 will form the backbone of the detailed construction method statements. Exact implementation details in the Construction Method Statements will be agreed with Cork County Council and NPWS representatives

The conclusion of this Natura Impact Statement is that there will be no potential for cumulative impacts arising in combination with any other plans or proposals, with the implementation of best practice and the recommended mitigation measures, it is considered that the proposed East Tip Remediation Project, Haulbowline, Co Cork will not adversely affect the integrity of Cork Harbour SPA as no reasonable scientific doubt remains as to the absence of such effects.

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APPENDIX A

Figure 1: Location of Proposed Works and Natura 2000 Sites

Cork Harbour SPA

Martello Tower Common Tern Colony

Great Island Channel cSAC

Cork Harbour SPA

Haulbowline East Tip Site

Cork Harbour SPA, Monkstown Creek

Spit Bank

Deep Water Port Common Tern Colony

Cork Harbour SPA,
Lough Beg

Cork Harbour SPA

N

Legend

- Cork Harbour Special Protection Area (SPA)
- Great Island Channel candidate Special Area of Conservation (cSAC)
- Study Area Boundary / Extent of works

TITLE

LOCATION OF PROPOSED WORKS AND NATURA 2000 SITES

Figure 1

File Ref: MCE0734MI0020F01
Date: April 2013

East Tip Remediation Project

EAST TIP REMEDIATION PROJECT

RPS

APPENDIX B

Habitats Directive Article 12 Screening Assessment

APPENDIX B

Habitats Directive Article 12 Screening Assessment

1 ARTICLE 12 SCREENING ASSESSMENT

1.1 REQUIREMENTS OF ARTICLE 12 OF THE HABITATS DIRECTIVE

The *European Union (EU) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora*, is commonly known as the 'Habitats Directive' and is implemented in Ireland through the European Communities (Natural Habitats) Regulations of 1997.

Articles 12 and 16 of the Habitats Directive are aimed at the establishment and implementation of a strict protection regime for animal species listed in Annex IV(a) of the Directive within the whole territory of Member States, i.e. in locations outside protected areas as well as inside their boundaries. Articles 12 (1) and 12 (3) are relevant to the current assessment. The wording of Article 12 (1) of the Directive is as follows:

> *1. Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range, prohibiting:*
>
> *(a) all forms of deliberate capture or killing of specimens of these species in the wild;*
>
> *(b) deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;*
>
> *(c) deliberate destruction or taking of eggs from the wild;*
>
> *(d) deterioration or destruction of breeding sites or resting places.*

The wording of Article 12 (3) of the Directive is as follows:

> *3. The prohibition referred to in paragraph 1 (a) and (b) and paragraph 2 shall apply to all stages of life of the animals to which this Article applies.*

This assessment is prepared with reference to the "*Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC (EC, 2007c), which states that: "The interpretation of Article 12 has to take into consideration the objective of Directive 92/43/EEC55 set out in Article 2, which applies, without distinction, to all Annexes. Consequently, strict protection measures adopted under Article 12 should aim to fulfil the main objective of the Directive by contributing to the maintenance or restoration, at favourable conservation status, of Annex IV(a) species of Community interest, while taking into account economic, social and cultural requirements and regional and local characteristics*" (EC, 2007c).

Hence, this assessment examines the possibility that the proposed works might result in a failure to maintain the favourable conservation status of any Annex II or Annex IV species; and thereby may potentially be in breach of Article 12. Details of the Article 12 Assessment are presented in Section 7 of this Report.

Article 16 of the Habitats Directive relates to the derogations of Article 12 that are allowed to member states. Derogations are allowed for a variety of reasons; "Provided that there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range." Wherever derogations are implemented by a member state, detailed reports must be submitted to the commission every two years detailing such issues as the reasons for the granting of the derogation, the alternatives that were examined, the agencies involved, and so on.

1.1.1 ANNEX IV SPECIES CONSIDERED IN THIS ASSESSMENT

Field surveys of the site have been conducted during the period between August and December

2012, and desktop documentation has been reviewed, in order to identify any Annex II or Annex IV species that may be present in the vicinity of the East Tip, Haulbowline and therefore subject to possible adverse effects resulting from the proposed works.

The East Tip site provides habitat for a very limited range of faunal species, however the waters of Cork Harbour which surround the site are suitable to support a range of Annex II and IV species. The species for which potentially suitable habitat might be present, and which may therefore potentially be affected by the proposed works are discussed by taxonomic group in the following sections; the relevant species are listed in **Table 1.1.** Cetaceans (whales and dolphins), Pinnipeds (seals), Bats and otter, are discussed in Sections 1.2 to 1.6

Table 1.1: Habitats Directive Annex II and Annex IV species that could potentially occur in the vicinity of East Tip, Haulbowline

Common Name	Scientific Name	Habitats Directive Annex(es)
Otter	*Lutra lutra*	**II and IV**
Common Pipistrelle	*Pipistrellus pipistrellus*	**IV**
Soprano Pipistrelle	*Pipistrellus pygmaeus*	**IV**
Leisler's Bat	*Nyctalus leisleri*	**IV**
Daubenton's Bat	*Myotis daubentonii*	**IV**
Common (Harbour) Seal	*Phoca vitulina*	**II**
Grey Seal	*Halichoerus grypus*	**II**
Harbour Porpoise	*Phocoena phocoena*	**II and IV**
Bottle-nosed Dolphin	*Tursiops truncatus*	**II and IV**

1.2 CETACEANS

Whilst there have been very occasional records of other cetacean species such as common dolphin (*Delphinus delphis*) and orca (killer whale; *Orcinus orca*) (June 2001) in Cork Harbour, only two species occur, or are at a likely to occur, on a regular basis: harbour porpoise and bottle-nosed dolphin; both are listed under Annexes II and IV of the Habitats Directive. Between February 200-6 and March 2011 a pod of six bottle-nosed dolphins were regular visitors to the Outer Cork Harbour area. None have been observed in the vicinity or Cobh or Haulbowline. Records of Cetacean observations are provided in **Table 1.1.**

Table 1.1: Cetacean observations in SW Ireland (Reid *et al*., 2003; DCENR, in press; O'Cadhla *et al*., 2004 and IDWG, 2011)

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Common Dolphin	The most frequently recorded dolphin species in Irish waters. Present in the Celtic and Irish Sea, predominantly in the summer and early autumn (Reid *et al*., 2003). Most abundant and breeding along the south and south west coasts of Ireland.											
Bottle-nosed Dolphin	Found in all Irish coastal waters and are the second most frequently recorded dolphin species in Irish waters. They occur inshore around all Irish coasts with a semi resident group historically reported outside Cork Harbour and at Kenmare (O'Brien et al 2009). They also occur offshore in the Celtic Sea and in the Irish Sea. They are present year round and breed in Irish waters. Inshore and offshore ecotypes may exist.											
Risso's dolphin	Continental shelf species. Recorded throughout the year in Irish waters with a wide distribution (Aecom & Metoc, 2010). Some seasonal movements apparent (Baines & Evans 2009). Occasionally, observed inshore and in bays along the southwest and southeast coasts (NPWS, 2008). Regularly occurring in the southern and central Celtic Sea (Baines & Evans 2009). Breeds in Irish waters.											
Harbour Porpoise	Ireland's only porpoise species. Abundant in the inshore waters throughout the year along the south and southwest coasts. Breeds in Irish waters. Occurs throughout the Irish and											

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Celtic Sea with some large aggregations noted off the south coast in the Autumn months. Some evidence for an offshore movement in spring between March and June (IWDG, 2010b) which may be linked to calving.											
Killer whale												
	Observed off all coasts and in the Irish Sea. Inshore sightings tend to increase during late summer and autumn (Berrow *et al*., 2010).											
Fin whale												
	The majority of inshore sightings come from counties Cork, Waterford and Wexford (Berrow *et al*., 2010). These species move inshore in early summer between May and June with a regular peak in sightings during November in west Cork. A single sighting (2007) within Cork Harbour of an individual later believed to have stranded There has only been one recorded sighting in the area from 2000-2009 (IWDG,2011)											
Key		Absent					Present					

1.2.1 CETACEAN CONSERVATION

Ireland is a signatory to conservation-orientated agreements under:

- the Berne Convention on Conservation of European Wildlife and Natural Habitats (1982);
- the Bonn Convention on Migratory Species (1983);
- the OSPAR Convention for the Protection of the Marine Environment of the northeast Atlantic (1992); and
- the EC Habitats Directive on the Conservation of Natural Habitats and of Fauna and Flora (92/43/EEC, 1992).

All cetacean species occurring in European waters are now afforded protection as Annex IV species under the EC Habitats Directive. Two common species: Bottlenose Dolphin and Harbour Porpoise; are Annex II species (i.e. animal species of Community interest, whose conservation requires the designation of Special Areas of Conservation) (refer to Section 2.3.1 of the AA Screening Assessment).

In 1991, the Irish government declared all Irish waters extending to the outer Continental shelf a whale and dolphin sanctuary, claiming that this was a "*clear indication of Ireland's commitment to contribute to the preservation and protection of these magnificent creatures in their natural environment, and to do everything possible to ensure they should not be put in danger of extinction but should be preserved for future generations*" (Rogan & Berrow, 1995). According to the declaration, the sanctuary was empowered under the legal framework already in place, which suggested that the Irish government considered the present legislation to be sufficient to provide full habitat protection to cetaceans within the continental shelf area.

1.3 PINNIPEDS

Both common (harbour) seal and grey seal occur regularly in small numbers in Cork Harbour, including the immediate vicinity of Haulbowline Island. Both species are listed under Annex II of the Habitats Directive. There is little evidence of seals using the site. The nearest NPWS recorded haulouts and sensitive habitats for seals are in Kinsale.

Incidental sightings of seal have occurred in the vicinity of the site and the naval base. These are expected to be adults transiting the area. There is no evidence of seals using the site.

Common (or harbour) seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) are common in Irish

waters, and are mainly concentrated inshore. Both the common seal and the grey seal are listed under Annex II of the EC Habitats and Species Directive as species whose conservation requires the designation of Special Areas of Conservation. In addition Common Seals and Grey Seals are protected under the Conservation of Seals Act 1970.

Seals are known to forage over a wide area, often straying up to 2,000 kilometres from their haul-out site (JNCC, 2007*;* Connell *et al.* 1999). There are no haul-out sites in the immediate vicinity of the proposed works where moulting or pupping may occur, the nearest is at Kinsale (O Cadhla *et al.*, 2008).

1.3.1 COMMON SEALS

The common seal is the smaller of the two species of pinniped that breed in Ireland and is also an important predator in this area of the north Atlantic. The main prey of common seals is considered to be Sandeel, Lesser Octopus, Whiting, Flounder and Cod (Tollit & Thompson, 1996). During the pupping (June) and moulting seasons (late July/August) they spend more time ashore than at other times of the year.

These haul-out groups have tended historically to be found among inshore bays and islands, coves and estuaries (Lockley, 1966; Summers *et al.,* 1980), particularly around the hours of lowest tide, the nearest is at Kinsale (O'Cadhla *et al*., 2008).

1.3.2 GREY SEALS

Grey seals are widespread in Ireland, with the greatest concentrations found on the exposed south-western, western and northern coasts (Lyons, 2004). Haulouts are recorded with breeding potential at Kinsale and Dungarvan, though the 2005 population estimates did not record significant numbers at these sites. Grey seals can be gregarious at these haul-outs, sometimes forming large groups of several hundred animals, especially when they are moulting their fur in spring following the winter pupping season.

1.4 POTENTIAL IMPACTS ON MARINE MAMMALS

1.4.1 CONSTRUCTION

During construction there will be physical presence disturbance that may cause avoidance behaviour during the day. The area is not used by marine mammals but this may cause temporary avoidance of the site by any transiting species. Activities may include pile driving in the lower shore or shallow subtidal, construction in the lower shore, vehicles, light and noise from onshore construction.

It is anticipated that all works in the lower shore extremities of the site will be undertaken in accordance with the NPWS (draft March 2012) '*Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters*'.

Any works in the shallow subtidal are expected to be of short duration. These works are intended to contain the site or part of the site where further remediation works are to take place and therefore no further effects are anticipated. These works are also intended to prevent re-suspension of sediment or other material from the site during construction.

There may be additional physical presence effects from light noise and human presence on the site during the works. Whilst this may cause local avoidance it will not exclude marine mammals from upper estuary areas and would be in line with existing noise levels of operations in the area.

Little vessel traffic is anticipated to be utilised outside existing routes therefore no increased risk of

collision is anticipated.

1.4.2 END USE, AFTERCARE AND MAINTENANCE WORKS

The proposed recreational end use of the site includes a slipway, pontoon area on the south of the East Tip area. All other areas will be or sheet piled finished. The site is currently not utilised as a haulout, for seals. Remediation works to the causeway area may provide suitable habitat for adult seals to utilise.

The site's proposed use as an amenity area and slipway will result in human presence, and may include fishing in the area to the south of the island. The Rocky Island area is already utilised for this amenity, the expected impact to marine mammals will not be significant and it is anticipated that individuals in this area are already acclimatised to such activity.

The proposed pontoon and slipway may provide recreational boat use. This could result in an increased small boat presence in the area and increased chance of interaction or collision. It is anticipated that the slip will be operated in the same manner as the other amenity areas in Cork Harbour and that sufficient information on marine mammals will be provided at the location. In addition the proposed activities are not proposed to be sufficient to cause a barrier to access through the channel by physical presence or operational noise. Therefore, no significant effects are expected.

1.4.3 CONCLUSIONS

Overall it is concluded that whilst marine mammals are likely to pass the East Tip site on an occasional basis, the site and environs do not constitute an important area of habitat for marine mammals. Whilst some temporary avoidance of the construction works is possible, there will be no significant effects to marine mammals from the proposed works.

1.5 BATS

All Irish bats are listed under Annex IV of the Habitats Directive; lesser horseshoe bat is also listed under Annex II.

A full bat survey of the site was undertaken on the 12th September 2012. The survey included both day-time examination of the site, particularly of buildings and other man-made structures, to investigate bat usage and the possible presence of roost sites; and night-time detector work to investigate the usage of the site by foraging or commuting bats.

No bat roosts were found or suspected to occur; the site was deemed generally unsuitable for bats, and there was only a single detector record of a common pipistrelle, flying briefly over the western boundary of the site close to the sports pitch.

The survey assessment concluded that: "As no bat roost was identified on-site and the existing habitats are exceptionally poor for these animals, the impact of any development on the favourable conservation status of local bat populations is expected to be negligible."

The assessment also concluded that remediation of the site can potentially have positive benefits for bats: "Any future development on-site will change the local environment as existing structures and vegetation will be removed and, potentially, new structures and vegetation will be erected and planted. Such development is not expected to negatively affect bats as the existing habitats and site use are quite unsuitable for these animals and the area is avoided as a result. The favourability of the area for these animals and other wildlife may however be improved through its future development if the development proposals are sensitively designed and constructed in a sustainable manner with consideration of the needs of the local fauna."

Hence, it is concluded that the proposed works will have no negative effect on bat populations, significant or otherwise, and that end uses of the site which include extensive vegetation planting and the establishment of freshwater features, are likely to have a positive effect on local bat populations.

1.6 OTTER

Otter is listed under Articles II and IV of the EU Habitats Directive and occurs in most freshwater and coastal habitats throughout Ireland.

The East Tip site has been examined in detail for signs of otter activity and to assess the quality of the habitat for otters on the 14th of August 2012, and further searches for spraint were conducted during October and November 2012. No evidence of otter activity in the form of holts, paths or spraint sites has been found. The East Tip site lacks sources of permanent fresh water and this probably explains the absence of resident otters at the site. A number of studies have shown that for otters which inhabit salt water environments, access to fresh water is essential for washing and maintainable of the quality of their coats; and that the distribution of holts is closely correlated with the availability of fresh water (e.g. Kruuk *et. al*, 1989; Beja. 1991).

Otters are present throughout Cork Harbour and Haulbowline's central position at the heart of the harbour, and bordering the narrowest part of the River Lee's channel through the harbour, means that it is highly likely that otters occur along the shoreline of the East Tip site on a regular basis when foraging or commuting between other locations in the vicinity.

Overall it is concluded that whilst otters are likely to pass along the coastline of the East Tip site on a regular basis, neither the shoreline or inland areas of the site are used heavily by otters; and the site does not constitute and important area of habitat for otters. This is likely to be due to the absence of fresh water. Hence, it is considered highly unlikely that the proposed works will have any detrimental effect on either individual otters or on wider otter populations on the vicinity.

Remediation of the site, if it includes the establishment of permanent fresh water features such as ponds within the end use landscape design, may encourage otters to use the area more frequently.

1.7 ARTICLE 12 SCREENING CONCLUSIONS

It is concluded that whilst the proposed works could result in localised and temporary avoidance of the immediate vicinity of the East Tip site by marine mammals, the proposed works will have no significant effects to marine mammal populations and the site and environs do not represent an important habitat for these species (See Section 1.1. and 1.2)

It is concluded that the proposed works will have no negative effect on bat populations, significant or otherwise, and that end uses of the site which include extensive vegetation planting and the establishment of freshwater features, are likely to have a positive effect on local bat populations (see Section 1.4).

It is concluded that the proposed works will not have any detrimental effect on either individual otters or on wider otter populations on the vicinity. Whilst otters are likely to pass along the coastline of the East Tip site on a regular basis, the site is not used heavily by otters; and the site does not constitute and important area of habitat for otters. This is likely to be due to the absence of fresh water. Remediation of the site, if it includes the establishment of permanent fresh water features such as ponds within the end use landscape design, may encourage otters to use the area more frequently.

APPENDIX C
Coastal Processes Study RPS (2013)

Haulbowline Island Remediation Project

Coastal Processes Study

DOCUMENT CONTROL SHEET

Client	Cork County Council					
Project Title	Haulbowline Island Remediation Project					
Document Title	Coastal Processes Study					
Document No.	IBE0759_Coastal_Processes_Study					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
	1	1	33	1	42	-

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2	Draft	AG	BB	NS	Belfast	Mar 2013
3	Approval	BB/MB	BB	NS	Belfast	28 Mar 2013
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6	Final Draft	BB	BB	AKB	Belfast	03 April 2013
7	Final	AG	BB	AKB	Belfast	03 April 2013

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1 MODELLING OVERVIEW

1.1 INTRODUCTION

In 2012 RPS were appointed by Cork County Council to prepare an Environmental Impact Statement for the proposed remediation of East Tip, Haulbowline Island, Co. Cork.

Haulbowline Island is located within Cork Harbour, between Cobh to the north and Ringaskiddy to the south. It is connected to the mainland at Ringaskiddy via a bridge which traverses Rocky Island. The Headquarters of the Irish Naval Service is situated on the western portion of the Island within the Naval Dockyard to the east. The East Tip site is situated to the east of the Naval Dockyard and is an area of land (approximately 9 hectares) reclaimed from the sea by infilling with processing waste, approximately 650,000 m^3 from a former steelworks located on Haulbowline Island.

The proposed remediation solution, as recommended in a Detailed Quantitative Risk Assessment (DQRA) completed on behalf of Cork County Council, was to provide a low permeability (maximum permeability of 10^{-9}m/s) *cover* system to minimise infiltration of surface water into the waste and underlying waters in combination with an engineered perimeter system with a maximum permeability of 10^{-5}m/s to reduce contaminant flux leaving the waste into the Cork Harbour waters and secondly to prevent erosion of the waste material into the sea.

The perimeter engineered system will incorporate works on and modifications to the existing foreshore at the East Tip site. Therefore hydrodynamic modelling was undertaken by RPS as part of a Coastal Processes Study to investigate the impact of proposed works on the hydrodynamic (current speed and direction) regime around Haulbowline Island. The numerical models also simulated changes to the sedimentation regime in the area as a result of the foreshore excavation operations. This modelling was used to investigate the potential impacts of:

- Alterations in foreshore bathymetry and construction of a perimeter rock armour revetment around Haulbowline Island East Tip on tidal flows and water levels, and
- The dispersion and fate of material excavated during the period of the Perimeter Engineers Structure (PES) construction.

The models simulated were based on the proposed works as described in the Environmental Impact Statement for the East Tip Remediation Project prepared by RPS on behalf of Cork County Council in 2013 (RPS Document Reference MCE0734RP0004).

1.2 COMPUTATION MODELS

Computational modelling techniques utilised modules from the MIKE 21 suite of coastal process modelling software. This modelling software is an industry standard tool developed by the Danish Hydraulics Institute and is used for the assessment of coastal processes.

The specific modules used in this study were:

- 2D hydrodynamic flow models;
- Dredged plume dispersion model.

1.3 MODELLING SOFTWARE

The tidal regime in Cork Harbour was simulated using the 2D depth averaged tidal flow model MIKE21 HD (hydrodynamic module). Bathymetric data for this model was taken from a number of hydrographic surveys including those relating to recent maintenance dredging completed by the Port of Cork within Cork Harbour. These surveys were supplemented with Admiralty Chart Data (as digitally supplied by C.Map of Norway). The base hydrodynamic flow model used in the study was a 2D MIKE21 nested HD flow model consisting of an outer model with a 30m grid resolution and a finer inner model at 10m resolution. Figure 1.1 shows the extent of the tidal models.

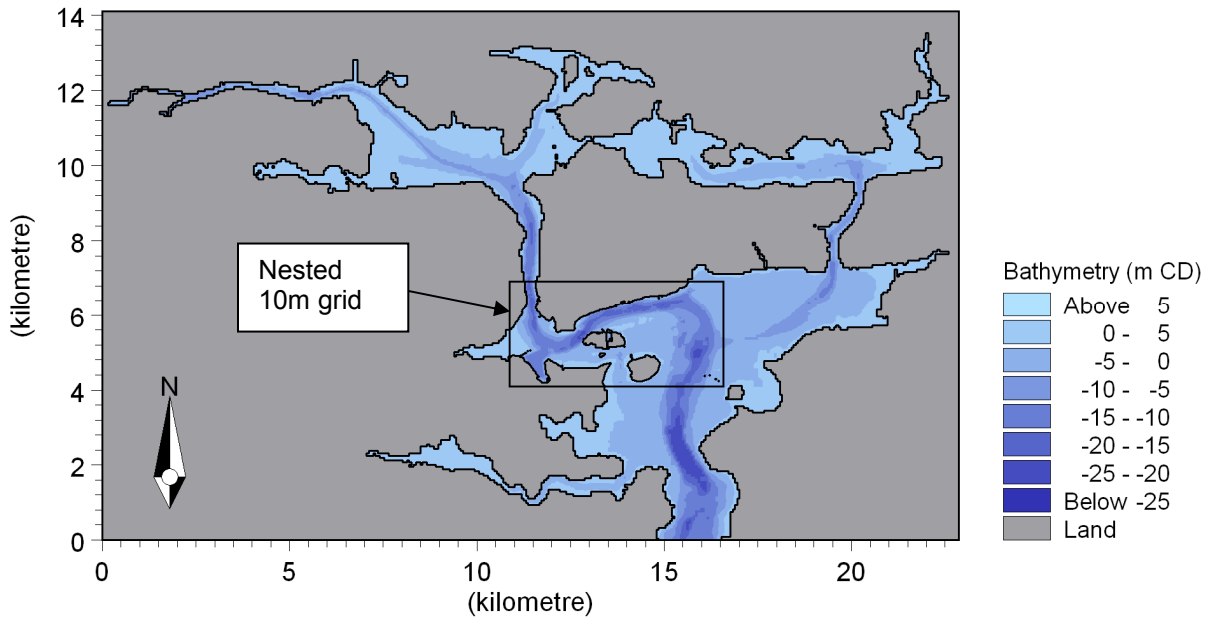

Figure 1.1: Tidal model domain 30m grid with nested 10m section

For the purposes of sediment plume modelling further refinement of the model resolution, to 3.3x3.3m grid, was required in the immediate area of Haulbowline Island. The extent of the 10m grid and inner 3.3m nested model is shown in Figure 1.2 below.

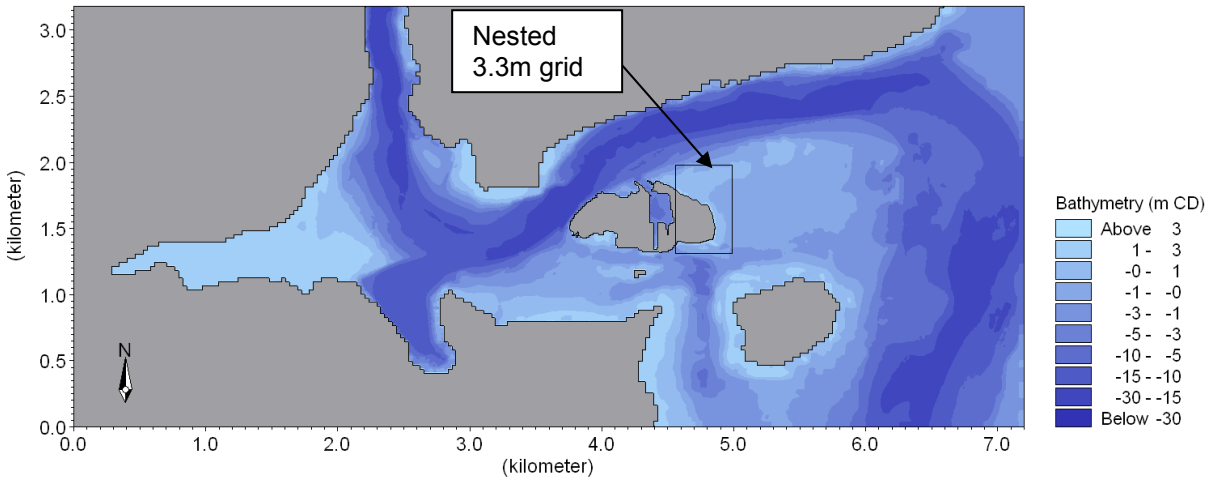

Figure 1.2: Bathymetry and the extent of the 10m nested model with detailed 3.33m area

The boundary conditions used for the model were tidal levels which were derived from harmonic constants for Roberts Cove and Cobh; as published in the Admiralty Tide Tables. The tidal model was calibrated and validated as part of previous studies completed on behalf

of the Port of Cork. For illustration purposes Figure 1.3 shows the model generated water surface elevation (tidal curve) at Haulbowline during a typical spring tide. Similarly, Figure 1.4 shows the water surface elevation for a typical neap tide.

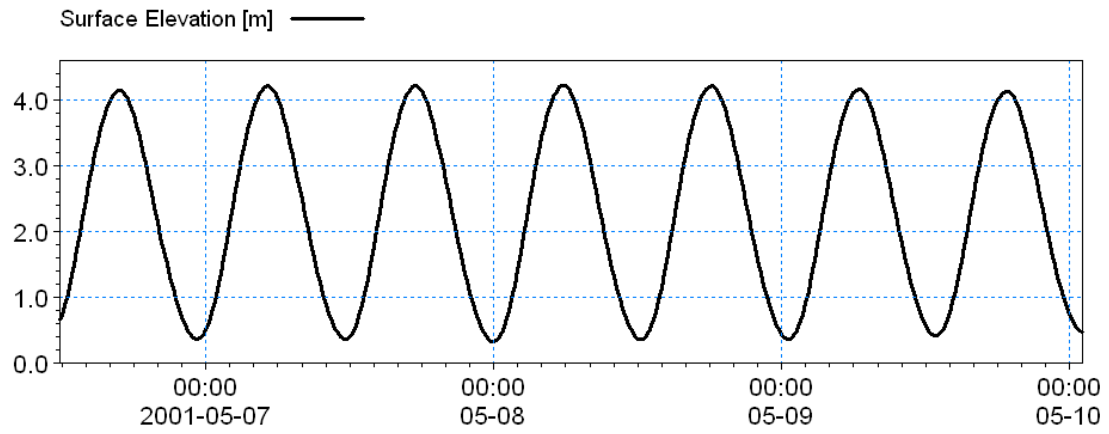

Figure 1.3: Simulated tidal elevations (m) for spring tide at Haulbowline

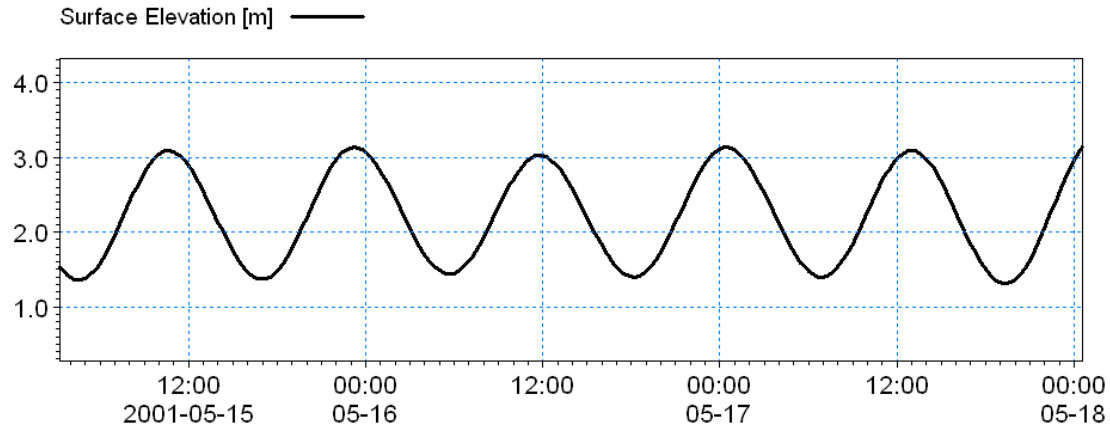

Figure 1.4: Simulated tidal elevations (m) for neap tide at Haulbowline

The modelling of sediment losses during the dredging/excavation process on the foreshore around Haulbowline Island was undertaken using the MIKE 321npa model. This is a particle tracking model that uses the hydraulic flow regime from the MIKE21 nHD model to simulate the transport and fate of material discharged to the water column. The model can include variable graded material and takes effect of re-erosion of deposited sediment so it is particularly suitable for the simulation of the disposal of dredged spoil. The model utilises 2D depth integrated hydrodynamic model data and simulates a vertical velocity profile to simulate velocity variations with depth i.e., lower near bed velocities and higher surface flows.

1.4 MODELLING APPROACH

The overall aim of the project is the remediation of the East Tip at Haulbowline Island. This will include the construction of a Perimeter Engineered Structure (PES) including the construction of a rock armour revetment at the face of the structure. Although the horizontal alignment of the structure will largely follow the existing eastern extent of the island at the East Tip, the proposed PES alignment will modify the existing foreshore extent in some locations.

Additionally, the project may require the removal of contaminated material from the foreshore. Therefore computational modelling was undertaken to assess the potential long term impact of proposed alterations to the foreshore extent on the island on the hydrodynamic flow and sediment transport regime in the area around Haulbowline Island.

Modelling was also undertaken to assess the extent of sediment plumes that may occur during and immediately after the construction phase of the project.

In order to assess the above work 4 No. model scenarios were considered:

- **Scenario A** – The construction of the rock armour keystone trench to facilitate the construction of the PES and rock armour protection. This scenario is based on the assumption that a berm will be constructed on the landward side of the keystone trench to facilitate the excavation of that trench. Re-profiling works of the existing foreshore side slopes would be executed on the landward side of the berm and therefore would not result in any sediment mobilisation. Any potential for sediment mobilisation would be solely from the works associated with the excavation of the trench;

- **Scenario B** – the removal of contaminated material in the foreshore by bulk excavation prior to PES construction. This scenario considers, as a conservative worst case, the unlikely bulk excavation of waste from the foreshore area undertaken with no sediment control. Sediment losses are based on an assumed loss from a dredger/excavator undertaking the excavation activity;

- **Scenario C** – the construction of the PES and the bulk excavation in combination. This model assumes that the bulk excavation has been completed ahead of the PES works;

- **Scenario D** – all construction works carried out behind a coffer dam around the perimeter of the East Tip.

Hydrodynamic and sediment transport characteristics were assessed for all four scenarios. Sediment plume modelling was carried out for Scenarios A and B. The output from this modelling is discussed in more detail in the following sections of this report.

2 HYDRODYNAMIC MODELLING

2.1 HYDRODYNAMIC SCENARIOS

Hydrodynamic modelling was initially undertaken using the existing bathymetry to derive the current tidal pattern, pre-works.

The proposed PES alignment around Haulbowline Island (as indicated on Figure 6.1 and 6.2 of the Haulbowline Remediation Project EIS, RPS, April 2013) was then incorporated into the numerical models and the post works scenario simulated. The variations in tidal currents were then compared to assess the impact of the works on tidal current patterns.

The following hydrodynamic model scenarios were simulated:

1) **Scenario A**: One month of hydrodynamic model data (assumed construction period) was generated based on the existing bathymetry with a bund located on the landward side of the keystone trench. A 1.5m wide x 2m deep x 900m long excavation around the island was assumed giving 2700m^3 excavated material. The location of the trench is shown on Figure 2.1

Figure 2.1: Location of the keystone trench from Scenario A

Figure 2.2 illustrates the location of the trench a simulated in the nested 3.33m model with the updated bathymetry.

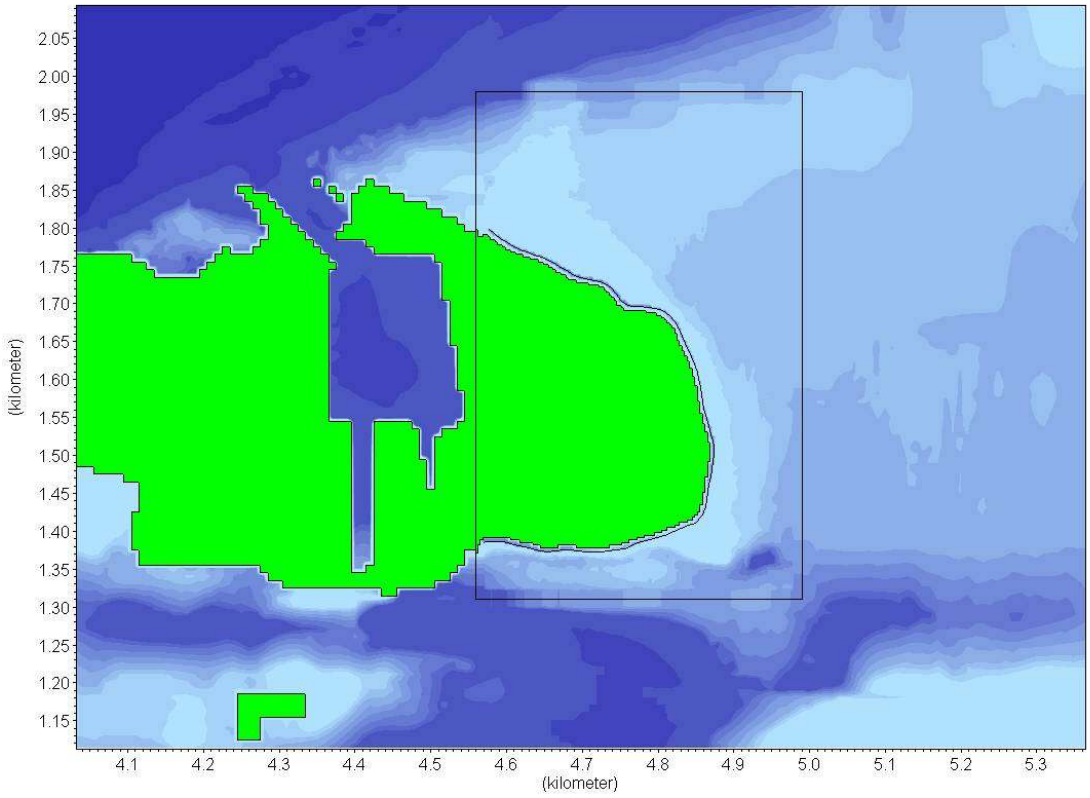

Figure 2.2: Updated bathymetry for the Scenario A with marked trench in 3.33m nested model

2) **Scenario B**: One month of hydrodynamic model data based on the existing bathymetry and incorporating an assumed bulk excavation from the foreshore area around the perimeter of the island. This excavation is assumed to have a maximum depth of 3m with an approximate trench width of 20m. Figure 2.3 below shows the extent of the bulk waste excavation and Figure 2.4 illustrates the updated bathymetry for this scenario within the 3.3m nested model extent.

Figure 2.3: Extent of the bulk excavation of waste from Scenario B

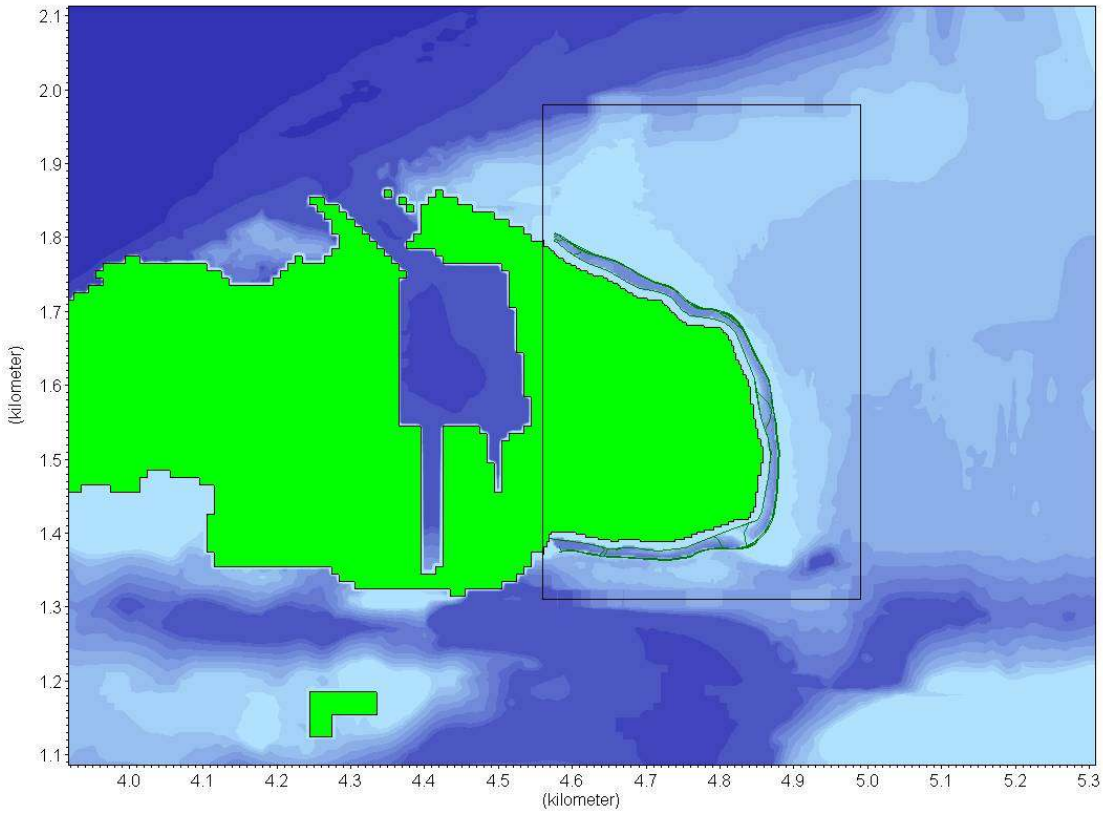

Figure 2.4: Updated bathymetry for the Scenario B with bulk excavation in 3.33m nested model

3) **Scenario C**: The hydrodynamic model simulated a typical spring to neap tidal cycle (17 days). This model incorporates a bulk excavation similar to Scenario B assuming that the proposed PES construction was complete.

Figure 2.5 below illustrates altered bathymetry in the nested 3.33m model and contours of the excavation for Scenario C.

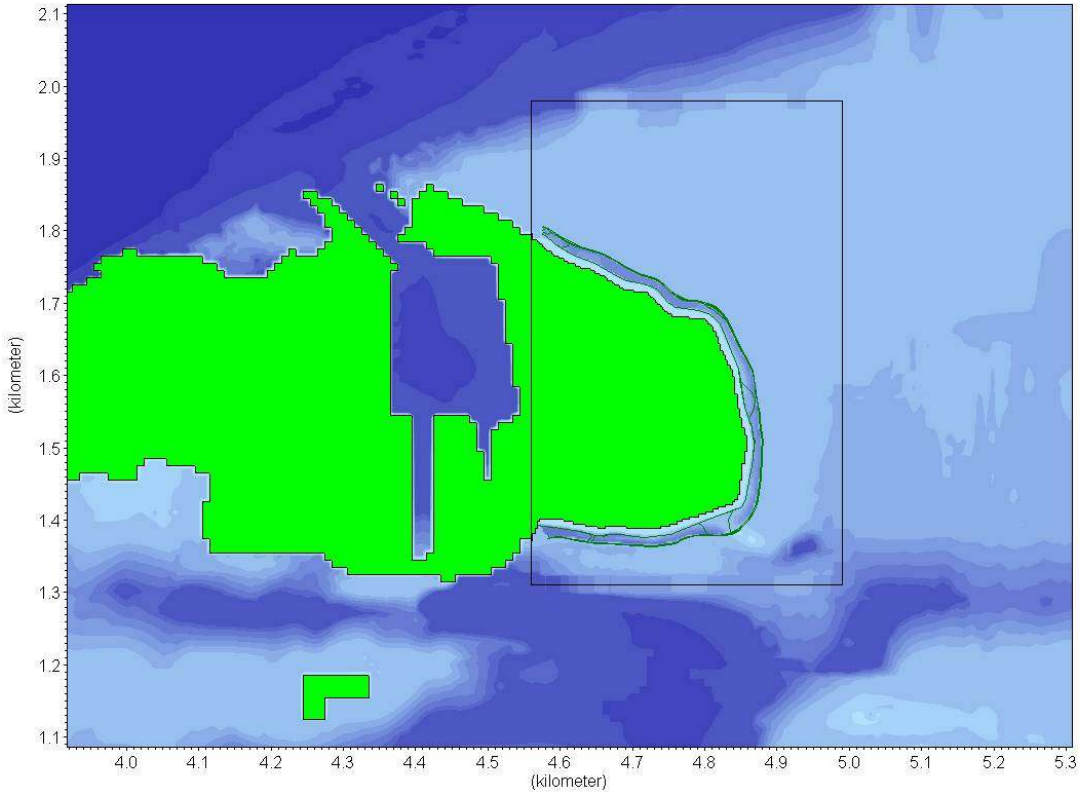

Figure 2.5: Updated bathymetry for the Scenario C with bulk excavation in 3.33m nested model

4) **Scenario D**: This simulation assumes that a cofferdam is located outside of the bulk excavation for full sediment containment purposes. For this scenario 17 days (neap to neap tidal cycle) of hydrodynamic currents were simulated.

Figure 2.6 below show extent of the bund which is the extent of the excavation.

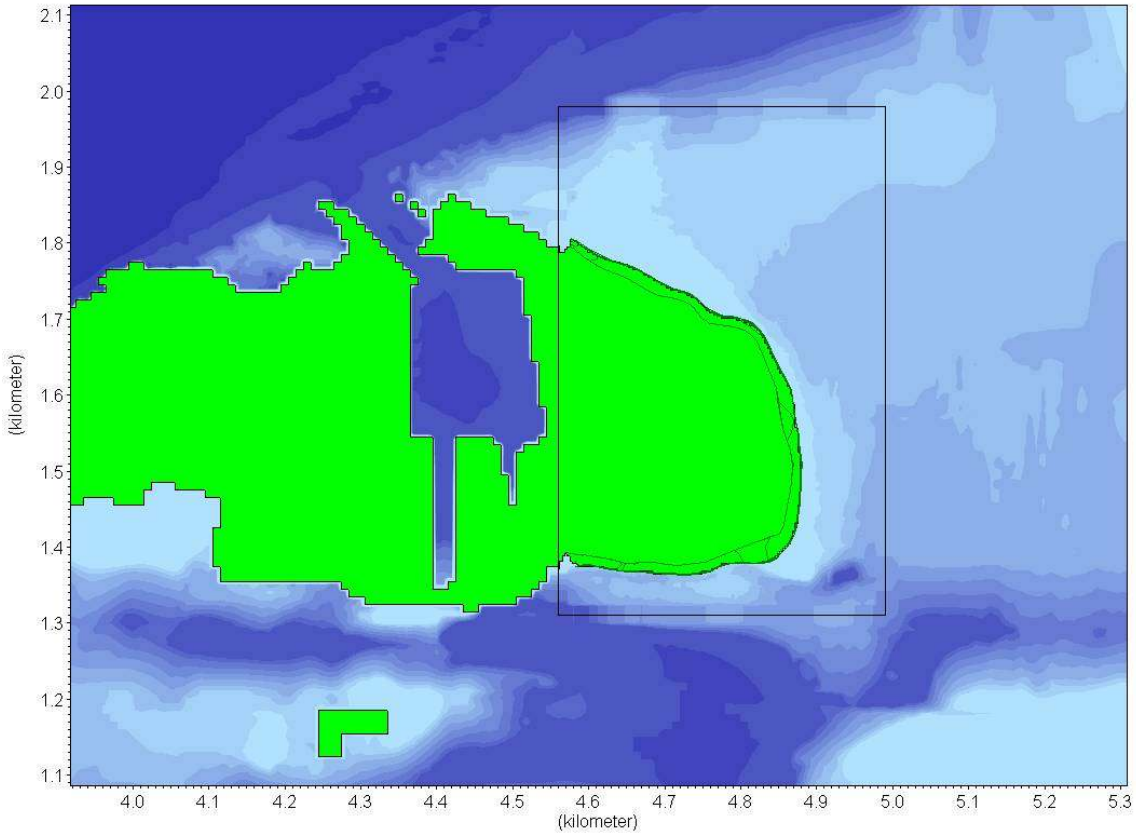

Figure 2.6: Updated bathymetry for the Scenario D with bulk excavation in 3.33m nested model

2.2 HYDRODYNAMIC MODELLING RESULTS

2.2.1 Existing tidal flow regime in Cork Harbour

The Spring to Neap Tidal cycle was simulated based on tidal data for May 2001. This month was selected for modelling purposes as it represented a period of average tidal conditions and would therefore be representative of the general range of tidal conditions. Typical tidal patterns are presented in Figure 2.7 and Figure 2.8 for mid-ebb and mid-flood respectively, both during spring tide conditions.

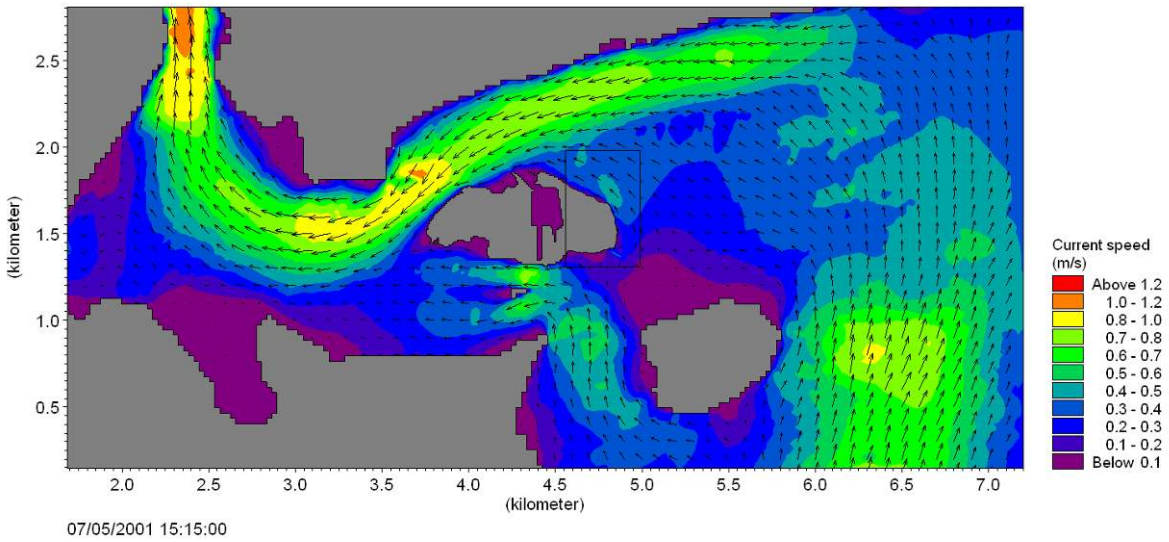

Figure 2.7: Existing Typical Spring Current Speed on Flood

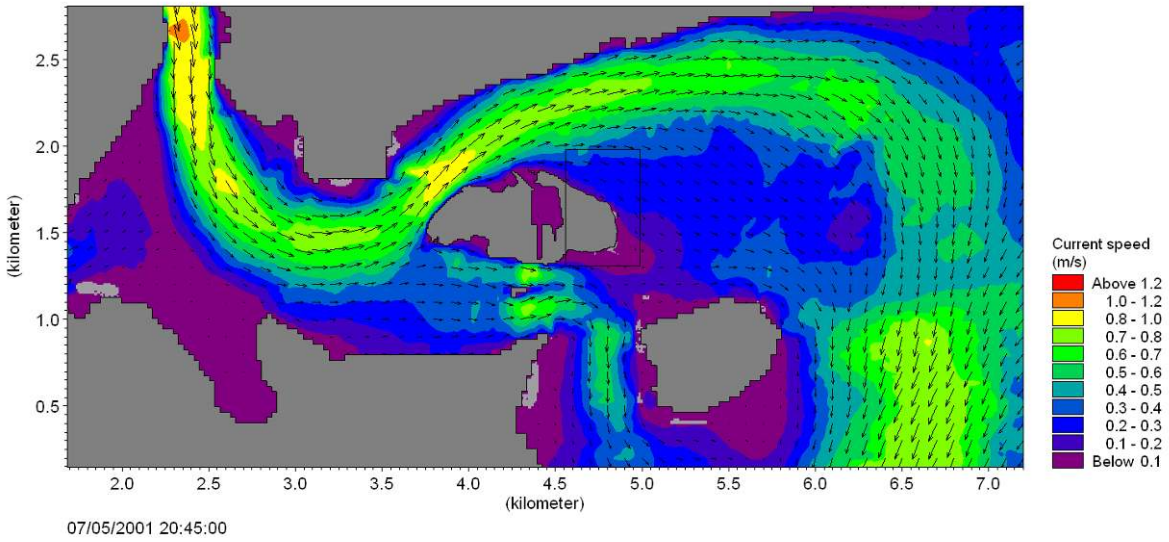

Figure 2.8: Existing Typical Spring Current Speed on Ebb

2.2.2 Impact of the Scenarios on the tidal flows

The impact of the proposed development was simulated by altering the tidal model bathymetry for the four scenarios outlined previously including the relevant modifications of the foreshore on the eastern end of the island. Comparisons of the tidal flow conditions throughout the area were then made to assess the impact of the development.

Figure 2.9 and Figure 2.11 respectively show the typical spring flood and ebb patterns following the trench excavation.

In order to evaluate the impact of the altered foreshore Figure 2.10 and Figure 2.12 illustrate the *change* in peak spring flood and ebb velocities between the existing and post keystone trench excavation (1.5m wide x 2m deep x 900m approx) works.

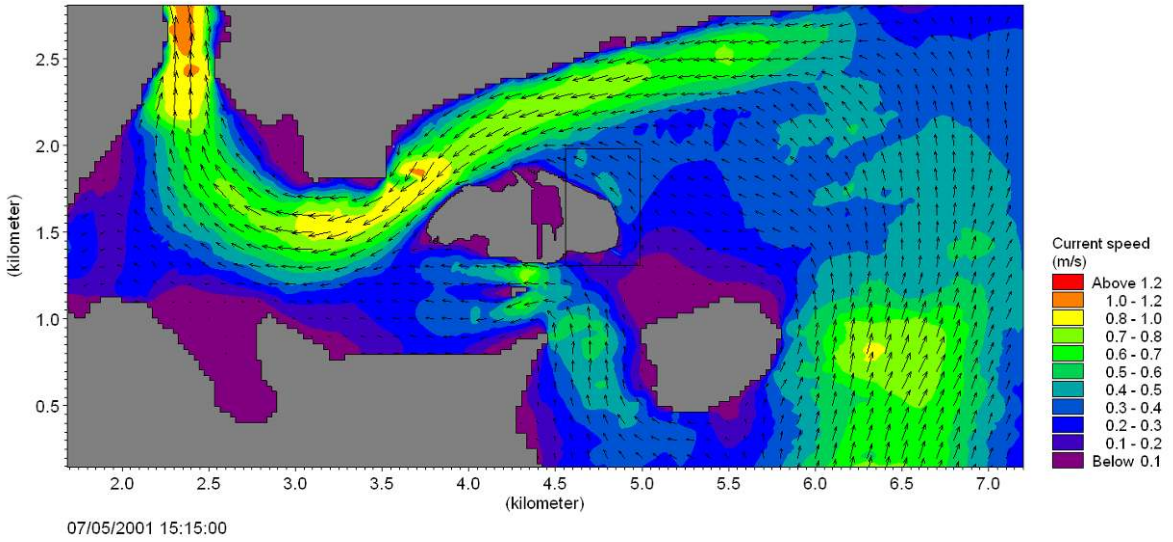

Figure 2.9: Scenario A: Spring Current Speed on Flood tide

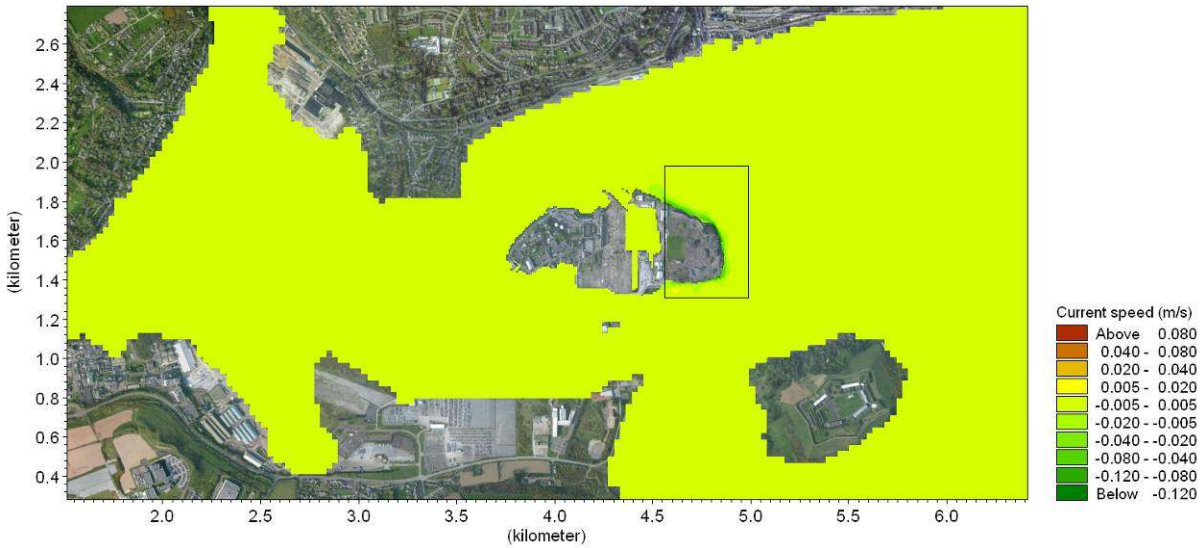

Figure 2.10: Scenario A: Change (pre-post works) in Current Speed on Flood tide

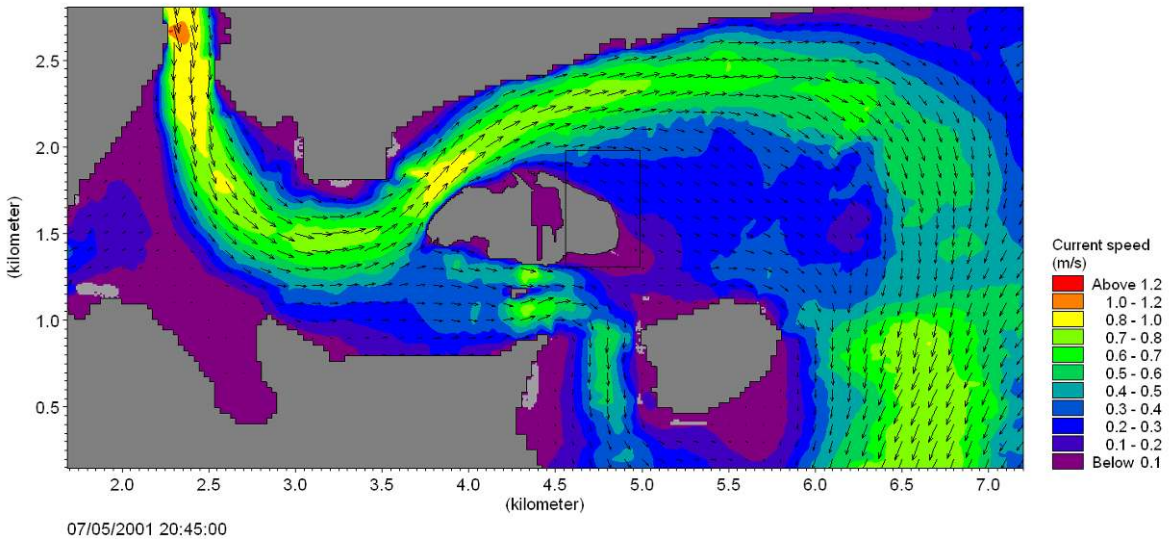

Figure 2.11: Scenario A: Spring Current Speed on Ebb tide

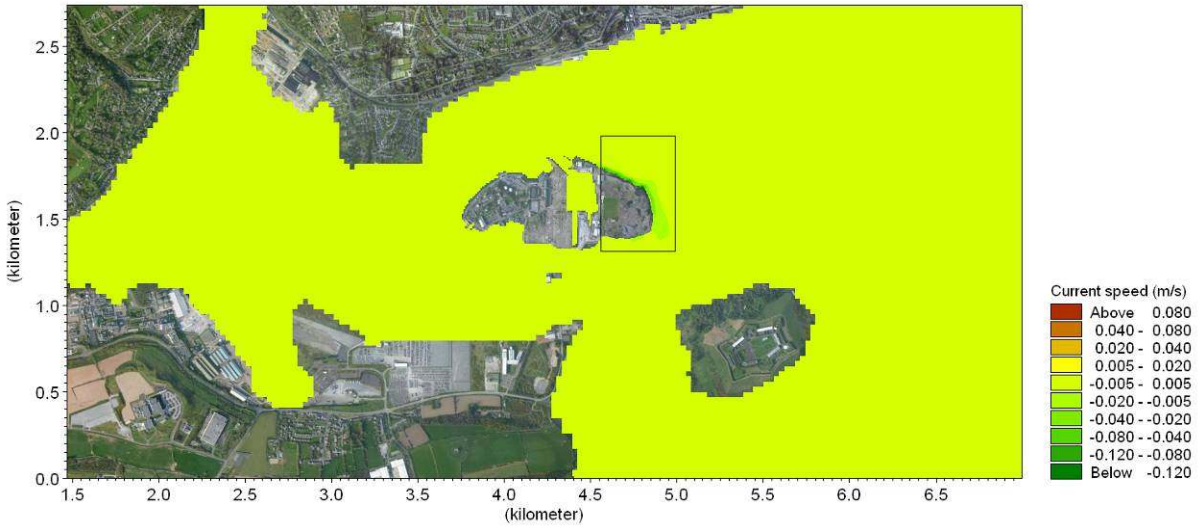

Figure 2.12: Scenario A: Change (pre-post works) in Current Speed on Ebb tide

From the above tidal velocity difference plots it can be seen that there are small changes in the current velocity in the area of the proposed works. The maximum change in the peak velocities are approximately -0.04m/s. This occurs in the immediate vicinity of the trench and is not considered to be significant. Away from the trench location no significant / negligible changes to the flood or ebb tidal flows are predicted.

Figure 2.13 to Figure 2.20 below illustrate peak spring current speed on flood and ebb for Scenario B and associated plots of the change in current speed with the completed bulk excavation. From these plots it can be seen that the change in current speed on flood is in

range of -0.04 to 0.08 m/s localised to the immediate vicinity of the works and does not have any impact on tidal regime further away from the proposed works.

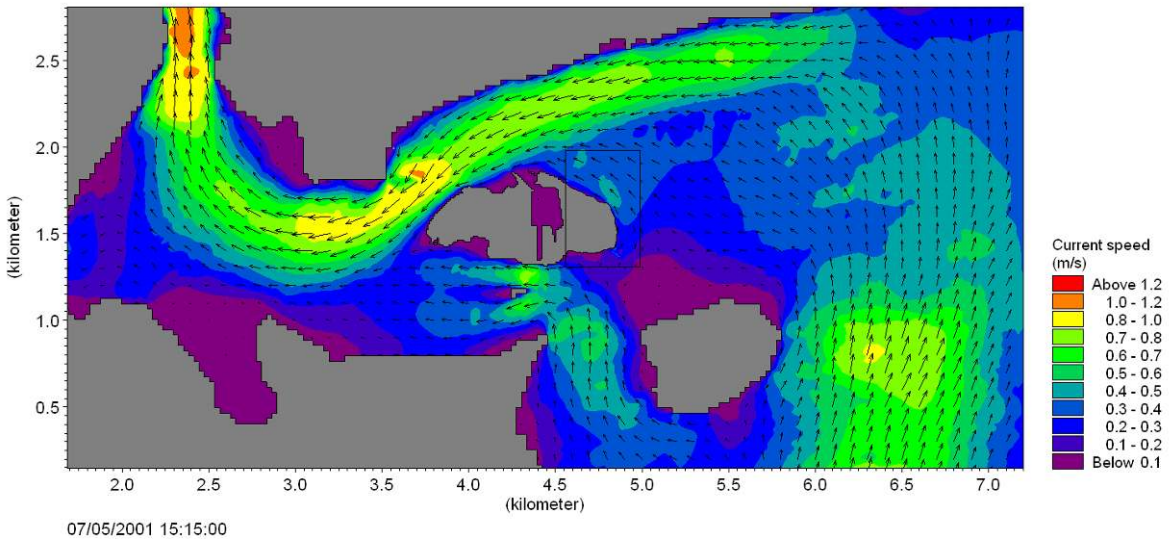

Figure 2.13: Scenario B: Spring Current Speed on Flood tide

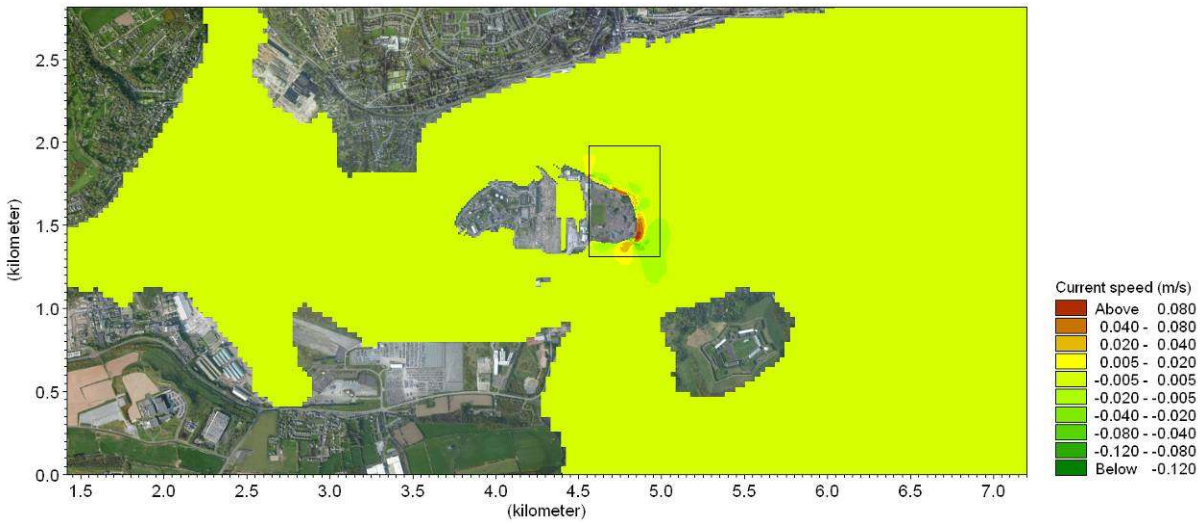

Figure 2.14: Scenario B: Change in Current Speed on Flood tide

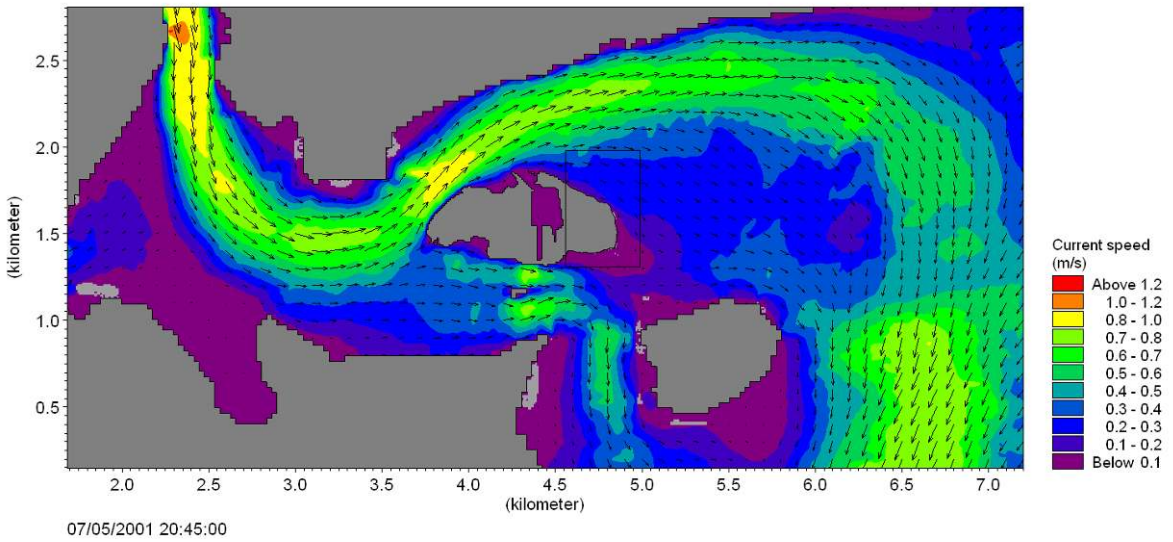

Figure 2.15: Scenario B: Spring Current Speed on Ebb tide

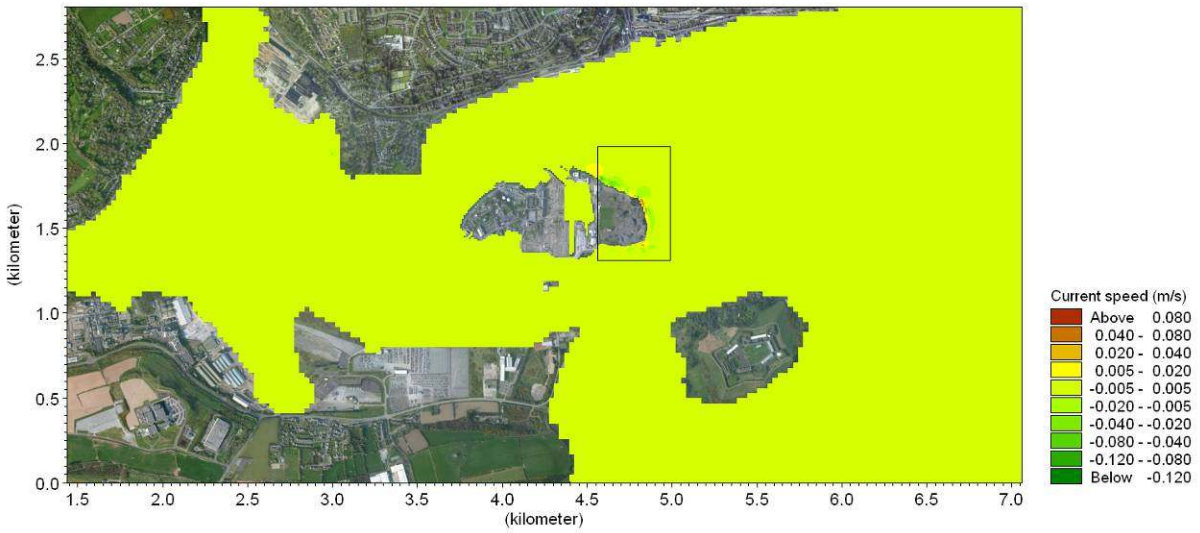

Figure 2.16: Scenario B: Change in Current Speed on Ebb tide

Peak flood and ebb current speed plots (Figure 2.17 & Figure 2.19) and difference plots (Figure 2.18 & Figure 2.20) are presented for Scenario C. It can be seen that the difference in current speed both on flood and ebb for this scenario, as in two previous scenarios, is very localised and changes in velocity variations, range -0.04 to +0.08 m/s, are not considered to be significant and can only be discerned on the flood tide.

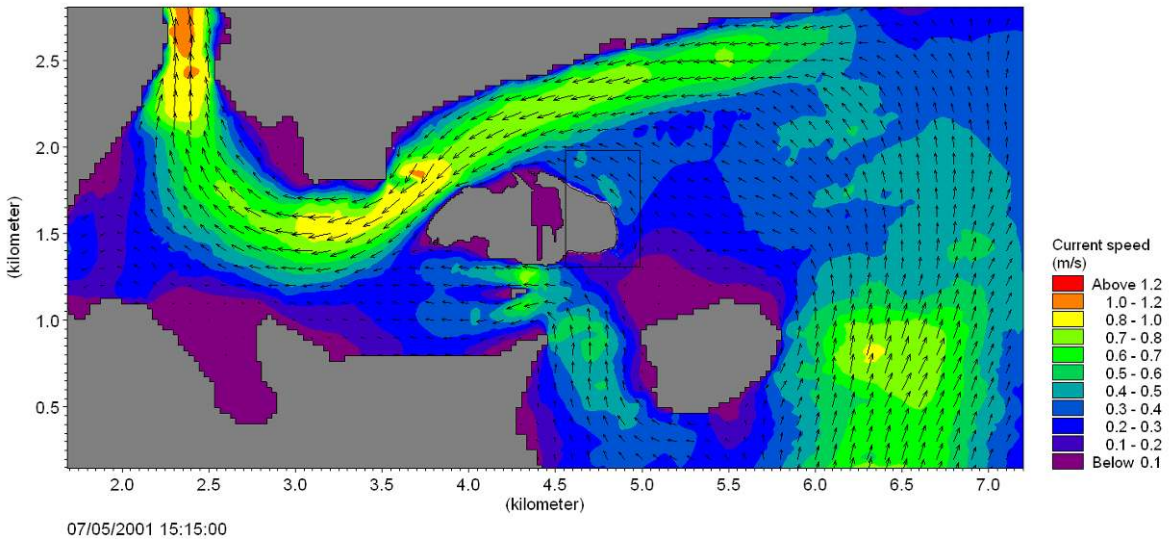

Figure 2.17: Scenario C: Spring Current Speed on Flood

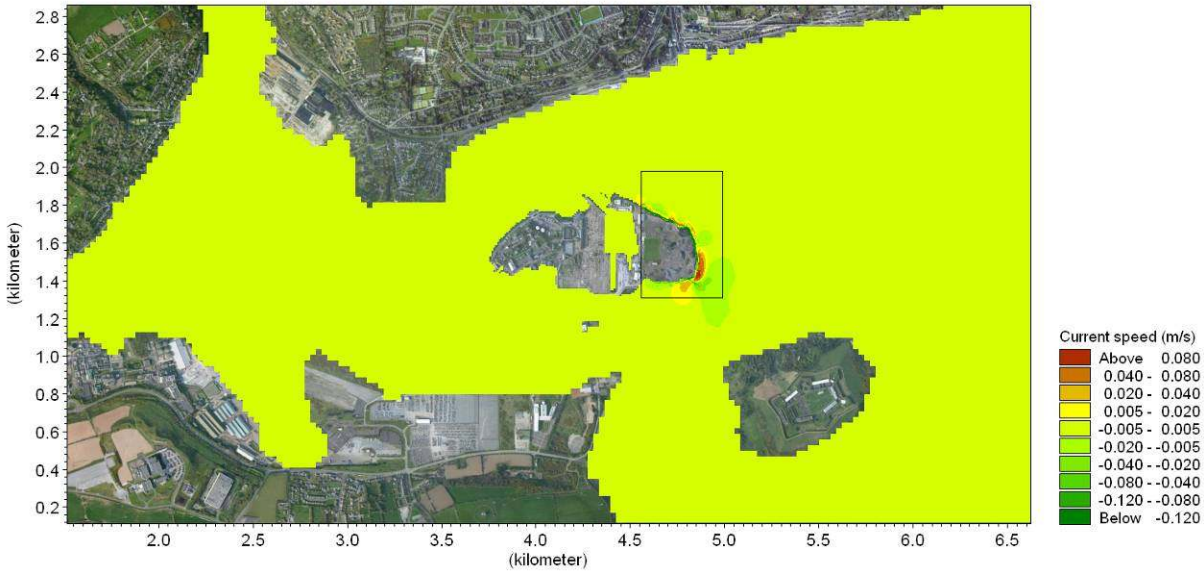

Figure 2.18: Scenario C Change in Current Speed on Flood

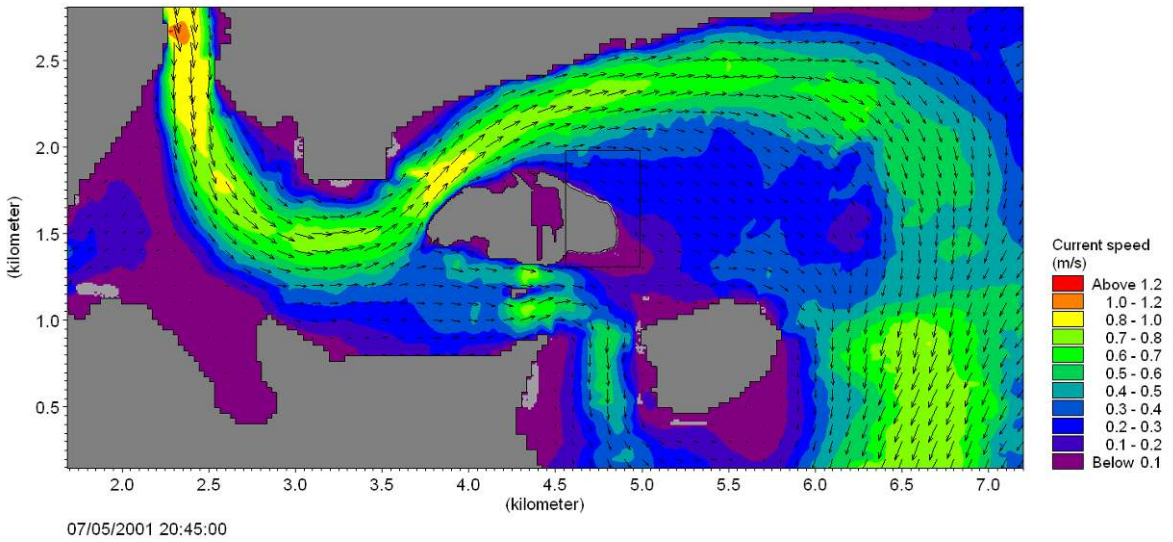

Figure 2.19: Scenario C Spring Current Speed on Ebb tide

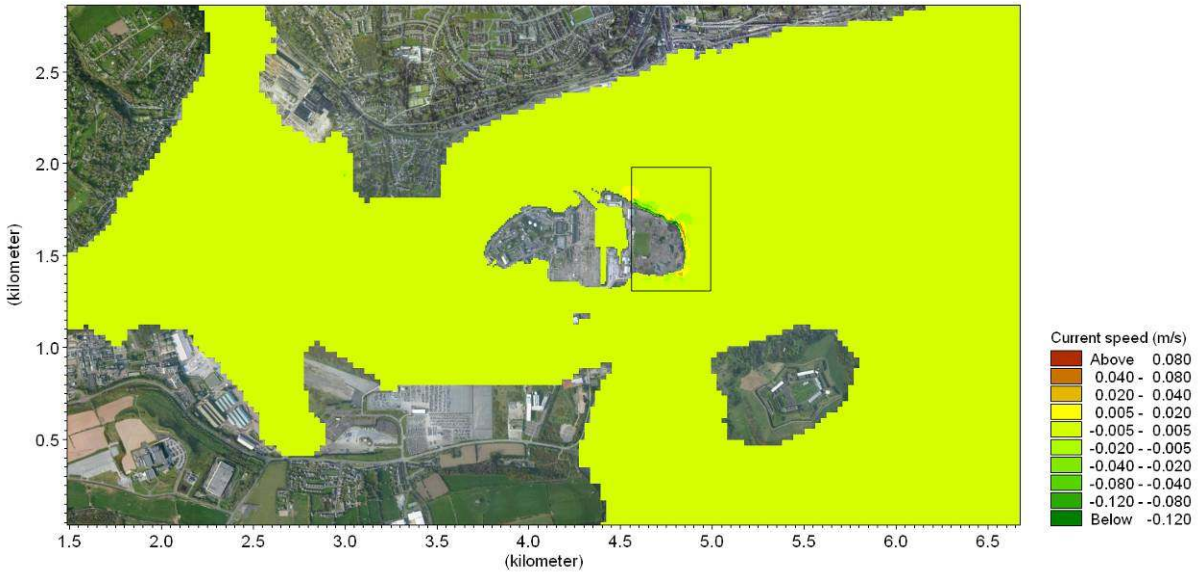

Figure 2.20: Scenario C: Change in Current Speed on Ebb tide

Figures 2.21 and 2.23 present peak velocities for flood and ebb tides for Scenario D. Pre and post works differences are limited to a small area with the change in peak current speed as illustrated in Figure 2.22 and Figure 2.24 for flood and ebb respectively.

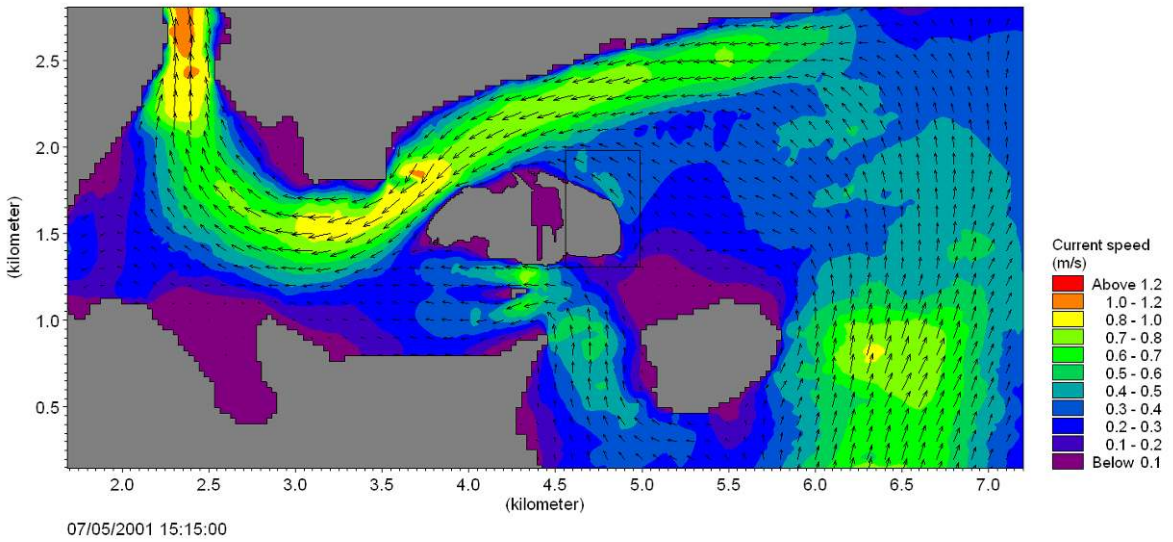

Figure 2.21: Scenario D: Spring Current Speed on Flood tide

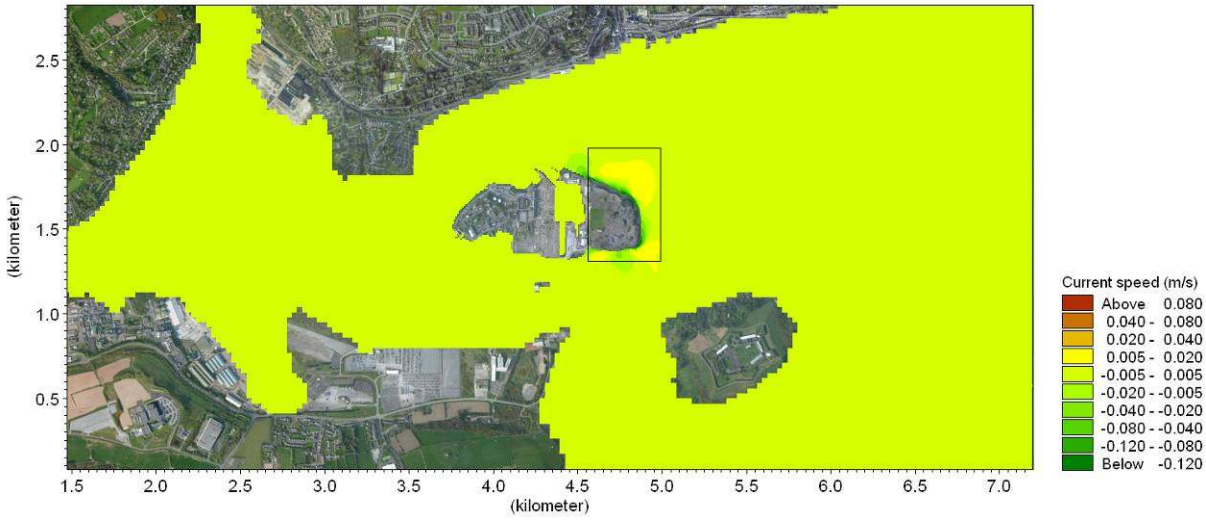

Figure 2.22: Scenario D: Change in Current Speed on Flood tide

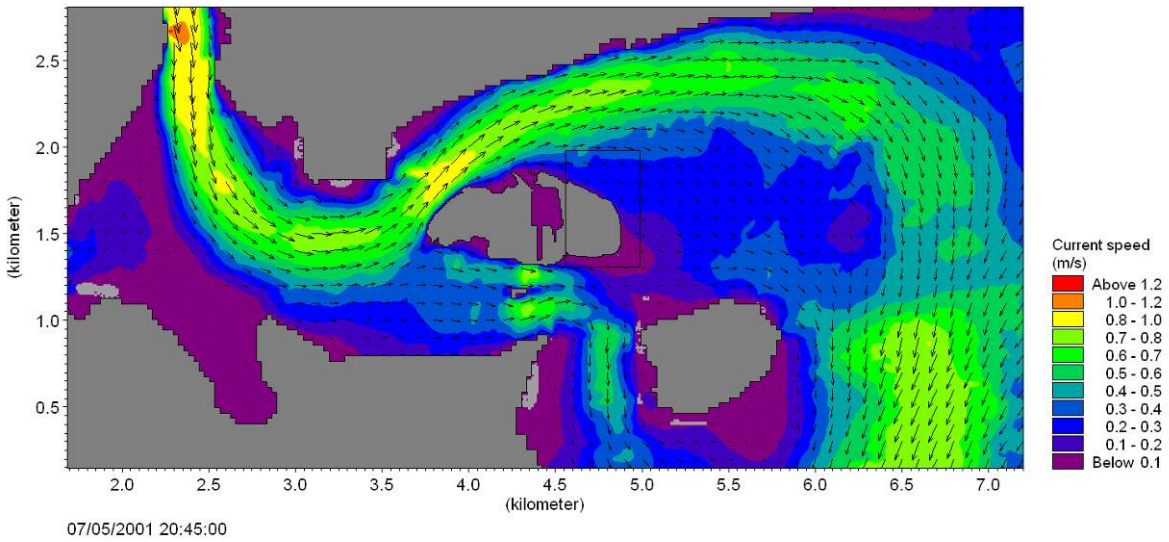

Figure 2.23: Scenario D: Spring Current Speed on Ebb tide

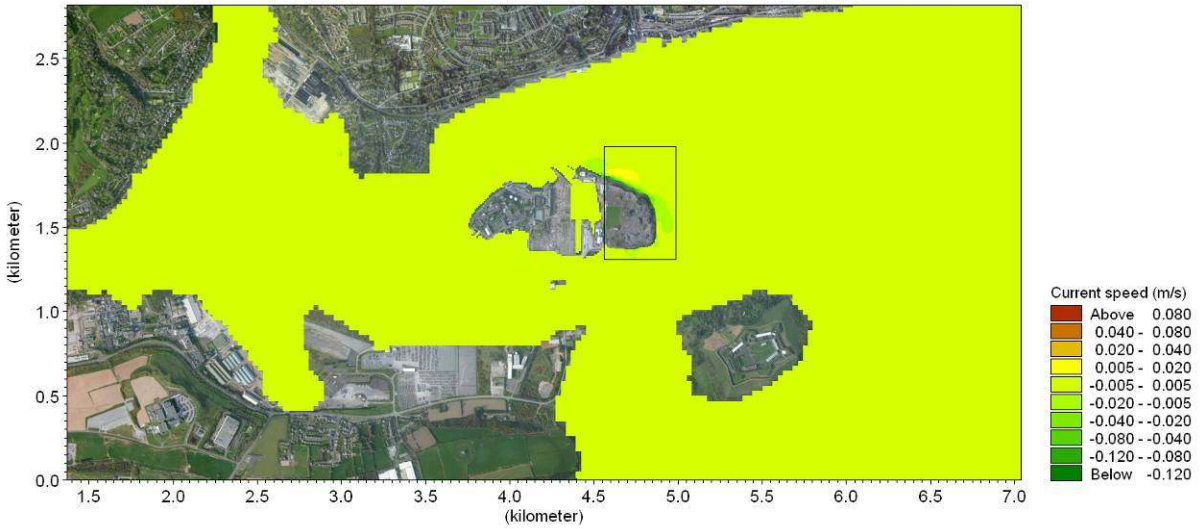

Figure 2.24: Scenario D: Change in Current Speed on Ebb tide

2.2.3 Impact of Scenarios on Sediment Transport

The residual current is the average current over the tidal cycle and will determine the net sediment transport due to tidal forcing.

Therefore an evaluation of residual currents can be used to assess the impact of any change in bathymetry on the longer term sediment transport regime. The residual current for the existing bathymetry is presented in Figure 2.25.

Changes in residual current speed for each of the scenarios A, B, C, and D respectively are shown below on Figure 2.27 to Figure 2.29. For Scenarios B and C, i.e. including the bulk excavation in the foreshore, the change is in range of -0.03 m/s to +0.03m/s. For the keystone trench (Scenario A) and the cofferdam along the line of the outer edge of the bulk excavation (Scenario D) a change of -0.03 m/s to +0.01m/s range can be seen. These changes have a very small magnitude and would not affect areas outside the immediate vicinity of the works.

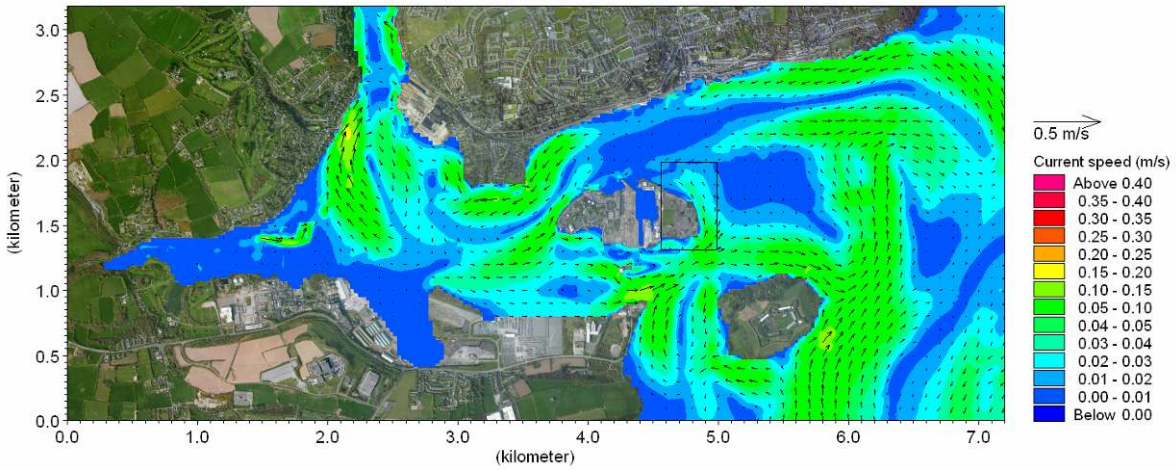

Figure 2.25: Residual spring tidal flow regime - Existing bathymetry at Haulbowline

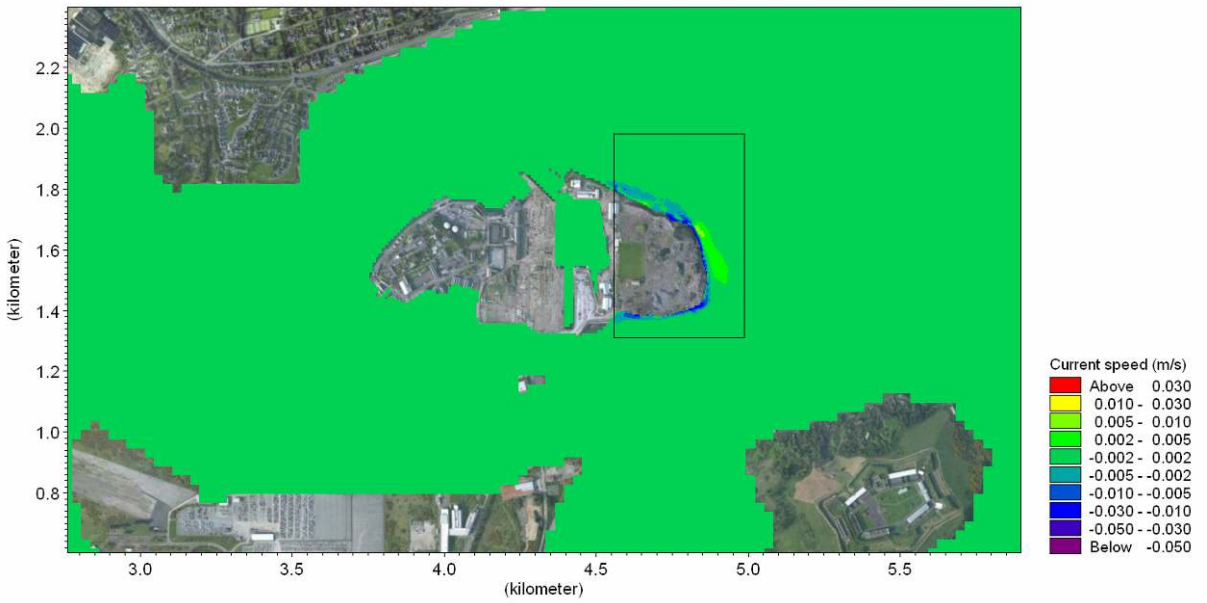

Figure 2.26: Scenario A: Difference in spring residual tidal regime – with development minus existing

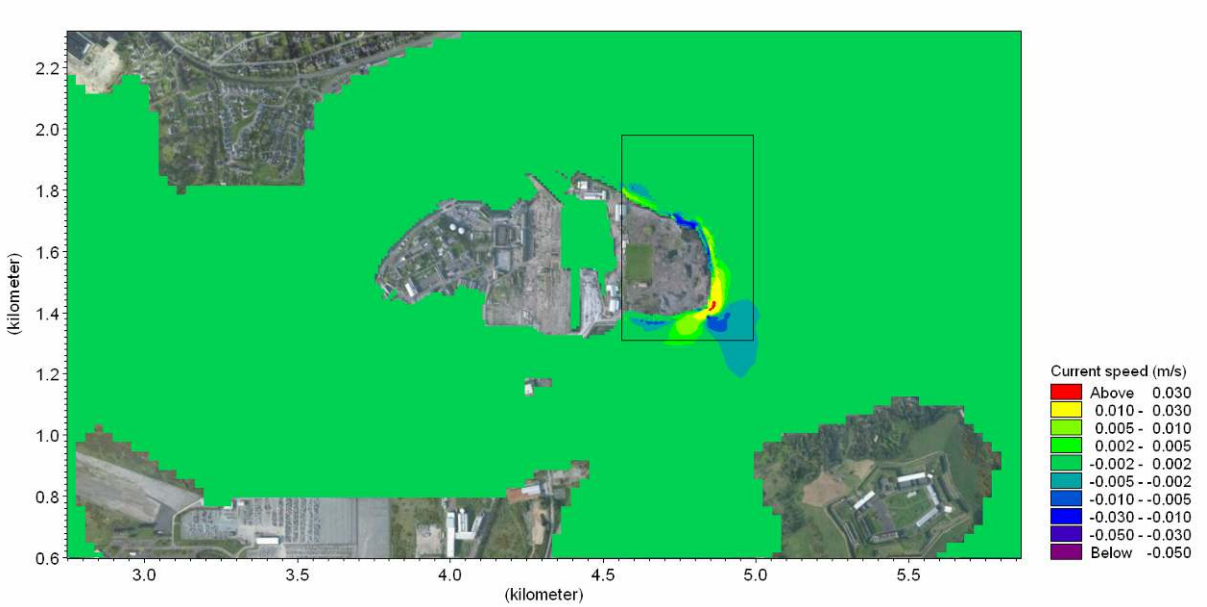

Figure 2.27: Scenario B: Difference in spring residual tidal regime – with development minus existing

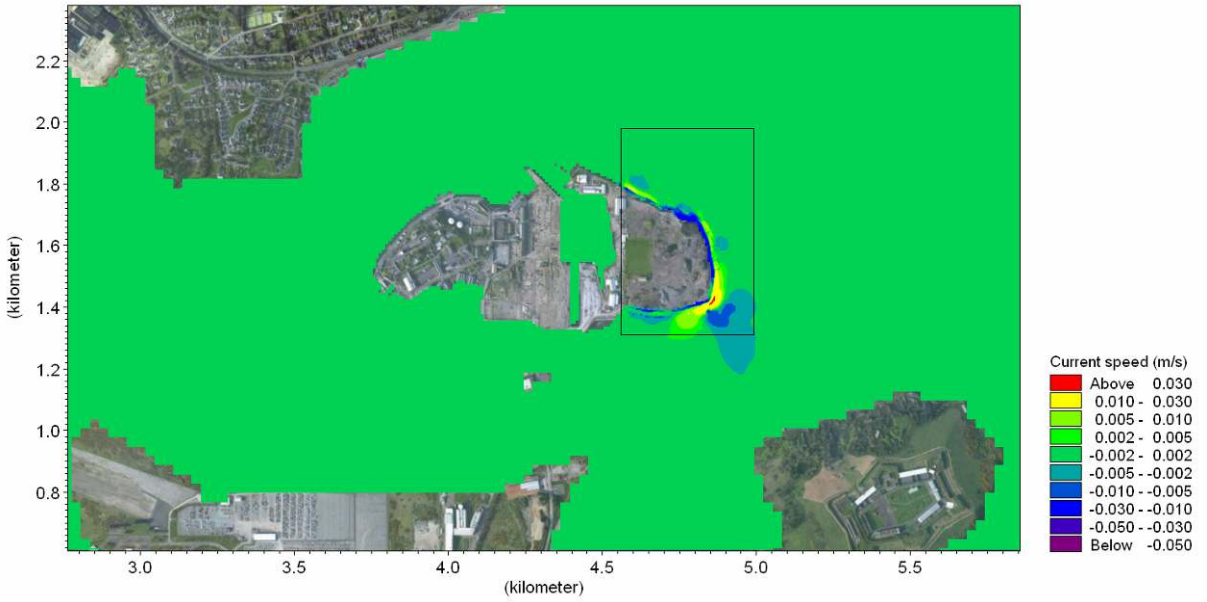

Figure 2.28: Scenario C: Difference in spring residual tidal regime – with development minus existing

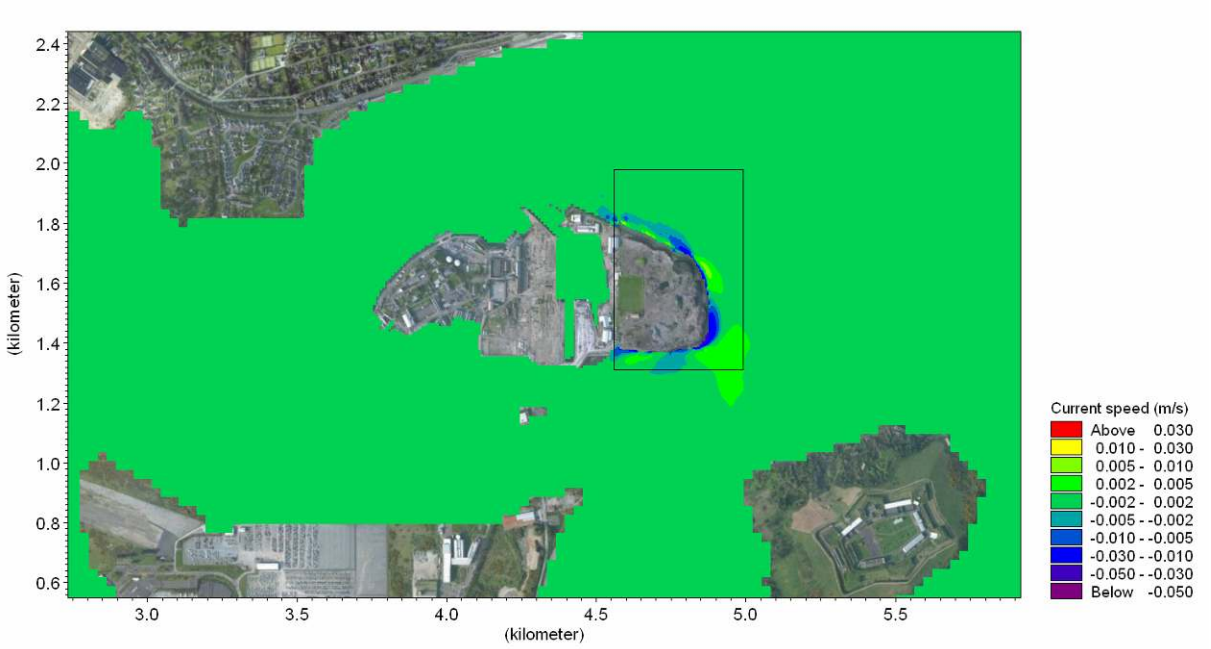

Figure 2.29: Scenario D: Difference in spring residual tidal regime – with development minus existing

2.2.4 Wave Climate

The proposed PES and associated rock armour revetment are on a "lee shore" in relation to the wave climate within Cork Harbour. Therefore the PES and rock armour will not significantly affect either the wave generation or propagation within the harbour area. In addition the Haulbowline Island East Tip area is not subjected to significant long period wave disturbance. Consequently the proposed development would not have a significant impact on either the wave climate or wave driven currents in the Cork Harbour area.

The sediment transport regime around the Haulbowline area of Cork Harbour is governed by the interaction of the tidal currents and waves with sediment material on the sea bed. As the examined scenarios have no significant impact on either the waves or the tidal currents away from the immediate area of the construction, the proposed land reclamation and revetments will have no impact on the sediment transport regime of Cork Harbour. It is expected that there will be some minor redistribution of sediments in the immediate area around the site.

3 SEDIMENT PLUME MODELLING

Sediment plume dispersion modelling was undertaken for this study using the MIKE 321npa model. This is a quasi 3-D particle tracking model that uses the depth integrated (2-D) hydraulic flow regime generated by the hydrodynamic module, MIKE21 nHD (see Section 2 of this report) to simulate the transport and fate of material discharged to the water column. The model can include variable graded material and simulates the re-erosion of deposited sediment so it is particularly suitable for the simulation of sediment losses from dredging and foreshore excavation operations.

3.1 SEDIMENT MODELLING SCENARIOS

The sediment transport simulations were carried out over a period a conservatively short construction period of 29 days. This period was also sufficient to assess the impact of the construction activities over the full lunar cycle tidal cycle. This assumed 'short' construction period also ensured that both the largest suspended sediment concentrations within the plume, occurring during neap tide, and the widest sediment plume, occurring at spring tide, were modelled. The tidal flows for the Scenario A and B provided the hydraulic input data relevant to the completed excavation work.

In these simulations the sediment was assumed to be released at 1m above the bed level. The sediment sources were modelled by releasing discrete particles during the excavation cycle and tracking their progress/fate within the model domain to produce predicted sediment plume concentrations and identify area of potential sediment deposition.

The physical parameters for the sediment was determined based on an analysis of twelve seabed sediment samples from the Haulbowline East Tip site. These samples were analysed by Glantreo Physical Testing Laboratory in Cork as part of the study. The information from the various samples shows consistently that the material to be excavated is predominantly fine grey silty sand. The results from the sample analysis were used in the model in order to derive the typical sediment grading of the dredged material, shown in Table 3.1.

Table 3.1: Grain size distribution and occurrence

Grain Dia [mm]	% Occurrence
3	8.6
1.5	18.5
0.667	11.2
0.333	10
0.133	17.5
0.083	23
0.02	11.2

For the purposes of this study sediment plume modelling simulations predict the dispersion and fate of sediments released to the water column during the excavation for **Scenarios A** and **Scenario B**.

Excavation of the keystone trench (Scenario A) would require approximately 2700m^3 material to be removed to achieve a 2m deep and 900m long and 1.5m wide trench. The quantity of sediment released into the water column during one month continuous excavation period was conservatively estimated as 10%, giving 270m^3 of sediment released into the water column. This estimated sediment loss was based on typical marine dredging operations with and additional allowance for washout. For the purposes of modelling it was conservatively assumed that two dredgers/excavators moving from either end of the trench would be used giving an average release of 0.144kg/s of sediment from each source. This assumption minimises the assumed construction period and thereby maximises the rate of sediment release into the water column during the construction process.

Sediment transport modelling for the Scenario B assumed that approx. 23,900m^3 of material would be excavated from the foreshore area. As in the case of Scenario A the excavation work activity was assumed to last 29 days (worst case assumption for maximum concentration of sediment loss) with two excavation crews simultaneously moving from either end of the trench over this period. Therefore the modelling encompassed the entire zone of the excavation, with the discharge source moving across the width of the excavation. In this case the washout rate was assumed to be restricted with each source releasing an average 0.64 kg/s of material based on a 5% volume release. This gave in total 1,195m^3 of released material during the excavation activity.

3.2 RESULTS OF THE SEDIMENT DISPERSION SIMULATIONS

Evaluation of the hydrodynamic results indicated that sediment dispersion and deposition was expected to be limited to the immediate vicinity of the excavation. Other areas in Cork Harbour remote from the works site are expected to remain largely unaffected by the PES construction.

The results of the excavation simulations for both Scenario A and Scenario B are shown graphically by a series of model output diagrams. The figures show the sediment deposition depths at the completion of the dredging as well as the average value envelopes for the suspended sediment concentrations. The maximum sediment deposition depth envelopes are also shown for the deposition of sediment during the dredging for both Scenarios. For the sedimentation plots the layer thickness takes account of the relatively high void ratio of the deposited material, which would not be consolidated in the short term.

Figure 3.1 and Figure 3.3 illustrate the maximum sediment deposition for Scenario A and Scenario B respectively. Maximum values of the sediment deposition on the figures represent peak value at each grid point in the model at any time during the simulation period even if the period of that peak value is very short. Figure 3.2 and Figure 3.4 show sediment deposition at the end of excavation process.

When comparing these plots it can be seen that sediment accumulates over the course of the dredging activity and remains in-situ following completion. It can also be seen that sediment depth for scenario B as expected is greater than for Scenario A. Sediment is temporarily deposited along the north shore of the Haulbowline Island and reaches a maximum depth of 50mm for Scenario A and 120mm for Scenario B at the entrance to the Haulbowline Island Harbour Basin. Much smaller levels of sedimentation are also experienced at shoreline locations where the tidal currents are much reduced. Away from these areas the deposition depth is very small and should not exceed 3mm. Negligible levels of sediment deposition may occur on the banks of the Oyster Bank. It should be noted that the modelling completed as part of this study adopted a conservative approach in that it does not include wave effects. Many of these inter-tidal locations would experience some level of sediment dispersion due to wave induced currents leading to lower levels of sedimentation than those predicted by this study.

It should be also noted that these peak values can be of a short duration and tend to occur during the turn of the tide and that the material can be re-suspended as the tidal currents pick up.

Where there is a significant concern in relation to potential deposition pre-works ‘in-survey’ followed by a post-works ’out-survey’ is recommended.

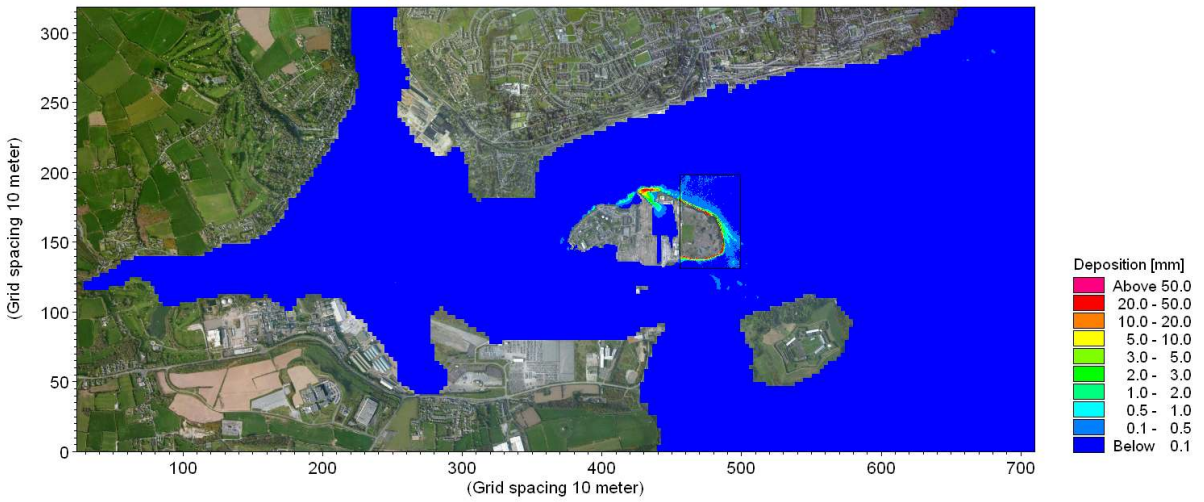

Figure 3.1: Scenario A: Maximum sediment deposition

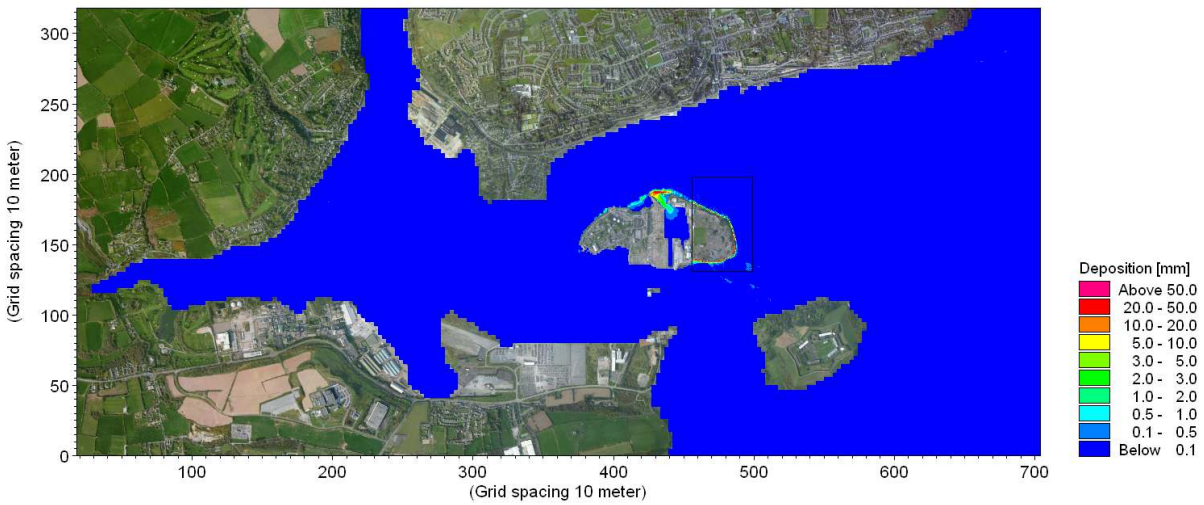

Figure 3.2: Scenario A: Sediment deposition at the end of the excavation activity

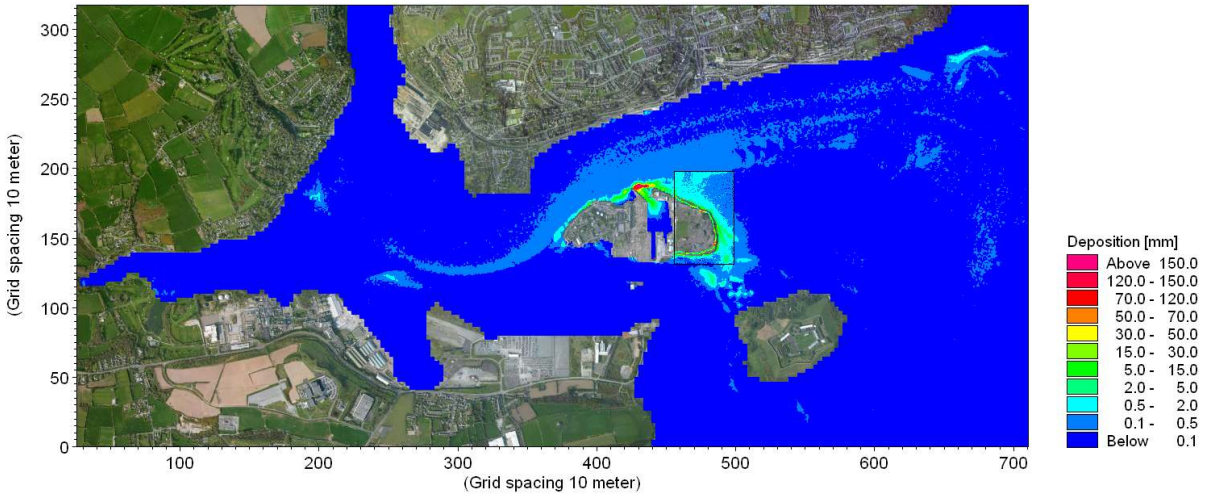

Figure 3.3: Scenario B: Maximum Sediment deposition

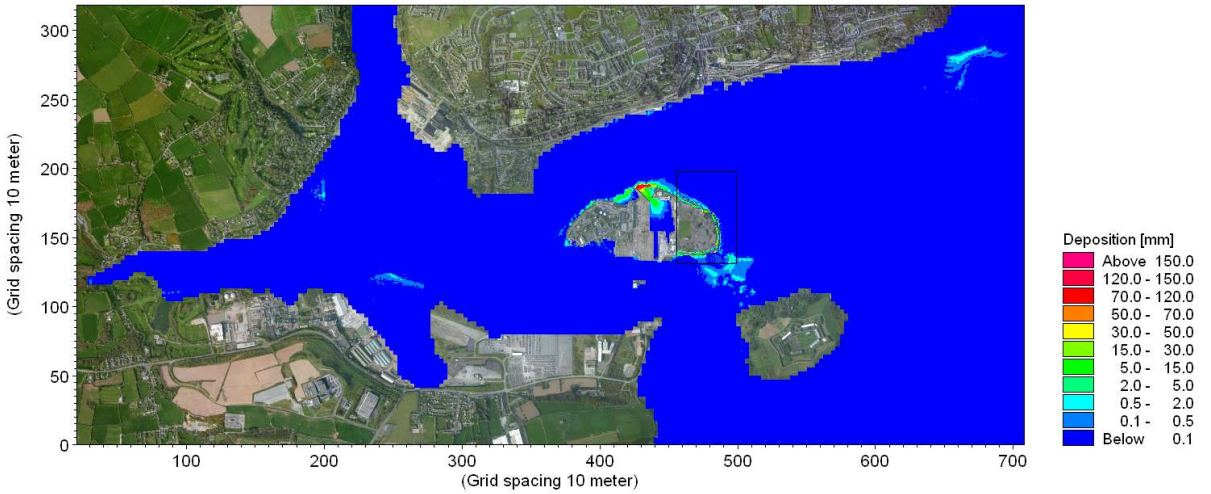

Figure 3.4: Scenario B: Sediment deposition at the end of the excavation activity

The concentration of suspended sediment within the water column during the course of the dredging was examined. Maximum sediment concentrations in the water column are shown in Figure 3.5 and Figure 3.6 below for Scenarios A and B respectively. The plume from the excavated material extending from the site is clearly visible with a reduced concentration at increased distances from the works area. These maximum levels are in the immediate vicinity of the works and generally remain less that 0.5 kg/m^3 (500mg/l) for Scenario A and 2 kg/m^3 (2000mg/l) for Scenario B.

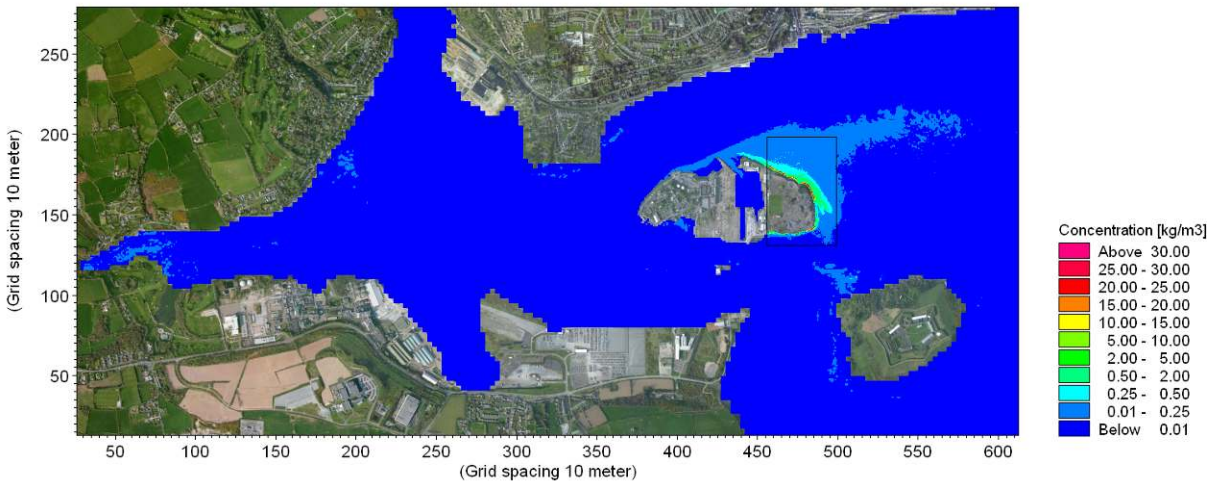

Figure 3.5: Scenario A: Maximum suspended solids concentration - water column

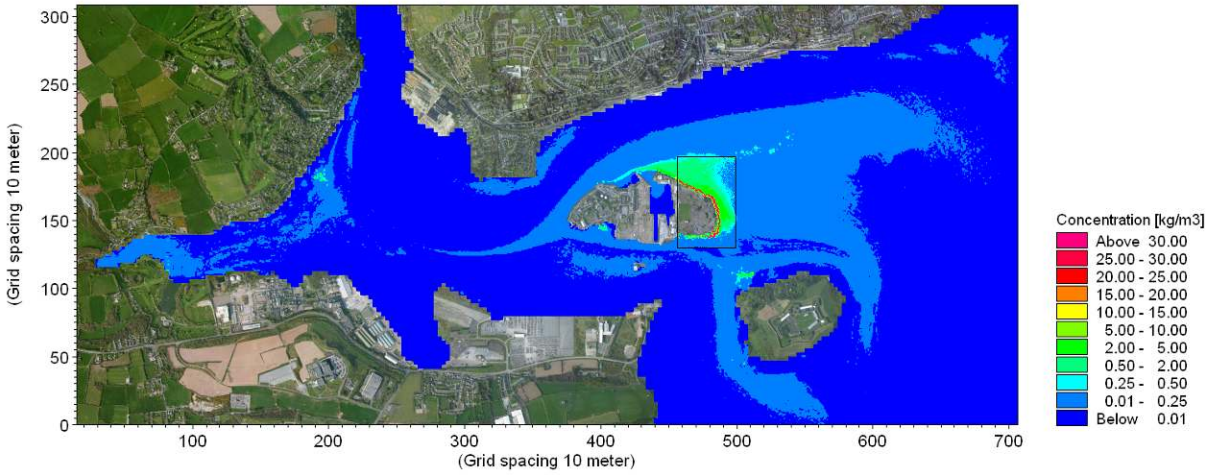

Figure 3.6: Scenario B: Maximum suspended solids concentration - water column

Similarly, Figure 3.7 and Figure 3.8 show peak suspended solids concentration at the bottom 0.5m of the water column. The extent of the plume in the bottom 0.5m is, as expected, larger than in the water column but the concentration reaches similar values.

It should be noted that 'peak' sediment concentration means the model predicted maximum concentration within the plume during the simulation period. This is a conservative concentration as the 'peak' may occur only for a short period of time and may over-estimate the longer term concentration in the sediment plume.

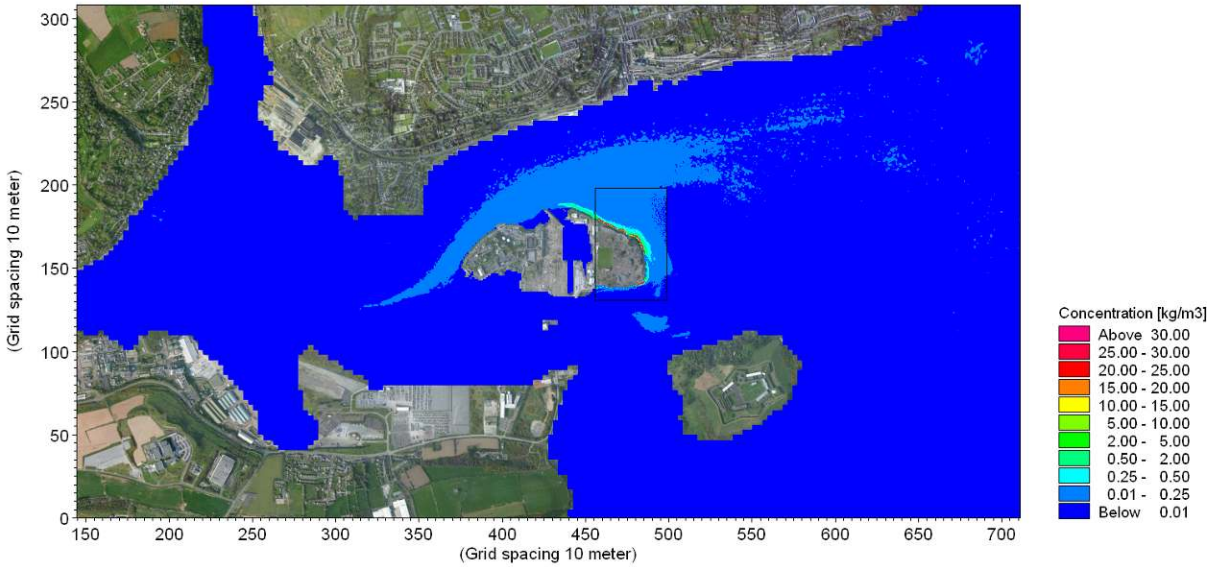

Figure 3.7: Scenario A: Maximum suspended solids concentration - bottom 0.5m

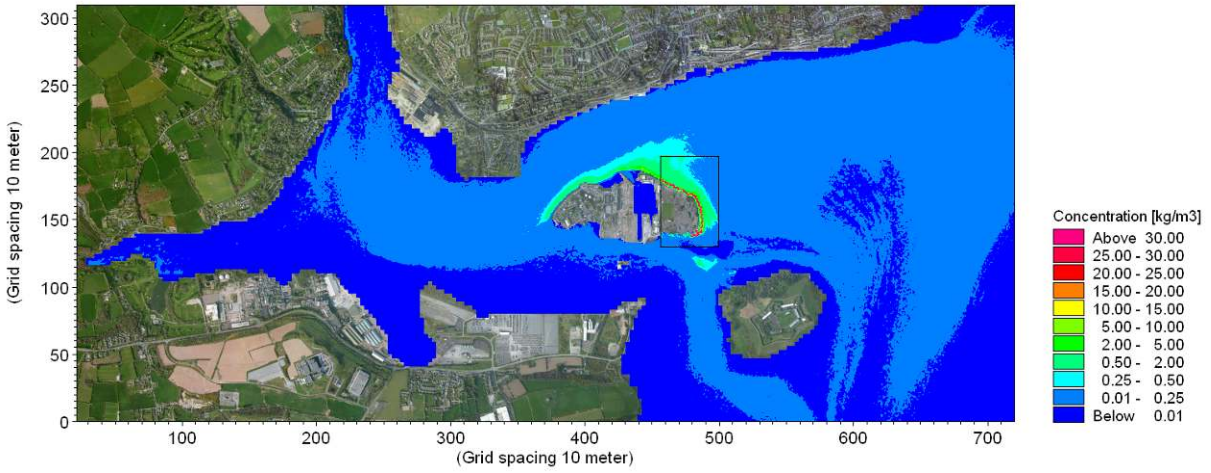

Figure 3.8: Scenario B: Maximum suspended solids concentration - bottom 0.5m

Figure 3.9 and Figure 3.10 illustrate average plume concentration in the water column respectively for Scenarios A and B. Average suspended solids concentrations for Scenario A remain less then 0.02 kg/m^3 (20mg/l) and less than 0.1 kg/m^3 (100mg/l) for Scenario B. In some isolated inter-tidal regions this level is increased due to re-suspension of deposited material, however as discussed earlier, this sedimentation is likely to be over-predicted due to the wave induced dispersion which would occur in these regions but is not included within the model.

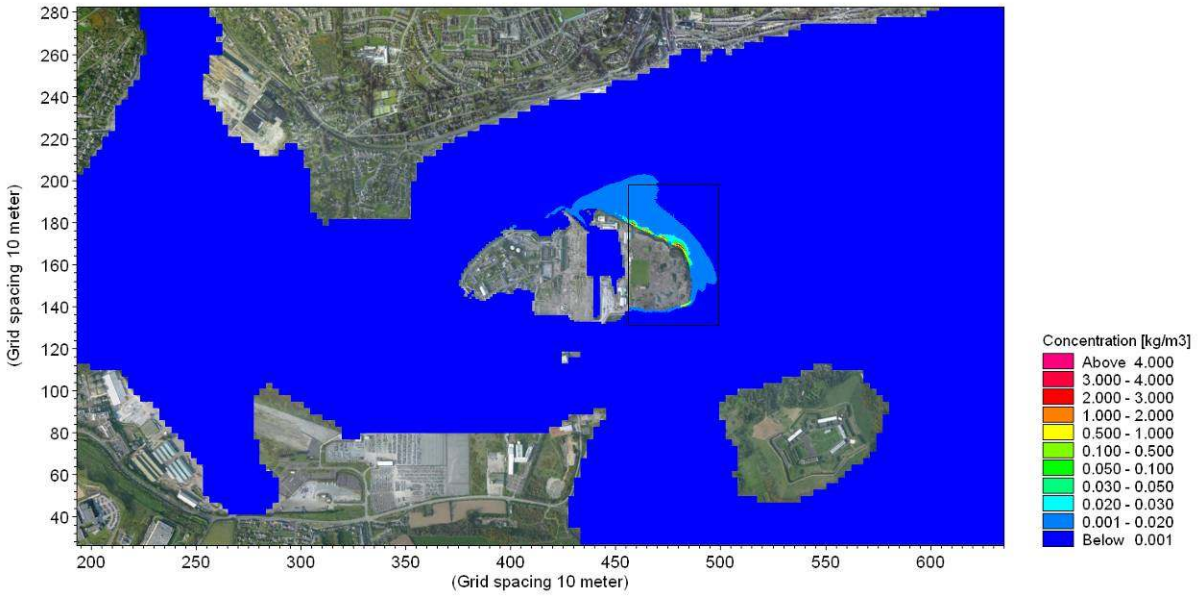

Figure 3.9: Scenario A: Average suspended solids concentration – water column

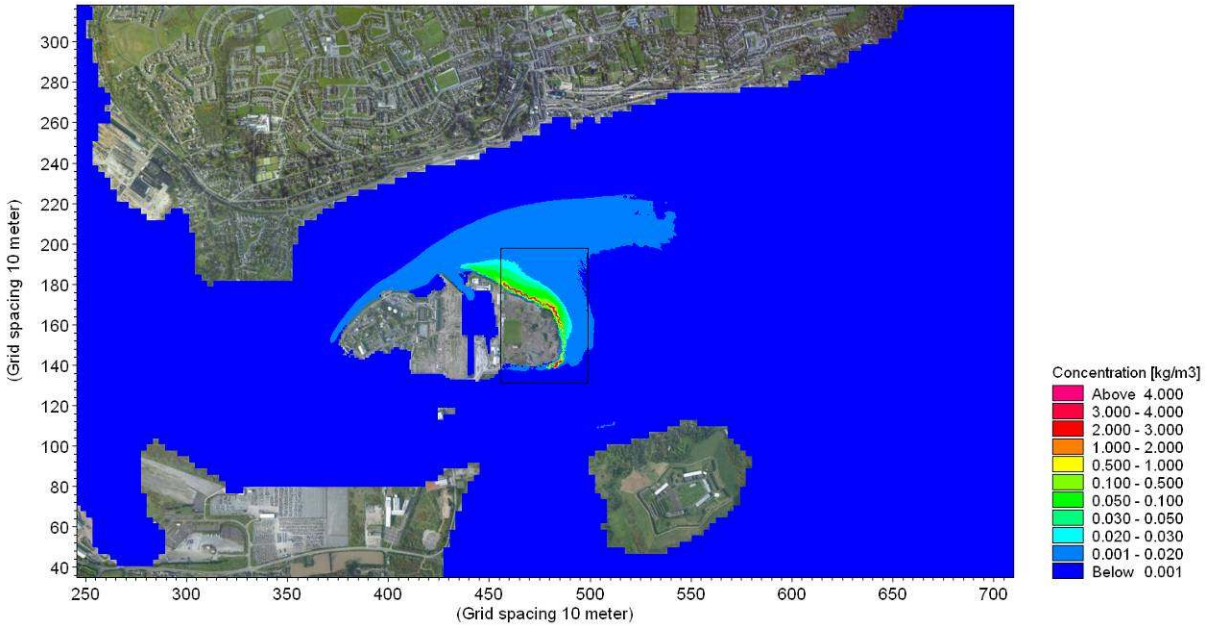

Figure 3.10: Scenario B: Average suspended solids concentration – water column

Average suspended solids concentration in the bottom 0.5m is presented in Figure 3.11 for the keystone trench scenario and in Figure 3.12 for the bulk excavation scenario. Values in close vicinity of the construction in both cases are similar to those reported in the water column but the plume envelope has greater extent. Although the extent of the plume in Scenario B seems to be more widespread the values far from the site do not exceed 0.03kg/m^3 (30mg/l).

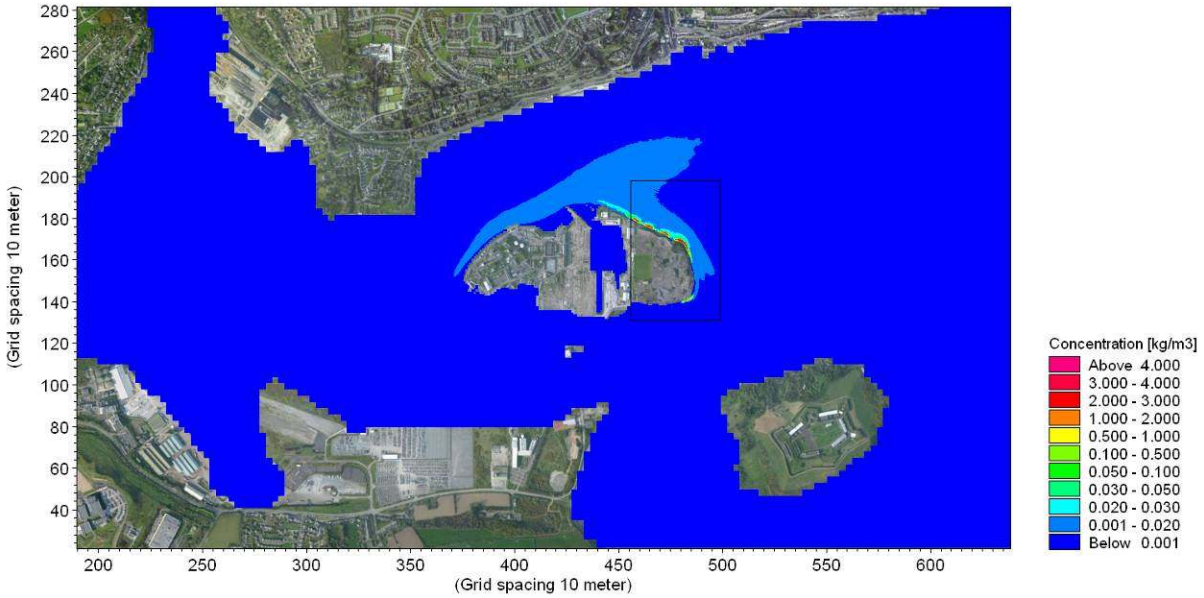

Figure 3.11: Scenario A: Average suspended solids concentration – bottom 0.5m

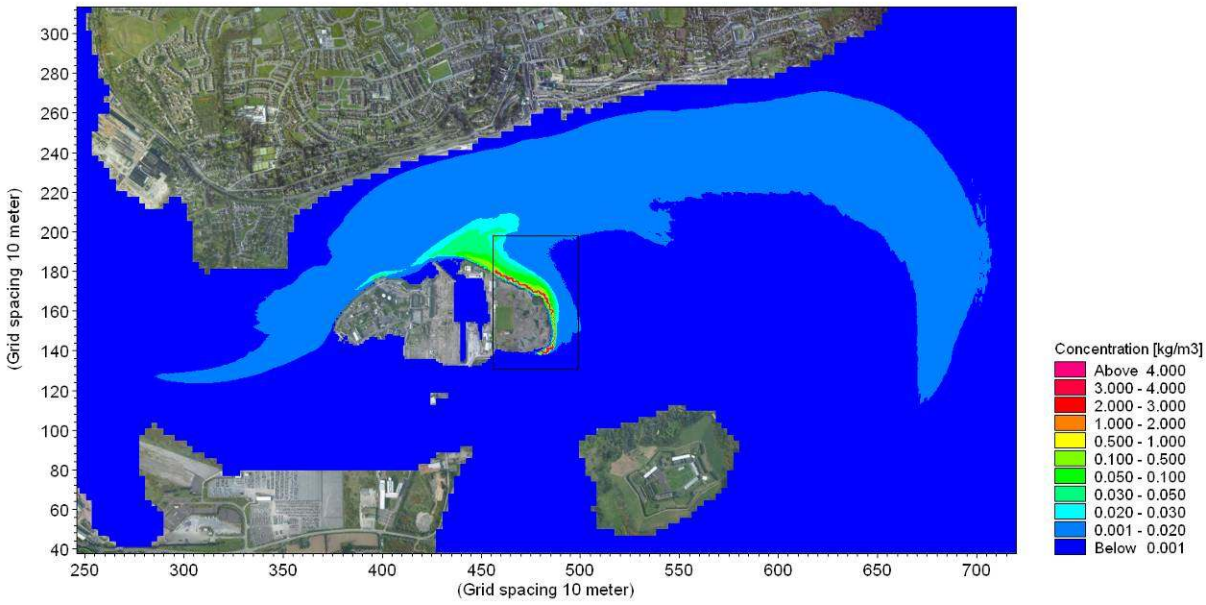

Figure 3.12: Scenario B: Average suspended solids concentration – bottom 0.5m

4 CONCLUSIONS

The potential effects of the proposed remediation project and associated rock armour revetment at Haulbowline on the coastal processes of Cork Harbour have been investigated using numerical models. Four scenarios have been examined using industry standard hydrodynamic modelling tools. Two scenarios (A and B) simulated potential sediment plumes over a conservatively short one month construction period on the foreshore.

The hydraulic flow model simulations showed that there were no changes in the flow regime away from the immediate area around the PES. Even the changes in current velocities in the immediate vicinity of the construction area were predicted to be very small, typically in the range -0.4 to +0.04m/s. Residual currents are predicted to be affected in a range of -0.03 m/s to +0.03m/s, with no increase in water level. The predicted changes to currents are considered to be not significant. The proposed development will have no significant impact of the wave climate in the area and will not affect the overall sediment transport regime in Cork Harbour. Thus it is concluded that the proposed developments at Haulbowline Island will not have a significant impact on the coastal processes of Cork Harbour.

Sediment deposition at the end of the dredging process is conservatively predicted to reach a depth of 50mm for scenario A and 120mm for scenario B at the entrance to the Haulbowline Island Harbour Basin. These depths would be localised and not very significant particularly when the conservative model assumptions are taken into account. Pre and post construction bathymetric surveys in the area would confirm the significance of any deposition in this area. If following these surveys localised sediment deposition is identified this could be removed as part of the 'tidy-up' at the end of the dredging period. No measurable amounts of material will be deposited further away from Haulbowline Island. Specifically, no measurable sedimentation is predicted in the main navigation channel or in the area of the turning circle for the Port of Cork's Cobh Cruise terminal.

During the course of the excavation work for both Scenarios A and B average suspended solid concentrations are predicted to remain largely below 100mg/l and is therefore considered not to be significant in the context of the water quality in this area of Cork Harbour.

In the long term it is expected that there will be some minor localised redistribution of sediments in the immediate area around the perimeter engineered structure but this is not expected to be significant.

APPENDIX D

AA Screening Report

East Tip Remediation Project, Haulbowline, Co Cork

Article 6 Appropriate Assessment and Article 12 Screening Report

January 2013

East Tip Remediation Project, Haulbowline, Co Cork

Article 6 Appropriate Assessment and Article 12 Screening Report

DOCUMENT CONTROL SHEET

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Project Title	East Tip Remediation Project, Haulbowline, Co Cork					
Document Title	Article 6 Appropriate Assessment and Article 12 Screening Report					
Document No.	RPS/MCE0734RP0003F01					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
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AA SCREENING REPORT

1 INTRODUCTION

Haulbowline Island is located within Cork Harbour, between Cobh to the north and Ringaskiddy to the south. It is connected to the mainland at Ringaskiddy via a bridge which transverses Rocky Island. The Headquarters of the Irish Naval Service is situated on the western portion of the Island with the Naval Dockyard to the east. Separating these is the site of former Irish Ispat Steelworks. To the east of the Naval Dockyard is the East Tip, an area of land reclaimed from the Spit Bank by infilling with processing waste from the steelworks.

The objective of this project is the remediation of the East Tip, which is approximately 9 hectares. The entire East Tip area is owned by the Irish State.

An Environmental Impact Statement (EIS) will be prepared to support the necessary applications for planning approval (to An Bord Pleanála) and waste licensing (to the Environmental Protection Agency). A Foreshore licence will also be sought from the Department of the Environment, Community & Local Government).

The approach to the waste licence application for the East Tip will differ from that of a conventional waste licence application in that the waste facility is technically in-situ and thus a licence is being sought to approve a proposed design solution to remediate the site.

The proposed development will consist of the construction of a perimeter engineered structure around the waste body and an engineered capping system on top of the waste body. The resulting area will be landscaped to facilitate exploitation of the site for amenity usage, if desired. . Consent will also be sought for construction of a slipway and floating pontoon in the southeast of the site.

This report presents an Appropriate Assessment Screening of the proposed works as required under Article 6 of the EU Habitats Directive (*Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora*) and includes assessment of potential impacts on Annex IV species as required under Article 12 of the Directive.

The purpose of the assessment is to examine the possibility that the proposed works, either individually or in combination with other plans and projects, may result in significant negative effects on the Conservations Objectives and the integrity of any Natura 2000 site.

The proposed works are located within Cork Harbour, which supports two Natura 2000 sites. *Cork Harbour* Special Protection Area (SPA) (site code 004030), which is comprised of several non-contiguous areas around the Harbour, the closest of which to Haulbowline is at Lough Beg 1.4km to the south; and *Great Island Channel* candidate Special Area of Conservation (cSAC) (site code: 001058) which is located 4.2km to the north of Haulbowline. The potential for adverse effects on the Conservation Objectives of these sites or on any Habitats Directive Annex IV species outside these sites is the focus of this Report.

This Screening Report includes an assessment of the potential for the proposed works to result in deliberate disturbance; deliberate destruction of breeding sites or resting places; or deliberate killing, of any Habitats Directive Annex II or IV species; all of these impacts are prohibited under Article 12 of the Directive.

2 ASSESSMENT METHODOLOGY

2.1 Requirements of Article 6 of the Habitats Directive

The requirement for Appropriate Assessment (AA) (also known as 'Habitats Directive Assessment') of plans or projects originates from Article 6 (3) and (4) of *European Union (EU) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora*, commonly known as the 'Habitats Directive', which is implemented in Ireland through the European Communities (Natural Habitats) Regulations of 1997. The wording of Article 6 (3) of the Directive is as follows:

> '*Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public*.'

The wording of Article 6 (4) of the Directive is as follows:

> '*If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.*'

Appropriate Assessment Guidelines for Planning Authorities were published by the Department of the Environment Heritage and Local Government in February 2010 (DoEHLG, 2010). The AA process in the Republic of Ireland should be conducted in full consultation with the National Parks and Wildlife Service. In addition to the advice available from NPWS, the EU has published a number of documents which provide guidance on the requirements of Appropriate Assessment, including, *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites - Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, (EC, 2002), which sets out the principles of how to approach decision making during the process and these have been followed as closely as possible.

The assessment is prepared with reference to the following additional guidelines:

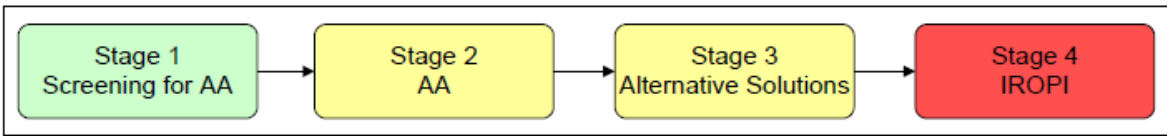
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg (EC, 2000);
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission; (EC, 2007);
- European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1989 – 2001; and
- Interpretation Manual of European Union Habitats. Version EUR 27. European Commission 2007.

2.2 Article 6 Appropriate Assessment Methodology

The Department of the Environment Heritage and Local Government guidelines (DoEHLG, 2010) outline the European Commission's methodological guidance (EC, 2002) promoting a four-stage process to complete the AA, and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

The four stages are summarised diagrammatically below. Stages 1-2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of the Article 6(3) Assessment or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

The Four Stages of Appropriate Assessment



2.2.1 Stage 1: Screening for Appropriate Assessment

This stage of the AA process involves establishing whether or not the plan or project requires Stage 2 Appropriate Assessment. This is determined by examining if it will have a significant effect on the conservation objectives of any Natura 2000 site. If significant effects cannot be excluded, on the basis of objective information, then the site in question is 'screened-in' and Stage 2 assessment is undertaken. The Screening process requires an initial review of the project to identify any elements of either construction, operation or decommissioning that might potentially have impacts upon Natura 2000 sites; and a review of the 'Qualifying Features' and 'Conservation Objectives' of all Natura 2000 sites that could potentially be subject to the impacts that have been identified. Whether or not impacts are likely to be of significance is then determined.

If the effects are deemed to be significant, potentially significant, or uncertain, or if the Screening process becomes overly complicated, then the process must proceed to Stage 2 (AA). Screening should be undertaken without the inclusion of mitigation, unless potential impacts clearly can be avoided through the modification or redesign of the plan or project, in which case the Screening process is repeated on the altered plan or project. The greatest level of evidence and justification will be needed in circumstances when the process ends at the Screening Stage on grounds of no impact. This report provides the information necessary to enable the appropriate authority to screen the proposed works for the requirement to prepare an Appropriate Assessment.

2.2.2 Natura 2000 Sites Included in the Screening Assessment

Clearly a key variable that will determine whether or not a particular Natura 2000 site is likely to be affected by the proposed works is its physical distance from the project site, and it will generally, but not necessarily, be the case that the greater the distance the smaller the possibility of impacts. The *Guidelines for Planning Authorities* (DoEHLG, 2010) state that the AA process should include the following Natura 2000 sites:-

1. *Any Natura 2000 sites within or adjacent to the plan or project area.*

The closest Natura 2000 site the proposed works is *Cork Harbour* SPA at Lough Beg (see 2. below), located approximately 1.4km from the proposed works site, and hence not adjacent. No sites are therefore included under this criterion.

2. Any Natura 2000 sites within the likely zone of impact of the plan or project. A distance of 15km is currently recommended in the case of plans, and derives from UK guidance (Scott Wilson *et. al.*, 2006). For projects, the distance could be much less than 15km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects.

Two Natura 2000 sites are located within Cork Harbour; *Cork Harbour* SPA (site code 004030), which is comprised of several non-contiguous areas around the Harbour, the closest of which to Haulbowline are at Lough Beg 1.4km to the south and at Monkstown Creek 2.2m to the west; and *Great Island Channel* candidate Special Area of Conservation (cSAC) (site code: 001058) which is located 4.2km to the north of Haulbowline. It is considered that due to the potential for water-borne contamination of these sites, both potentially lie within the zone of influence of the proposed works and the potential for adverse effects on the Conservation Objectives of these sites is therefore considered in this Screening Assessment.

3. Natura 2000 sites that are more than 15km from the plan or project area depending on the likely impacts of the plan or project, and the sensitivities of the ecological receptors, bearing in mind the precautionary principle. In the case of sites with water dependent habitats or species, and a plan or project that could affect water quality or quantity, for example, it may be necessary to consider the full extent of the upstream and/or downstream catchment.

The next closest Natura 2000 site to the proposed works at Haulbowline is *Ballycotton Bay* SPA (site code 004022), 17km to the east and impacts on this and other more remote coastal SPAs and cSACs are not considered possible due to the large distances from the proposed works and the large areas of deep oceanic water that lie between the works location and the sites, which would buffer and dilute any possible contaminating chemical to such an extent that significant toxic effects could not be anticipated. Hence, it is not considered that further AA Screening of these sites, or of any other Natura 2000 sites, is required. **Table 2.1** presents details of the Natura 2000 sites considered further in this Screening Report.

Table 2.1: Natura 2000 Sites Included in this Screening Assessment

Site Name	Designation Type	Site Code	Approximate Location Relative to Proposed Works
Cork Harbour	SPA	004030	Haulbowline site is 1.4km to the north of Lough Beg section; and 2.2km to the east of Monkstown Creek section of the SPA
Great Island Channel	cSAC	001058	Haulbowline site is 4.2km to the south of the cSAC in a direct overland line and 5.9km by a route over the sea

2.3 Requirements of Article 12 of the Habitats Directive

The *European Union (EU) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora*, is commonly known as the 'Habitats Directive' and is implemented in Ireland through the European Communities (Natural Habitats) Regulations of 1997.

Articles 12 and 16 of the Habitats Directive are aimed at the establishment and implementation of a strict protection regime for animal species listed in Annex IV(a) of the Directive within the whole territory of Member States, i.e in locations outside protected areas as well as inside their boundaries. Articles 12 (1) and 12 (3) are relevant to the current assessment. The wording of Article 12 (1) of the Directive is as follows:

> *1. Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range, prohibiting:*
>
> *(a) all forms of deliberate capture or killing of specimens of these species in the wild;*
> *(b) deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;*
> *(c) deliberate destruction or taking of eggs from the wild;*
> *(d) deterioration or destruction of breeding sites or resting places.*

The wording of Article 12 (3) of the Directive is as follows:

> *3. The prohibition referred to in paragraph 1 (a) and (b) and paragraph 2 shall apply to all stages of life of the animals to which this Article applies.*

This assessment is prepared with reference to the "*Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC (EC, 2007c), which states that: "The interpretation of Article 12 has to take into consideration the objective of Directive 92/43/EEC55 set out in Article 2, which applies, without distinction, to all Annexes. Consequently, strict protection measures adopted under Article 12 should aim to fulfil the main objective of the Directive by contributing to the maintenance or restoration, at favourable conservation status, of Annex IV(a) species of Community interest, while taking into account economic, social and cultural requirements and regional and local characteristics*." (EC, 2007c).

Hence, this assessment examines the possibility that the proposed works might result in a failure to maintain the favourable conservation status of any Annex II or Annex IV species; and thereby may potentially be in breech of Article 12. Details of the Article 12 Assessment are presented in Section 7 of this Report.

Article 16 of the Habitats Directive relates to the derogations of Article 12 that are allowed to member states. Derogations are allowed for a variety of reasons; "Provided that there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range." Wherever derogations are implemented by a member state, detailed reports must be submitted to the commission every two years detailing such issues as the reasons for the granting of the derogation, the alternatives that were examined, the agencies involved, and so on.

2.3.1 Annex IV Species Considered in this Assessment

Field surveys of the site have been conducted during the period between August and December 2012, and desktop documentation has been reviewed, in order to identify any Annex II or Annex IV species that may be present in the vicinity of East Tip, Haulbowline and therefore subject to possible adverse effects resulting from the proposed works.

The East Tip site provides habitat for a very limited range of faunal species, however the waters of Cork Harbour which surround the site are suitable to support a range of Annex II and IV species. The species for which potentially suitable habitat might be present, and which may therefore potentially be effected by the proposed works are discussed by taxonomic group in Sections 7 and 8 of this Report; the relevant species are listed in **Table 2.2.**

Table 2.2: Habitats Directive Annex II and Annex IV species that could potentially occur in the vicinity of East Tip, Haulbowline

Common Name	Scientific Name	Habitats Directive Annex(es)
Otter	*Lutra lutra*	**II and IV**
Common Pipistrelle	*Pipistrellus pipistrellus*	**IV**
Soprano Pipistrelle	*Pipistrellus pygmaeus*	**IV**
Leisler's Bat	*Nyctalus leisleri*	**IV**
Daubenton's Bat	*Myotis daubentonii*	**IV**
Common (Harbour) Seal	*Phoca vitulina*	**II**
Grey Seal	*Halichoerus grypus*	**II**
Harbour Porpoise	*Phocoena phocoena*	**II and IV**
Bottle-nosed Dolphin	*Tursiops truncatus*	**II and IV**

3 DESCRIPTION OF THE PROPOSED WORKS

This Section presents a summary of the proposed works, which are not "directly connected with or necessary for the management of" any Natura 2000 site, and are not therefore exempt from Appropriate Assessment under the Article 6(3) of the Habitats Directive (see Section 2.1 of this Report).

3.1 Description of the Site of the Proposed Works

Further to European Court of Justice Ruling 494/01, Cork County Council, on behalf of the Irish State, is currently managing the regularisation of the East Tip on Haulbowline Island, which will entail an application for a waste licence, planning application and foreshore licence application.

Haulbowline Island is located within Cork Harbour, between Cobh to the north and Ringaskiddy to the south. It is connected to the mainland at Ringaskiddy via a bridge which transverses Rocky Island. The Headquarters of the Irish Naval Service is situated on the western portion of the Island with the Naval Dockyard to the east of it, in the central part of the island. Separating these is the site of former Irish Ispat Steelworks. The eastern part of the island is occupied by the East Tip, an area of land reclaimed from the Spit Bank by infilling with processing waste from the steelworks. The objective of this project is the remediation of the East Tip, which is approximately 9 hectares. The entire East Tip area is owned by the Irish State. The East Tip comprises wastes that were largely associated with the steel making process.

3.2 Description of the Proposed Works

The primary objective of this project is to remediate the East Tip thereby ensuring that potential risks to humans and the wider environment are minimised. The following sections describe the proposed remediation works and the other works associated with the end use of the site, which include widening the access road and construction of a slipway and floating pontoon.

3.2.1 Remediation Works

It is proposed that the waste at the site will be contained by constructing an engineered capping system on top of the waste and a perimeter engineered structure around the waste body. The capping system will consist of the placement of a 600mm depth of clay (or equivalent e.g. geosynthetic clay liner) on top of an impermeable liner such as LLDPE, above which is placed a geocomposite drainage layer followed by approximately 1m of subsoil and topsoil (topsoil depths will range from 150mm to 300mm). The liner(s) will be placed in an anchor trench around the edge of the site while the geocomposite drainage layer will feed into drains to take away surface water drainage from the 1m subsoil/topsoil material i.e. rainwater collected within the capping system.

The perimeter engineered structure will be constructed around the bulk of waste body to the north, south, east and west of the waste body. The structure will consist of an engineered berm and/or trench , which will tie into the underlying alluvium layer. Rock armour will be placed on the foreshore side of the berm and/or trench to provide protection against long term costal erosion. Given that the level of the foreshore around the site varies, the width of the toe of the berm and associated rock armour protection will also vary up to an anticipated maximum width at the base of approximately 25m.

It is proposed that works to construct the perimeter engineered structure will be undertaken within tidal cycles. Where works are subject to tidal inundation, it is proposed that the works

will be protected by sheet piles or other temporary retaining structure. For the majority of the perimeter works, it is not intended to locate the coffer dam or any other temporary works below the low water mark, however such works will be required along the southern boundary and parts of the eastern boundary.

At the western boundary of the East Tip adjacent to the Naval Dock Yard, a perimeter engineered structure will also be installed, but such works will not impinge on the foreshore area.

Prior to the construction of the capping system at East Tip, the following activities will be required on site, which will not require access to the foreshore, these include

- The demolition of the existing buildings which include a shed and a gantry crane.
- Potential removal from the site of some existing stockpiles of material e.g. mill scale.
- Reprofiling of the existing waste body to facilitate the capping of the site (see Section 3.2.4). This will require the excavating of waste, including rock breaking, to create the new profile for the amenity end use.
- Potential on-site processing of slag material from the site using crushers and on-site storage of this material for reuse in construction of the perimeter engineered structure (see Section 3.2.1). The use of this material in the construction of the berm has yet to be confirmed. If this is not possible, then suitable material will instead be imported to the site.

In addition, to the above works, it is proposed that some clean up of waste i.e. scrap metal will be removed from outside the existing waste mass i.e. in the foreshore area. This will require surface picking by hand and the use of plant to remove heavier waste material. The exact extent of these works in the foreshore around the East Tip has yet to be ascertained. It is understood that existing waste on the old causeway to the south east of the site will be cleaned up in this way. At this stage, no other works are proposed on the spit/causeway.

Surface water control during the works will be managed by filtrating surface water discharges through the waste body. There will be no direct discharge points for surface water control during the construction stage, however clean surface water may also be diverted to certain discharge points during the construction stage. Once the capping system has been constructed a number of clean water discharge points will exist at various points around the site.

3.2.2 Road Widening & Footpaths

It is proposed that the existing access road on Haulbowline Island between the bridge and the entrance to East Tip be widened to allow for two additional lanes and footpaths on either side. Security fencing with security gates will also be required along sections of this access road and the existing security hut and barriers will be moved just north of their current location. These works will not encroach upon the foreshore. Drains taking surface water from the upgraded access road will discharge to the harbour at a point yet to be determined. Any material requiring excavation for the proposed road infrastructure will be excavated and disposed of appropriately.

3.2.3 Floating Pontoon and Slipway

Directly west of East Tip, along the southern boundary of the access road, it is proposed that a slipway, which will be approximately 60m long and 10m wide will be constructed by land reclamation and use of a piled structure with the addition of rock armour as required. It is

proposed that the floating pontoon would facilitate the future use by passenger ferries and leisure boats.

3.2.4 End Use; Recreation / Amenity

Once the remediation solution has been constructed, it is proposed that the East Tip will be landscaped for amenity and recreational purposes, which will include the following:

- A soil based pitch in and beyond the area where the existing pitch (used by the Navy) is located. Floodlighting is not proposed.
- The profiling of the site will allow for the potential creation of an area that would be suitable for future events, in the north of the site. Flood lighting is not proposed for the amphitheater.
- Running/walking tracks will be installed around the site.
- Recreational areas i.e. green fields which will allow picnicking, etc.
- Car Park for approximately 50 cars at the site entrance.
- Bird watching areas. It is proposed that benches placed behind wooden screens will be placed at various points around the site to allow for bird watching. Bird watching hides are currently not proposed.
- Creation of landscaped areas including areas that will screen the site from any sections of the foreshore area that are found to be used by birds for feeding and roosting (bird survey work is ongoing, January 2013, details will be discussed in the NIS and EIA).
- Security Fencing will be erected at the western site perimeter between the East Tip and Naval dock yard.

3.2.5 Construction Programme

It is proposed that works will take approximately 18 months to 24 months to construct, however certain elements of the landscaping may extend beyond this time to allow for planting etc., subject to seasonal requirements; the availability of suitable capping material may also result in a longer construction programme.

3.2.6 Aftercare Requirements

The Waste Licence for the site will set out requirements for aftercare monitoring. Therefore there will be an ongoing requirement for access to monitoring wells on the site and to take water samples from the surrounding marine environment.

Maintenance works for the upkeep of the site for recreational use will also be required on an ongoing basis.

It is not anticipated that any major maintenance works will be required for the upkeep of the engineered remediation solution.

3.2.7 Invasive Species

All material imported into the East Tip site for the purposes of capping or for landscaping or other end-uses, will be sources from suppliers who guarantee that the material is not contaminated with any invasive alien plant species material, particularly Japanese Knotweed,

but also any other species listed under Third Schedule of the 2011 Natural Habitats Regulations[1].

[1] S.I. No. 477/2011 — European Communities (Birds and Natural Habitats) Regulations 2011.

4 DESCRIPTIONS OF THE NATURA 2000 SITES

4.1 Great Island Channel cSAC (site code 001058)

Great Island lies between the cSAC to the north and Haulbowline Island to the south. The cSAC covers the channel between the north coast of Great Island from Little Island to the west to Midleton to the east. Whilst the distance between the East Tip site and the cSAC boundary is only 4.2km at its closest point, the distance between the two via a route over the sea is 5.9km.

Great Island Channel, compared to the rest of Cork Harbour, is relatively undisturbed. Within the site is the estuary of the Owennacurra and Dungourney Rivers. These rivers, which flow through Midleton, provide the main source of freshwater to the North Channel.

The main habitats of conservation interest are the sheltered tidal sand and mudflats and Atlantic salt meadows. Owing to the sheltered conditions, the intertidal flats are composed mainly of soft muds. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially at Rossleague and Belvelly. The salt marshes are scattered through the site and are all of the estuarine type on mud substrate.

The site is extremely important for wintering waterfowl and is considered to contain three of the top five areas within Cork Harbour, namely North Channel, Harper's Island and Belvelly-Marino Point. Shelduck are the most frequent duck species with 800-1000 birds centred on the Fota/Marino Point area. There are also large flocks of Teal and Wigeon, especially at the eastern end. Waders occur in the greatest density north of Rosslague, with Dunlin, Godwit, Curlew and Golden Plover the commonest species. A population of about 80 Grey Plover is a notable feature of the area. All the mudflats support feeding birds; the main roost sites are at Weir Island and Brown Island and to the north of Fota at Killacloyne and Harper’s Island. Ahanesk supports a roost also but is subject to disturbance. The numbers of Grey Plover and Shelduck, as given above, are of national importance.

While the main land use within the site is aquaculture (Oyster farming), the greatest threats to its conservation significance come from road works, infilling, sewage outflows and possible marina developments.

4.1.1 Conservation Objectives of *Great Island Channel* cSAC

The following generic text relating to the Conservation Objectives of *Great Island Channel* cSAC and to all other Natura 2000 sites is taken from the NPWS website (see:www.npws.ie/protectedsites):

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing; and
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis."

Conservation Objectives specific to *Great Island Channel* cSAC are as follows:

Objective 1: To maintain the favourable conservation status of the Qualifying Interests of the SAC; the Annex I habitats:

- Mudflats and sandflats not covered by seawater at low tide (1140); and
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330).

Objective 2: To maintain the extent, species richness and biodiversity of the entire site.

Objective 3: To establish effective liaison and co-operation with landowners, legal users and relevant authorities.

4.2 Cork Harbour SPA (Site Code 004030)

The SPA is comprised of several non-contiguous areas around the Harbour, the closest of which to the Haulbowline East Tip site are at Lough Beg 1.4km to the south and at Monkstown Creek 2.2km to the west.

Cork Harbour is a large, sheltered bay system, with several river estuaries, principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour. Owing to the sheltered conditions, the intertidal flats are often muddy in character. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Some shallow bay water is included in the site. Rostellan Lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds.

Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in the country. The two-year mean of summed annual peaks for the entire harbour complex was 55,401 for the period 1995/96 and 1996/97. Of particular note is that the site supports internationally important populations of Black-tailed Godwit and Redshank. At least 18 other species have populations of national importance, as follows: Little Grebe, Great Crested Grebe, Cormorant, Grey Heron, Shelduck, Wigeon, Teal, Pintail, Shoveler, Red-breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Dunlin, Bar-tailed Godwit, Curlew and Greenshank.

The Shelduck population is the largest in the country (over 10% of national total). Cork Harbour is a nationally important site for gulls in winter and autumn, especially Black-headed Gull, Common Gull and Lesser Black-backed Gull. A range of passage waders occurs regularly in autumn, including such species as Ruff, Spotted Redshank and Green Sandpiper.

Cork Harbour has a nationally important breeding colony of Common Tern (3-year mean of 69 pairs for the period 1998-2000, with a maximum of 102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower between Great Island and Fota Island, 5.16km to the northwest of the East Tip site. In 2012 between 40 and 45 pairs of Common Tern nested at this location.

In 2011 and 2012 (and perhaps also in 2010), Common Terns established a sub-colony at the Deep Water Port in Ringaskiddy, 1.79km to the southwest of the East Tip site. In 2012 between 45 and 50 pairs of Common Tern nested at this location.

4.2.1 Conservation Objectives of the Natura 2000 Sites

The following generic text relating to the Conservation Objectives of *Cork Harbour SPA* and to all other Natura 2000 sites is taken from the NPWS website (See:www.npws.ie/protectedsites):

"The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing; and
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis."

Conservation Objectives specific to *Great Island Channel* cSAC are as follows:

Objective 1: To maintain the favourable conservation status of the Qualifying Interests of the SAC; the bird species:

- Wintering Little Grebe (*Tachybaptus ruficollis*) (species code: A004)
- Wintering Great Crested Grebe (*Podiceps cristatus*) (A005)
- Wintering Cormorant (*Phalacrocorax carbo*) (A017)
- Wintering Grey Heron (*Ardea cinerea*) (A028)
- Wintering Shelduck (*Tadorna tadorna*) (A048)
- Wintering Wigeon (*Anas penelope*) (A050)
- Wintering Teal (*Anas crecca*) (A052)
- Wintering Pintail (*Anas acuta*) (A054)
- Wintering Shoveler (*Anas clypeata*) (A056)
- Wintering Red-breasted Merganser (*Mergus serrator*) (A069)
- Wintering Oystercatcher (*Haematopus ostralegus*) (A130)
- Wintering Golden Plover (*Pluvialis apricaria*) (A140)
- Wintering Grey Plover (*Pluvialis squatarola*) (A141)
- Wintering Lapwing (*Vanellus vanellus*) (A142)
- Wintering Dunlin (*Calidris alpina*) (A149)
- Wintering Black-tailed Godwit (*Limosa limosa*) (A156)
- Wintering Bar-tailed Godwit (*Limosa lapponica*) (A157)
- Wintering Curlew (*Numenius arquata*) (A160)
- Wintering Redshank (*Tringa totanus*) (A162)
- Wintering Black-headed Gull (*Chroicocephalus ridibundus*) (A179)
- Wintering Common Gull (*Larus canus*) (A182)
- Wintering Lesser Black-backed Gull (*Larus fuscus*) (A183)
- Breeding Common Tern (*Sterna hirundo*) (A193)

And the Qualifying Feature:

- Wetlands & Waterbirds (A999)

Objective 2: To maintain the extent, species richness and biodiversity of the entire site.

Objective 3: To establish effective liaison and co-operation with landowners, legal users and relevant authorities.

5 POSSIBLE EFFECTS OF THE PROPOSED WORKS ON NATURA 2000 SITES

The purpose of this Section of the Screening is to examine the possibility that the proposed works, either individually or in combination with other plans and projects, may result in significance negative effects of on the Conservations Objectives and the integrity of the Natura 2000 sites discussed in Section 4; *Great Island Channel* cSAC or *Cork Harbour* SPA.

If there is deemed to be potential for significant effects or if this is considered to be a possibility or is uncertain, then the AA process must either proceed to Stage 2 (Appropriate Assessment) or Stage 1 Screening must be repeated on a modified proposal.

5.1 Potential Direct Impacts on Natura 2000 Sites

The closest Natura 2000 site to the Haulbowline East Tip site is the Lough Beg section of *Cork Harbour* SPA located 1,4km to the south, no direct impact will therefore occur within the boundary of any Natura 2000 site as a result of the proposed works.

5.2 Potential Indirect Impacts, Cork Harbour SPA

5.2.1 Construction

It is considered that there are six mechanisms by which an adverse effect on the Conservation Objectives of the SPA might potentially occur during construction activity, as follows:

a) Disturbance to birds, outside the SPA boundary, but having effects within the SPA;

b) Contamination of sea water by release of harmful substances from disturbed waste contaminating food chains outside the SPA boundary, but having effects within the SPA;

c) Contamination of sea water by release of harmful substances from disturbed waste contaminating habitats within the SPA;

d) Contamination of sea water by release of harmful substances from disturbed sediments contaminating food chains outside the SPA boundary, but having effects within the SPA;

e) Contamination of sea water by release of harmful substances from disturbed sediments contaminating habitats within the SPA; and/or

f) Disturbance of invasive alien plant species at the site, or introduction to invasive plant species to the site, which could result in their spread to locations within the SPA.

5.2.1.1 Possible Disturbance to Birds

Haulbowline Island is located centrally within Cork Harbour and is in a busy location that is subject to high levels of human activity and of disturbance. Sources of disturbance to birds and other wildlife include the main Cork Harbour shipping lane immediately to the north; nearby port activity at Cobh, Rushbrooke and Ringaskiddy; naval activity on the western part of Haulbowline; boat-based fishing activity and recreational boating activity on all sides; and the busy town of Cobh to the north. Hence birds using the waters and shorelines around the East Tip site need to be habituated to relatively high levels of noise and visual disturbance.

Construction works at the East Tip will be conducted using both land-based and shore-based vehicles and machinery including excavators, dumpers, trucks, compactors, rollers, a crusher, a screener and a piling rig. It is likely that birds using the shoreline and waters immediately adjacent to the East Tip will be displaced from the area during construction activity, however displacement beyond the immediate area of the works, to an expected maximum distance of 100 metres, is highly unlikely to occur given the high levels of disturbance that already exist in the area. The shoreline of the East Tip site is not heavily used by birds, with the total number of waders, herons and others using the site recorded being in only single figures during high tide surveys in the autumn and early winter of 2012. Such numbers are substantially too small for their displacement to the SPA to have significant negative effects within the SPA in terms of resource depletion. Similarly, whilst some birds feed within the inshore waters close to the East Tip site, and may be displaced by construction works, including Common Terns in the summer months; and Shags, Cormorants and gulls throughout the year, the numbers involved are far too small to have any impact on broader populations or to have knock-on effects within the SPA.

Hence, whilst disturbance and resulting displacement of birds from the immediate vicinity of construction works at the East Tip is likely to occur, it is not considered possible that this could have any adverse effect on the Conservation Objectives of *Cork Harbour* SPA.

5.2.1.2 Possible Contamination of Food Chains and SPA Habitats Resulting from Disturbance of Waste

Details of the profile of the waste at the East Tip are presented in Cork County Council's 'Factual Report on the site (Cork County Council, 2012). A further risk assessment has been carried out by Cork County Council in 2012 and is currently being finalised

The waste samples collected at East Tip in investigations in 2008 by White Young Green and previous investigations identified that the process waste materials consists largely of non-hazardous slag and refractory waste together with scrap metal. The composition of the materials encountered is characteristic of materials derived from a metal industry and include contaminants such as chromium, chromium VI, copper, lead, limited cadmium, zinc and PAHs. Further details on the results of solid sample analysis will be provided in the NIS.

It is considered possible that a number of elements of the proposed construction plan might result in a release of contaminants. Two elements of the construction programme appear to have specific potential to disturb 'hot spots' of contaminants within the waste, which could then become susceptible to downward and lateral migration as a result of heavy rainfall and or tidal flows, potentially contaminating the waters of Cork Harbour, these are:

1. Reprofiling and/or pulling back of the waste mass at the edge of the waste body during construction of the perimeter engineered structure;
2. Reprofiling of the existing waste body to facilitate the capping of the site and its use as an amenity. This will require the excavating of waste including rock breaking to create the new profile for the amenity end use.

Hence, whilst it is considered unlikely to occur, and mitigation measures to tackle any such situation are currently being developed, the possibility that the works could potentially result in a release of contaminants to the waters of Cork Harbour cannot be entirely ruled out at present. Such a release could potentially result in adverse effects on the Conservation Objectives of *Cork Harbour* SPA in either of the following ways:

a) By contamination food chains in the immediate vicinity of the East Tip (for example at the Common Tern feeding area of Spit Bank); and/or

b) By transport of contaminants via oceanic currents to habitats within the boundary of the SPA.

In summary, it is considered that Stage 2 Appropriate Assessment is required to investigate this possibility further and to allow for the further development of mitigation measures to ensure avoidance of any such significant release of contaminants during construction.

5.2.1.3 Possible Contamination of Food Chains and SPA Habitats Resulting from Disturbance of Sediments

The extent of sediment disturbance that will occur during construction works has been minimised in the project design. During the majority of the construction period and during all works in the intertidal and sub-littoral parts of the site, the coffering (or other containment measures) will effectively eliminate the possibility of resuspension of sediment or the escape of solutes from sediments from within the works areas. However a small amount of sediment disturbance is unavoidable during processes such as surface scraping to remove waste beyond the perimeter containment system; pile-driving for construction of coffering; removal of the piles and of the coffering and construction of the slipway.

It is therefore considered that Stage 2 Appropriate Assessment is required to further investigate the possibility that a significant release of contaminants from sediments to sea water could occur during construction works at the site, which could potentially result in adverse effects on the Conservation Objectives of *Cork Harbour* SPA; and to further develop mitigation measures to ensure that no significant releases can occur.

5.2.1.4 Possible Spread of Invasive Species

The possibility that the works could potentially cause the spread of invasive alien species to the SPA has been considered. The East Tip site was surveyed by ecologists from RPS on the 14th of August 2012. The site was examined for the presence of Japanese Knotweed (*Fallopia japonica*) or other invasive alien flora species that could potentially be spread or otherwise benefited by construction works.

A number of non-native plant species are present at the site including Canadian Fleabane / Bilbao Fleabane (*Conyza canadensis / C. bilbaoana*) and / or hybrids of the two species (which is abundant); Biting Stonecrop (*Sedum acre*) (which is abundant) and Buddleia (*Buddleia davidii*) (which is occasional). However, no Japanese Knotweed or other invasive alien plant species listed under the Third Schedule of the 2011 Natural Habitats Regulations[2] were found.

Measures are included in the Project Description to ensure that no invasive alien plant species will be imported into the East Tip site during either capping works or during development of end-use landscaping (see Section 3.2.7).

It is not considered that the proposed construction works have any potential to result in the spread of Japanese Knotweed or any other invasive alien plant species listed under the Third Schedule of the 2011 Natural Habitats Regulations.

[2] S.I. No. 477/2011 — European Communities (Birds and Natural Habitats) Regulations 2011.

5.2.2 Operation

Operation activity at the site will be very limited, involving only routine maintenance works for the upkeep of the site for recreational use. It is not anticipated that any major maintenance works will be required for the upkeep of the engineered remediation solution. Hence, no indirect impacts will occur during operation of the site at any location remote from the site itself, including locations within the boundary of *Cork Harbour* SPA.

The small scale, infrequent and short-term nature of routine landscaping maintenance works such as grass cutting, and so on, are such that birds which are Qualifying Features of the SPA but are using areas outside the SPA, in the vicinity of Haulbowline, will not be significantly disturbed or otherwise affected.

Hence, no adverse effects on the Conservation Objectives of the SPA as a result of any ongoing operational works at the site are anticipated at any time following the completion of construction works.

5.3 Potential Indirect Impacts, Great Island Channel cSAC

5.3.1 Construction

It is considered that there are two mechanisms by which an adverse effect on the Conservation Objectives of the SPA might potentially occur during construction activity, as follows:

a) Contamination of sea water by release of contaminants released from disturbed waste contaminating habitats within the cSAC; and/or
b) Disturbance of invasive alien plant species at the site could result in their spread to locations within the cSAC.

5.3.1.1 Possible Contamination of cSAC Habitats

Great Island lies between the cSAC to the north and Haulbowline Island to the south. Whilst the distance to between the East Tip site and the cSAC boundary is 4.2km at its closest point the distance between the two via a route over the sea is 5.9km; this is the distance that any water borne contaminant or suspended sediment would have to travel from the site to reach the cSAC. Furthermore, the cSAC is 'upstream' of the East Tip site along the main marine channel of the River Lee, so in general, very little, if any, water travels from the vicinity of Haulbowline to the cSAC.

Sections 5.2.1.2 and 5.2.1.3 discuss the possibility of the works resulting in the release of contaminants from the East Tip to the Waters of Cork Harbour. The data presented in those Sections indicates that contamination at locations as remote from Haulbowline as the Great Island Channel cSAC is not a possibility due to the anticipated small volumes of contaminants potentially involved.

5.3.1.2 Possible Spread of Invasive Species

The possibility that the works could potentially cause the spread of invasive alien species to the cSAC has been considered. The East Tip site was surveyed by ecologists from RPS on the 14th of August 2012. The site was examined for the presence of Japanese Knotweed (*Fallopia japonica*) or other invasive alien flora species that could potentially be spread or otherwise benefited by construction works.

A number of non-native plant species are present at the site including Canadian Fleabane / Bilbao Fleabane (*Conyza canadensis / C. bilbaoana*) and / or hybrids of the two species (which is abundant); Biting Stonecrop (*Sedum acre*) (which is abundant) and Buddleia (*Buddleia davidii*) (which isoccasional). However, no Japanese Knotweed or other invasive

alien plant species listed under the Third Schedule of the 2011 Natural Habitats Regulations[3] were found.

Measures are included in the Project Description to ensure that no invasive alien plant species will be imported into the East Tip site during either capping works or during development of end-use landscaping (see Section 3.2.7).

It is not considered that the proposed construction works have any potential to result in the spread of Japanese Knotweed or any other invasive alien plant species listed under the Third Schedule of the 2011 Natural Habitats Regulations.

5.3.2 Operation

Operation activity at the site will be very limited, involving only routine maintenance works for the upkeep of the site for recreational use. It is not anticipated that any major maintenance works will be required for the upkeep of the engineered remediation solution. Hence, no indirect impacts will occur during operation of the site at any location remote from the site itself, including locations within the boundary of *Great Island Channel* cSAC.

Hence, no adverse effects on the Conservation Objectives of the cSAC as a result of any ongoing operational works at the site are anticipated at any time following the completion of construction works.

5.4 Possible Cumulative Impacts with Other Plans and Projects in the Area

As part of Stage 1 Screening, in addition to the proposed project, other relevant projects and plans in the relevant region must also be considered. This step aims to identify at this early stage any possible significant effects on the Natura 2000 sites of the proposed works in-combination or cumulative with other plans and projects.

Sections 5.2 and 5.3 discuss the potential for impacts on the Conservation Objectives of *Cork Harbour* SPA and *Great Island Channel* cSAC respectively. The information presented in these Sections indicates that the only possible source of impacts on Natura 2000 sites derives from the possibility of a release of contaminants from waste or sediments at the East Tip site affecting birds that are Qualifying Features of *Cork Harbour* SPA (see Section 5.2.1.2). Hence, possible contributors to in-combination effects will be limited to other sources of contaminants that might enter the food chains on which these birds depend.

Cork Harbour is a densely populated and heavily industrialised area, and a number of IPCC licences, waste licences and discharge licences are in effect for facilities that discharge to the water of Cork Harbour. It is considered that the possibility of cumulative or in-combination effects resulting from such discharges, or from other sources, cannot be ruled out.

Hence, it is considered that there is a possibility that contaminants released from waste or sediment during construction activity on the current project could potentially act in combination with other contaminants released elsewhere in Cork Harbour and thereby result in adverse effects on the Conservation Objectives of Cork Harbour SPA. This possibility therefore needs to be examined further at Stage 2 Appropriate Assessment and discussed in a Natura Impact Statement. A Full review will be undertaken of, published water quality data;

[3] S.I. No. 477/2011 — European Communities (Birds and Natural Habitats) Regulations 2011.

existing IPCC licences, waste licences and discharge licences within the relevant portion of Cork Harbour; and of information presented in the forthcoming EIS for the current project relating to soils, geology, marine ecology and water quality.

6 ARTICLE 6 SCREENING CONCLUSIONS

6.1 Construction

It is considered that there are two possible pathways by which adverse effects on the Conservation Objectives of *Cork Harbour* SPA might occur. The two possible sources are:

a) A release of contaminants from the waste at the East Tip during construction (see Section 5.2.1.2); and / or

b) A release of contaminants from sediments in intertidal and sublittoral areas around the site during construction (see Section 5.2.1.3).

Either source could potentially result in adverse effects on the Conservation Objectives of Cork Harbour SPA via one of two pathways, as follows:

a) Contamination of food chains outside the SPA boundary, but having effects within the SPA; and/or

b) Contamination of habitats within the SPA.

It is not considered that adverse effects on any other Natura 2000 site are possible as a result of either construction or operation of the proposed works at the East Tip site.

It is not considered possible that disturbance of waste or sediment at the site during construction activity could result in a sufficient release of contaminants that contamination of waters could occur at locations as distant from Haulbowline as *Great Island Channel* cSAC, and hence no impacts are considered possible at this site or at any other more remote Natura 2000 sites outside Cork Harbour.

6.2 Operation

Operation activity at the site will be very limited, involving only routine maintenance works such as grass cutting, and so on, for the upkeep of the site for recreational use. Hence, no indirect impacts will occur during operation of the site at any location remote from the site, including locations within the boundary of *Cork Harbour* SPA, *Great Island Channel* cSAC or any other Natura 2000 site. The small scale, infrequent and short-term nature of routine landscaping maintenance works are such that birds which are Qualifying Features of the SPA but are using areas outside the SPA in the vicinity of Haulbowline, will not be significantly disturbed or otherwise affected. Hence, no adverse effects on the Conservation Objectives of any Natura 2000 site as a result of any ongoing operational works at the site are anticipated at any time following the completion of construction works.

6.3 Summary of Article 6 Screening Conclusions

It is considered that two issues require Stage 2 Appropriate Assessment: the possibility of a release of contaminants to the waters surrounding Haulbowline Island during construction activity. It is considered that such a release could potentially result in adverse effects on the Conservation Objectives of *Cork Harbour* SPA in two ways:

c) Contamination of food chains outside the SPA boundary, but having effects within the SPA; and/or
d) Contamination of habitats within the SPA.

Hence, it is considered that Stage 2 Appropriate Assessment is required to examine further the possibility that construction works might cause a release of contaminants to waters surrounding Haulbowline Island, potentially resulting in an adverse effect on the Conservation Objectives of *Cork Harbour* SPA.

In addition, it is considered that there is a possibility, albeit very unlikely, that contaminants released from waste or sediment during construction activity on the current project could potentially act in combination with other contaminants released elsewhere in Cork Harbour and thereby result in adverse effects on the Conservation Objectives of Cork Harbour SPA. This possibility therefore needs to be examined further at Stage 2 Appropriate Assessment.

7 ARTICLE 12 SCREENING

The Habitats Directive Annex IV species which could potentially occur in the vicinity of the site are discussed in Section 2.3.1 of this Report. The potential for these species to occur within the 'zone of influence' of the proposed works is discussed further here; and the potential for these species to experience significant adverse that might constitute a breech of the provisions of Article 12 (see Section 2.3) as a result of the proposed works is addressed. Cetaceans (whales and dolphins), Pinnipeds (seals), Bats and otter, are discussed in Sections 7.1 to 7.4.

7.1 Cetaceans

Whilst there have been very occasional records of other cetacean species such as common dolphin (*Delphinus delphis*) and orca (killer whale; *Orcinus orca*) (June 2001) in Cork Harbour, only two species occur, or are at a likely to occur, on a regular basis: harbour porpoise and bottle-nosed dolphin; both are listed under Annexes II and IV of the Habitats Directive. Between February 200-6 and March 2011 a pod of six bottle-nosed dolphins were regular visitors to the Outer Cork Harbour area. None have been observed in the vicinity or Cobh or Haulbowline.

Table 6.1: Cetacean observations in SW Ireland (Reid *et al*., 2003; DCENR, in press; O'Cadhla *et al*., 2004 and IDWG, 2011)

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Common Dolphin	The most frequently recorded dolphin species in Irish waters. Present in the Celtic and Irish Sea, predominantly in the summer and early autumn (Reid *et al*., 2003). Most abundant and breeding along the south and south west coasts of Ireland.											
Bottle-nosed Dolphin	Found in all Irish coastal waters and are the second most frequently recorded dolphin species in Irish waters. They occur inshore around all Irish coasts with a semi resident groups historically reported outside Cork Harbour and at Kenmare (O'Brien et al 2009). They also occur offshore in the Celtic Sea and in the Irish Sea. They are present year round and breed in Irish waters. Inshore and offshore ecotypes may exist.											
Risso's dolphin	Continental shelf species. Recorded throughout the year in Irish waters with a wide distribution (Aecom & Metoc, 2010). Some seasonal movements apparent (Baines & Evans 2009). Occasionally, observed inshore and in bays along the southwest and southeast coasts (NPWS, 2008). Regularly occurring in the southern and central Celtic Sea (Baines & Evans 2009). Breeds in Irish waters.											
Harbour Porpoise	Ireland's only porpoise species. Abundant in the inshore waters throughout the year along the south and southwest coasts. Breeds in Irish waters. Occurs throughout the Irish and Celtic Sea with some large aggregations noted off the south coast in the Autumn months. Some evidence for an offshore movement in spring between March and June (IWDG, 2010b) which may be linked to calving.											
Killer whale						Observed off all coasts and in the Irish Sea. Inshore sightings tend to increase during late summer and autumn (Berrow *et al*., 2010).						
Fin whale	The majority of inshore sightings come from counties Cork, Waterford and Wexford (Berrow *et al*., 2010). These species move inshore in early summer between May and June with a regular peak in sightings during November in west Cork. A single sighting (2007) within Cork Harbour of an individual later believed to have stranded There has only been one recorded sighting in the area from 2000-2009 (IWDG,2011)											

Key		Absent		Present

7.1.1 Cetacean Conservation

Ireland is a signatory to conservation-orientated agreements under:

- the Berne Convention on Conservation of European Wildlife and Natural Habitats (1982);
- the Bonn Convention on Migratory Species (1983);
- the OSPAR Convention for the Protection of the Marine Environment of the northeast Atlantic (1992); and
- the EC Habitats Directive on the Conservation of Natural Habitats and of Fauna and Flora (92/43/EEC, 1992).

All cetacean species occurring in European waters are now afforded protection as Annex IV species under the EC Habitats Directive. Two common species: Bottlenose Dolphin and Harbour Porpoise; are Annex II species (i.e. animal species of Community interest, whose conservation requires the designation of Special Areas of Conservation) (refer to Section 3.3.1).

In 1991, the Irish government declared all Irish waters extending to the outer Continental shelf a whale and dolphin sanctuary, claiming that this was a "*clear indication of Ireland's commitment to contribute to the preservation and protection of these magnificent creatures in their natural environment, and to do everything possible to ensure they should not be put in danger of extinction but should be preserved for future generations*" (Rogan & Berrow, 1995). According to the declaration, the sanctuary was empowered under the legal framework already in place, which suggested that the Irish government considered the present legislation to be sufficient to provide full habitat protection to cetaceans within the continental shelf area.

7.2 Pinnipeds

Both common (harbour) seal and grey seal occur regularly in small numbers in Cork Harbour, including the immediate vicinity of Haulbowline Island. Both species are listed under Annex II of the Habitats Directive. There is little evidence of seals using the site. The nearest NPWS recorded haulouts and sensitive habitats for seals are in Kinsale.

Incidental sightings of seal have occurred in the vicinity of the site and the naval base. These are expected to be adults transiting the area. There is no evidence of seals using the site.

Common (or harbour) seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) are common in Irish waters, and are mainly concentrated inshore. Both the common seal and the grey seal are listed under Annex II of the EC Habitats and Species Directive as species whose conservation requires the designation of Special Areas of Conservation. In addition Common Seals and Grey Seals are protected under the Conservation of Seals Act 1970.

Seals are known to forage over a wide area, often straying up to 2,000 kilometres from their haul-out site (JNCC, 2007*;* Connell *et al.* 1999). There are no haul-out sites in the immediate vicinity of the proposed works where moulting or pupping may occur, the nearest is at Kinsale (O Cadhla *et al.*, 2008).

7.2.1 Common Seals

The common seal is the smaller of the two species of pinniped that breed in Ireland and is also an important predator in this area of the north Atlantic. The main prey of common seals is

considered to be Sandeels, Lesser Octopus, Whiting, Flounder and Cod (Tollit & Thompson, 1996). During the pupping (June) and moulting seasons (late July/August) they spend more time ashore than at other times of the year.

These haul-out groups have tended historically to be found among inshore bays and islands, coves and estuaries (Lockley, 1966; Summers *et al.,* 1980), particularly around the hours of lowest tide. the nearest is at Kinsale (O'Cadhla *et al*., 2008).

7.2.2 Grey Seals

Grey seals are widespread in Ireland, with the greatest concentrations found on the exposed south-western, western and northern coasts (Lyons, 2004). Haulouts are recorded with breeding potential at Kinsale and Dungarvin, though the 2005 population estimates did not record significant numbers at these sites. Grey seals can be gregarious at these haul-outs, sometimes forming large groups of several hundred animals, especially when they are moulting their fur in spring following the winter pupping season.

7.3 Potential impacts on Marine Mammals

7.3.1 Construction

During construction there will be physical presence disturbance that may cause avoidance behaviour during the day. The area is not used by marine mammals but this may cause temporary avoidance of the site by any transiting species. Activities may include pile driving in the lower shore or shallow subtidal, construction in the lower shore, vehicles, light and noise from onshore construction.

It is anticipated that all works in the lower shore extremities of the site will be undertaken in accordance with the NPWS (draft March 2012) '*Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters*'.

Any works in the shallow subtidal are expected to be of short duration. These works are intended to contain the site or part of the site where further remediation works are to take place and therefore no further effects are anticipated. These work are also intented to prevent resuspension of sediment or other material from the site during construction.

There may be additional physical presence effects from light noise and human presence on the site during the works. Whilst this may cause local avoidance it will not exclude marine mammals from upper estuary areas and would be in line with existing noise levels of operations in the area.

Little vessel traffic is anticipated to be utilised outside existing routes therefore no increased risk of collision is anticipated.

7.3.2 Operation

The proposed recreational end use of the site includes a slipway, pontoon area on the south of the East Tip area. All other areas will be rock armour or sheet piled finished. The site is currently not utilised as a haulout, for seals. Remediation works to the causeway area may provide suitable habitat for adult seals to utilise.

The site and slipwaywill result in human presence and may include fishing in the area to the south of the island. The Rocky Island area is already utilised for this amenity and the expect impact to marine mammals will not be significant and it is anticipated that individuals in this area are already acclimated to such activity.

The proposed pontoon and slipway will result in recreational boat use. This could result in an increased small boat presence in the area and increased chance of interaction or collision. It is anticipated that the slip will be operated in the same manner as the other amenity area in Cork Harbour and that sufficient information on marine mammals will be provided at the location. In addition the proposed activities are not proposed to be sufficient to cause a barrier to access through the channel by physical presence or operational noise. Therefore, no significant effects are expected.

7.3.3 Conclusions

Overall it is concluded that whilst marine mammals are likely to pass the East Tip site on a occasional basis, the site and environs do not constitute and important area of habitat for marine mammals. Whilst some temporary avoidance of the construction works is possible, there will be no significant effects to marine mammals from the proposed works.

7.4 Bats

All Irish bats are listed under Annex IV of the Habitats Directive; lesser horseshoe bat is also listed under Annex II.

A full bat survey of the site was undertaken on the 12th September 2012. The survey included both day-time examination of the site, particularly of buildings and other man-made structures, to investigate bat usage and the possible presence of roost sites; and night-time detector work to investigate the usage of the site by foraging or commuting bats.

No bat roosts were found or suspected to occur; the site was deemed generally unsuitable for bats, and there was only a single detector record of a common pipistrelle, flying briefly over the western boundary of the site close to the sports pitch.

The survey assessment concluded that: "As no bat roost was identified on-site and the existing habitats are exceptionally poor for these animals, the impact of any development on the favourable conservation status of local bat populations is expected to be negligible."

The assessment also concluded that remediation of the site can potentially have positive benefits for bats: "Any future development on-site will change the local environment as existing structures and vegetation will be removed and, potentially, new structures and vegetation will be erected and planted. Such development is not expected to negatively affect bats as the existing habitats and site use are quite unsuitable for these animals and the area is avoided as a result. The favourability of the area for these animals and other wildlife may however be improved through its future development if the development proposals are sensitively designed and constructed in a sustainable manner with consideration of the needs of the local fauna."

Hence, it is concluded that the proposed works will have no negative effect on bat populations, significant or otherwise, and that end uses of the site which include extensive vegetation planting and the establishment of freshwater features, are likely to have a positive effect on local bat populations.

7.5 Otter

Otter is listed under Articles II and IV of the EU Habitats Directive and occurs in most freshwater and coastal habitats throughout Ireland.

The East Tip site has been examined in detail for signs of otter activity and to assess the quality of the habitat for otters on the 14th of August 2012, and further searches for spraint were conducted during October and November 2012. No evidence of otter activity in the form of holts, paths or spraint sites has been found. The East Tip site lacks sources of permanent fresh water and this probably explains the absence of resident otters at the site. A number of

studies have shown that for otters which inhabit salt water environments, access to fresh water is essential for washing and maintainable of the quality of their coats; and that the distribution of holts is closely correlated with the availability of fresh water (e.g. Kruuk *et. al*, 1989; Beja. 1991).

Otters are present throughout Cork Harbour and Haulbowline's central position at the heart of the harbour, and bordering the narrowest part of the River Lee's channel through the harbour, means that it is highly likely that otters occur along the shoreline of the East Tip site on a regular basis when foraging or commuting between other locations in the vicinity.

Overall it is concluded that whilst otters are likely to pass along the coastline of the East Tip site on a regular basis, neither the shoreline or inland areas of the site are used heavily by otters; and the site does not constitute and important area of habitat for otters. This is likely to be due to the absence of fresh water. Hence, it is considered highly unlikely that the proposed works will have any detrimental effect on either individual otters or on wider otter populations on the vicinity.

Remediation of the site, if it includes the establishment of permanent fresh water features such as ponds within the end use landscape design, may encourage otters to use the area more frequently and to establish holts in the area.

8 ARTICLE 12 SCREENING CONCLUSIONS

It is concluded that whilst the proposed works could result in localised and temporary avoidance of the immediate vicinity of the East Tip site by marine mammals, the proposed works will have no significant effects to marine mammal populations and the site and environs do not represent an important habitat for these species (See Section 7.1. and 7.2)

It is concluded that the proposed works will have no negative effect on bat populations, significant or otherwise, and that end uses of the site which include extensive vegetation planting and the establishment of freshwater features, are likely to have a positive effect on local bat populations (see Section 7.3).

It is concluded that the proposed works will not have any detrimental effect on either individual otters or on wider otter populations on the vicinity. Whilst otters are likely to pass along the coastline of the East Tip site on a regular basis, the site is not used heavily by otters; and the site does not constitute and important area of habitat for otters. This is likely to be due to the absence of fresh water. Remediation of the site, if it includes the establishment of permanent fresh water features such as ponds within the end use landscape design, may encourage otters to use the area more frequently and to establish holts in the area (see Section 7.4).

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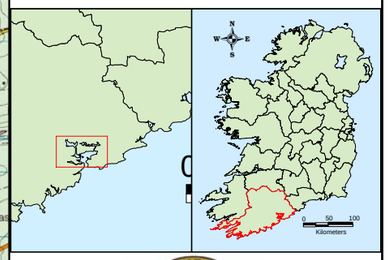
APPENDIX A

Figure 1: Location of Proposed Works, Natura 2000 Sites and Other Relevant Features Mentioned in this Report

Legend

- Haulbowline East Tip Site
- Cork Harbour Special Protection Area (SPA)
- Great Island Channel candidate Special Area of Conservation (cSAC)



Project: **East Tip Remediation, Haulbowline Island, Appropriate Assessment Screening**

Title

Location of Natura 2000 Sites and Other Features

Figure **1**

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