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DUBLIN PORT COMPANY

Alexandra Basin Redevelopment Project

Environmental Impact Statement

Volume 4 | Non Technical Summary

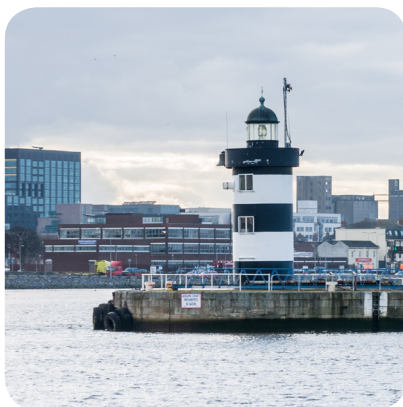


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1 INTRODUCTION

This document is the Non Technical Summary (NTS) of the Environmental Impact Statement (EIS) which has been prepared to assess the environmental impact of the Alexandra Basin Redevelopment (ABR) Project.

The NTS aims to provide the reader with a concise overview of the main elements of the ABR Project, the environmental assessments undertaken, the mitigation measures proposed and any residual impact expected as a result of the project.

Project Summary

The ABR Project comprises the following three elements:

- 1 Works at Alexandra Basin West including construction of new quays and jetties, remediation of contamination on the bed of the basin, capital dredging to deepen the basin and to achieve the specified depths of -10m Chart Datum (CD) at the new berths.
2. Infilling of the Basin at Berths 52 & 53 and construction of a new river berth with a double tiered Ro-Ro ramp.
3. Deepening of the fairway and approach to Dublin Port to increase the ruling depth from -7.8m CD to -10.0m CD.

This is the most significant infrastructural development planned by Dublin Port Company (DPC) in the past 100 years and will involve a major capital investment by the Port.

Project Justification

The ABR Project is the first major infrastructure project to be brought for planning and other consents from DPC's Masterplan 2012 to 2040 (see Figure 1.1).

The Masterplan recognises the need to provide capacity in the Port to cater for 60m gross tonnes of cargo by 2040 and was approved by the Board of Dublin Port Company in January 2012. It was also subsequently endorsed by Government in its National Ports Policy 2013 in the following terms:

"The government endorses the core principles underpinning the company's Masterplan, and the continued commercial development of Dublin Port Company is a key strategic objective of National Ports Policy".

The ABR Project is based on an in-depth evaluation of needs (supported by detailed modelling and simulation studies) and a determination of the potential environmental impact of the proposed development during the EIA process.

The ABR Project complements recent and continuing initiatives by DPC to regain operational control over port lands and, more generally, to influence port operators to increase their utilisation of port lands. Figure 1.2 shows the status of lands being reacquired / redeveloped by DPC in recent times for the transit and storage of cargo.

These initiatives have recently included the publication by DPC of a policy document setting out the company's policies regarding the use of port lands and appropriate targets for their utilisation for different types of cargo.

In identifying the engineering options in the Masterplan, DPC recognised significant levels of public concern about the expansion of the Port through further infill in Dublin Bay. The Masterplan confirmed that the Company would continue to develop the Port within its current footprint to the maximum extent possible before any major reclamation works might be considered.

The ABR Project, therefore, focuses on a combination of re-developing existing (and in some cases life-expired) infrastructure and increasing the productivity of existing port lands..

To maximise the operational efficiency of the Port, many of the new berths proposed in the ABR Project have been designed to be multipurpose to cater for the needs of a range of ship and cargo types.

Why is the ABR Project Needed?

The need for the project arises for a number of reasons:

1. Dublin Port needs to make timely provision for the anticipated growth in volumes of both cargo and passengers.
2. Dublin, as the centre of national economic activity and given the regional connectivity afforded by the road and rail network, is the preferred location for the providers of shipping services to operate to and from.
3. Dublin Port needs to prepare for increases in ship sizes and the changing operational preferences of the providers of shipping services. The Port also needs to be able to cater for a large increase in the number of ship arrivals each day.
4. Dublin Port needs to re-configure port operations to best meet future capacity requirements without additional infill beyond the existing port boundaries.
5. Existing infrastructure is approaching the end of its useful life and needs to be renewed / replaced; and.
6. Undertaking the works in Alexandra Basin West will allow DPC to take steps to address a legacy contamination issue in the basin which restricts DPC's ability to carry out routine and essential maintenance dredging operations.



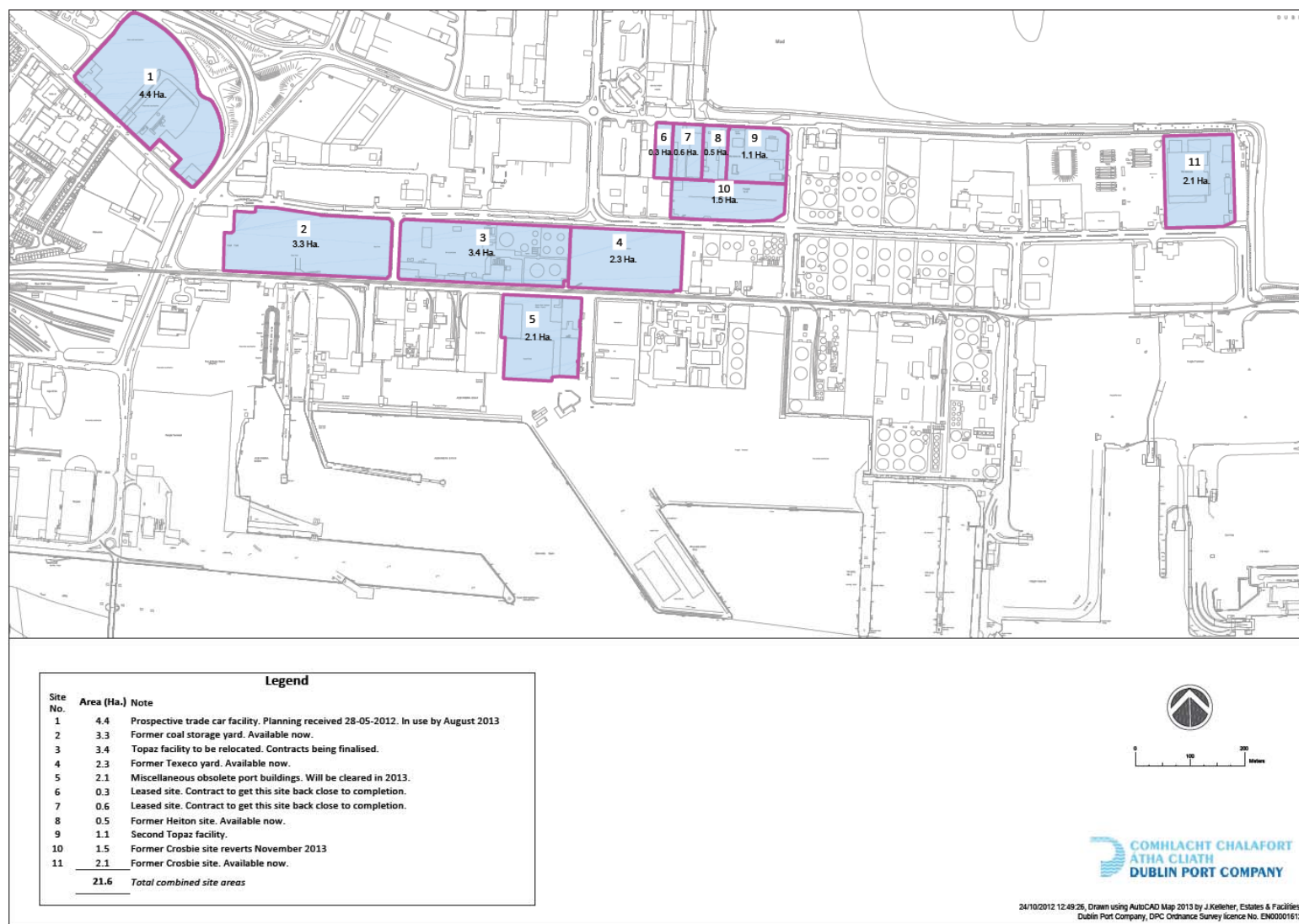


Figure 1.2 Lands re-acquired or in the process of being re-acquired by DPC

Future-proofing the Port

The ABR Project is, to a large extent, a re-engineering of port infrastructure built between the late Victorian period and the 1960's. The engineering works proposed in the project are on berths that are currently in use. This makes the project challenging in its implementation.

Moreover, it will be built at a time of growing volumes. Having seen the Port's volumes decline by 9.5% between the peak of 2007 (30.9m gross tonnes) and 2012 (28.0m gross tonnes), volumes are beginning to increase again and are up by 3.0% to 28.8m tonnes in 2013.

DPC is, therefore, challenged to complete the proposed works before volumes grow to the extent that works cannot be carried out without disrupting the businesses of the Port's customers and damaging the wider economy.

Against this background, some of the elements of the ABR Project are intended to deal with current demand and operational requirements while also future-proofing the Port by providing the capacity to further deepen berths in future years as and when required to meet market demand.

In particular, it is planned as a key part of the ABR Project that the major disruption in port activity resulting from large civil engineering works will be managed and occur on a phased basis in a way that will not result in major disruption to the movement of cargo (both import and export) through the Port.

Factors determining a port's capacity

The capacity and effectiveness of any port depend on five attributes:

1. Adequate depth and navigability of the approach channel;
2. The availability of berths with sufficient depths alongside;
3. The availability of back-up land and facilities for the transit storage of cargo;
4. Proximity to the port's ultimate customers; and
5. Quality of the landside access.

In the case of Dublin Port, proximity and landside access are probably as favourable as they could be.

In the case of landside access, Dublin Port has the immediate connection through the Dublin Port Tunnel to the M50 and beyond to the national motorway network. In addition, Dublin Port has an active and busy connection to the national rail network with daily trains transporting large volumes of lead and zinc ore concentrates from Tara Mines and a daily container train service to Ballina.

Moreover, since the publication of the Masterplan 2012 to 2040, DPC is on course to complete the assembly of 21.6 hectares of port land suitable for the transit storage of growing volumes of import and export cargo.

With three of the above five criteria satisfied, only the channel and berths remain outstanding and the proposed project seeks to address each of these.

The historic success of Dublin Port is founded on the efforts over centuries to provide the channel, berths and land for the Port in the shallow and sandy waters of Dublin Bay. These waters are characteristic of most of the east coast of Ireland where there are no great natural harbours (such as Cork, Falmouth or Sydney) but where ports developed for the most part on the estuaries of not very big rivers.

It is a story of considerable engineering ingenuity and of the continual upgrading of old infrastructure to meet new demands. Moreover, it is a continuing story where the challenges of the past remain essentially the same today and Dublin Port Company is trying to foresee the capacity that is needed for the future and to plan and build accordingly.

The project now proposed envisages the upgrading of the port's access channel and berths to ultimately cater for a range of ships significantly larger than can currently be accommodated:

- Container ships with draughts of up to about 12.5m with capacities in excess of 3,500 TEU;
- Dry bulk ships with draughts of up to 12.5m with deadweight capacities in the region of 55,000 tonnes;
- Deepsea Ro-Ro ships with draughts approaching 12.0m and lengths approaching 300m;
- Multipurpose (freight and passenger) Ro-Ro ferries with lengths of up to 240m; and
- Cruise ships with lengths of up to 340m and average draughts of 9.0m

Cargo Volumes and Dublin Port's Masterplan

There has been a long term trend of relentless growth in Dublin Port's volumes. Table 1.1 summarises past trends and projected future trends over the 90 years from 1950 to 2040.

In the 30 years to 1980, the volume of goods handled in Dublin Port increased at an average rate of 3.2% per annum. In the following 30 years to 2010, the level of growth increased to 4.6%.

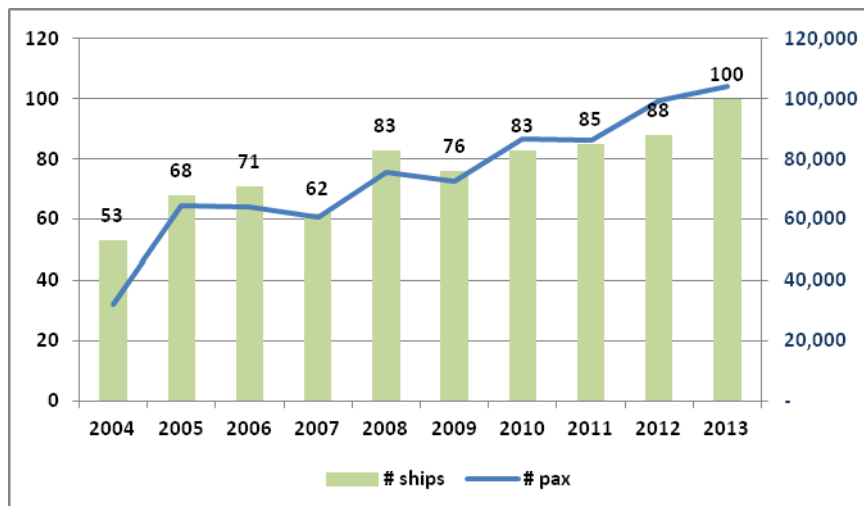
Trading patterns in Dublin Port, supported by economic analysis carried out for DPC, indicates that growth will continue in the future albeit at a lower long-term rate. In particular, DPC believes that a rate of 2.5% per annum in the 30 years to 2040 is realistically achievable.

Table 1.1 Dublin Port's long-term annual average growth rates, 1950 – 2040

Year	Gross tonnes	AAGR
1950	2,856	-
1980	7,300	3.2%
2010	28,879	4.6%
2040	60,000	2.5%

Beyond cargo volumes, DPC believes that Dublin Port's cruise business will grow considerably. In particular, DPC is confident that Dublin City has the potential to attract significantly more cruise visitors.

Dublin Port's cruise ship and passenger volumes have increased dramatically over the past decade as shown in Figure 1.3.

**Figure 1.3 Trends in Dublin Port's cruise business 2004 to 2012**

DPC believes that cruise passenger volumes will continue to increase substantially to circa 140 cruise ships per annum by 2040 carrying 340,000 passengers.

The ABR Project is therefore justified on grounds including the need to provide capacity for projected growth and the requirement to replace life-expired assets. The project is part of a Government-endorsed Masterplan which sets out a development strategy for the Port over the next 30 years. Given the long lead time for construction of port assets and their long economic life, the project incorporates measures to future proof the Port.

Consideration of Alternatives

Five generic options were identified and described in detail within the EIS:

1. The "Do Nothing" Scenario

2. Use of other Locations within the Port Area.
3. Creation of New Additional Port Areas
4. Alternative East Coast Locations and other Port Locations on the South and West Coasts.
5. Other Locations for New Ports

These were tested as appropriate against criteria relating to:

- Size,
- Shape,
- Proximity to deep water,
- Road and rail access.
- Vessel requirements
- Landside requirements
- Environmental considerations,
- Planning considerations

The project contains two main elements, the first relating to cruise vessels and the second to cargo handling with specific reference to the unitised trade. Although the berths for cruise vessels are primarily dedicated to such vessels during the cruise season they will be multi-purpose and available for other vessel types as the need arises.

The assessment of alternatives concluded that the ABR Project offers the only realistic solution in the near term to the requirements for the movement of the unitised trade in and out of the Dublin region by sea.

The Planning Process

Following consultations under Section 37B of the Planning and Development Act, 2000 as amended, An Bord Pleanála served notice to the applicants under section 37B(4)(a) which stated that they had decided that the proposed development would be strategic infrastructure within the meaning of section 37A of the Act. Any application for the proposed development must therefore be directly to the Board under Section 37E of the Act. In addition to the application to An Bord Pleanála, applications will also be made to the EPA for a Waste License and a Dumping at Sea Permit. Foreshore consent under the Foreshore and Dumping at Sea (Amendment Act) 2009 will also be sought from the Department of Environment, Community and Local Government.

The proposed development is set within the context of a number of key economic and planning policies and guidance documents. The ABR Project complies with:

The proposed development is set within the context of a number of key economic and planning policies or guidance documents. The ABR Project complies with:

- Government Ports Policy;
- The Employment and Industry zoning objective for the area in the Dublin City Development Plan; and

- The ambition for integration with the city in the Masterplan and Local Action Plan (with the location of cruise berths at North Wall Quay Extension as well as the interpretive elements which will be available to the public).

It also meets

- The medium term capacity requirements recognised in the National Spatial Strategy, the Regional Planning Guidelines for the Greater Dublin Area and DPC's own Masterplan.

There have been developments in relation to the Eastern Bypass as a result of meetings held between Dublin City Council, the National Roads Authority and Dublin Port Company that are covered in detail in the Planning Report accompanying the planning application. It can be noted that the ABR Project does not impede the delivery of the Eastern Bypass.

The major advance in terms of clarity in relation to planning ports and Dublin Port in particular is the National Ports Policy 2013. For the first time there is an unambiguous recognition of the importance of the Port and its need to cater for economic growth in the Dublin Region and Ireland as a whole as well as its role in the wider European context.

It can be expected that revised planning documents at regional and local level will reflect the Port's Policy by removing any residual ambiguities in relation to the Port's future. The endorsement of DPC's Masterplan within the Policy is a strong indication of Government support.

Scope of the EIS

A scoping exercise was carried out at the beginning of this project to determine the issues that needed to be addressed in the EIS.

Once the key issues were identified, baseline studies/surveys were carried out. The studies enabled the prediction of the likely environmental impacts arising from the proposed development. These impacts were evaluated in terms of their significance, nature and magnitude.

The main aim of the environmental assessment, as part of the design process, is to ensure that any potentially damaging effects are avoided or minimised and that the beneficial aspects of the project are enhanced. The best means of impact mitigation is to avoid it in the planning and design process. Reduction involves lessening the degree of an impact that cannot be completely avoided. Reducing the impact acknowledges that some degree of adverse impact will arise, but provides the means by which the conditions can be improved or compensated for.

The scoping itself continued throughout the project and in particular during the main consultation phase of the project.

2 CONSULTATION PROCESS

In January 2011 DPC commenced a 14 month long consultation process for the Masterplan. The process was aimed at soliciting views from a wide circle of stakeholders whose perspectives on the operations and future of the port were regarded as important.

The key documents produced during this period of consultation are shown in Figure 2.1.



Figure 2.1 Masterplan Documentation

The consultation process for the Masterplan created a significant level of interest and active participation.

The community briefings attracted over 100 people from Clontarf, East Wall and Ringsend. A conference was attended by 140 key stakeholders, while additional briefings were held with 12 organisations and groups.

The publication of the Issues Paper secured 222 formal responses from a range of participants including statutory bodies, commercial entities and community groups. This was a very encouraging response rate for a consultation process of this nature and, in particular, the level of understanding of the matters outlined in the Issues Paper was extremely high.

Having examined and considered the detailed responses, DPC published a draft Masterplan in October 2011 which reflected many of the excellent and constructive suggestions from the Issues Paper consultation.

The draft Masterplan consultation process conducted over November and December 2011 secured 34 formal responses from a range of participants categorised as follows:

- Submissions by Individuals & Community Groups – 19 respondents
- Submissions by Public Representatives – 3 respondents
- Submissions by governmental/statutory bodies – 9 respondents
- Submissions by Commercial entities – 3 respondents

The object of the consultation process was to create awareness of Dublin Port, to identify the issues that DPC was seeking to address in the Masterplan and, most importantly, to encourage participation and submissions on the Issues Paper and draft Masterplan to contribute to the final Masterplan. A key aspect to the consultation process was to identify some of the key parameters which should inform individual projects which should subsequently emerge from the Masterplan.

The ABR Project directly reflects and addresses many of the key observations made during the consultation process for the Masterplan such as:

- Recognition that DPC should fully exhaust all viable alternatives to meeting the operating requirements of the Port before engaging in additional reclamation works.
- An acceptance that Dublin Port is a key part of the national strategic infrastructure and plays a key role in the life of the City and the Greater Dublin area.
- A desire for greater integration between Dublin City and Dublin Port.
- A need for any subsequent development and increased port activity to take account of the marine ecology and the important natural resource presented by Dublin Bay.
- The proposed new location for cruise ship disembarkation was viewed very favourably. There was strong agreement that the suggested location was situated in a more attractive

setting for passengers arriving into the city. This forms a core part of the current development proposal through the creation of multi purpose berths adjacent on the North Wall Quay Extension which can accommodate large cruise vessels as close to the City as it is possible to get.

- The need for any new development proposals to be accompanied by a significant community gain, in particular with new environmental enhancements and boundary softening. The potential offered for additional cultural gain was also recognised given the historical fabric of some port infrastructure.
- Concerns about how future developments might impact on the areas surrounding the port lands in terms of transport, noise and amenity.

Building on the extensive consultation carried out during the process to develop the Masterplan, DPC and their consultants RPS carried out further extensive consultation on the ABR Project in the course of developing the current proposal.

Consultation with the statutory bodies was continual throughout the Environmental Impact Assessment process and, in particular, where potential issues were raised during the impact assessment phase.

An extensive programme of public consultation concerning the ABR Project was undertaken between September and November 2013 to seek the views of the wider public on the ABR Project and the proposed community gain initiative to be advanced as part of the project.

The community gain initiative, proposed as a key part of this project, involves the transfer of land owned by DPC on Bull Island to Dublin City Council for the people of Dublin and the allocation of funds by DPC towards the cost of a study and a new visitors centre on Bull Island.

The consultation process involved:

- The publication of a community newsletter on the ABR Project and the community gain element, which was circulated to over 40,000 homes in areas adjacent to the Port.
- Meetings with local community groups in areas directly adjacent to the Port.
- Briefings with local public representatives on the ABR Project and the community gain element – these meetings included one to one briefings with individual public representatives and also with Local Area Committees of Dublin City Council.
- The development of a dedicated website to explain the proposed initiative and facilitate feedback. The website link is as follows www.dublinport.ie/masterplan/dublinportabr
- A dedicated community consultation process to seek views on both the ABR Project and the Community Gain initiative – the consultation process sought respondents' views in general but also invited responses around specific questions about the project and the Community Gain proposal.
- The publication of public notices in local newspapers.
- An extensive media campaign to publicise the project which secured wide coverage in all national and local print, electronic and online media outlets.

The consultation process on the ABR Project and the community gain secured written responses from 34 parties. A number of specific comments/issues were raised during the consultation process which have been addressed in the EIA, where relevant, and the application for development being brought to An Bord Pleanála, including:

- Broad based support for the community gain proposal outlined by DPC as part of the ABR Project.
- The need for timely development of facilities at Dublin Port to accommodate trade levels, trends in shipping and economic development.
- The maximisation of use of current land in Dublin Port as an alternative to additional encroachment into Dublin Bay.
- Support for new berthing facilities for cruise vessels given the increase in the level of cruise traffic and the economic contribution presented by cruise liners.
- Recognition of the need for closer integration between the Port and the City.
- Recognition of the potential for cultural heritage gain presented by the ABR Project – specifically around the restoration of Graving Dock #1 with modernity and cultural heritage co-existing.
- Need for better public transportation links between the Port and the City.
- Boundary softening between the Port and surrounding areas would be a significant benefit from the development.
- A desire to comment on the specific development proposals once presented to An Bord Pleanála and to participate more fully in the development assessment process.
- Some concerns about the impact of the proposed development on the displacement of commercial activity currently carried out in Dublin Port.
- A desire that any proposals from Dublin City Council for Bull Island following on from the implementation of the community gain proposal should be subject to appropriate consultation, best practice and the relevant planning consent and environmental assessment process.

In addition to the significant level of consultation undertaken in the development of the Masterplan and as part of the ABR Project to date, it is planned to undertake a major public information exercise to inform all stakeholders of the proposed development when the planning application is lodged with An Bord Pleanála. The purpose of this information exercise will be to inform people of the development proposals, the impacts arising and to ensure that they are aware of the opportunities available to them to participate in the development assessment process.

3 SITE DESCRIPTION

The proposed development is located within Dublin Port Estate, Dublin, the largest Port in Ireland located on the East Coast of Ireland and within the navigation channel and fairway from Dublin Port into Dublin Bay.

Dublin Port Estate comprises an area of circa 260 hectare spanning both North and South banks of the River Liffey (Figure 3.1).

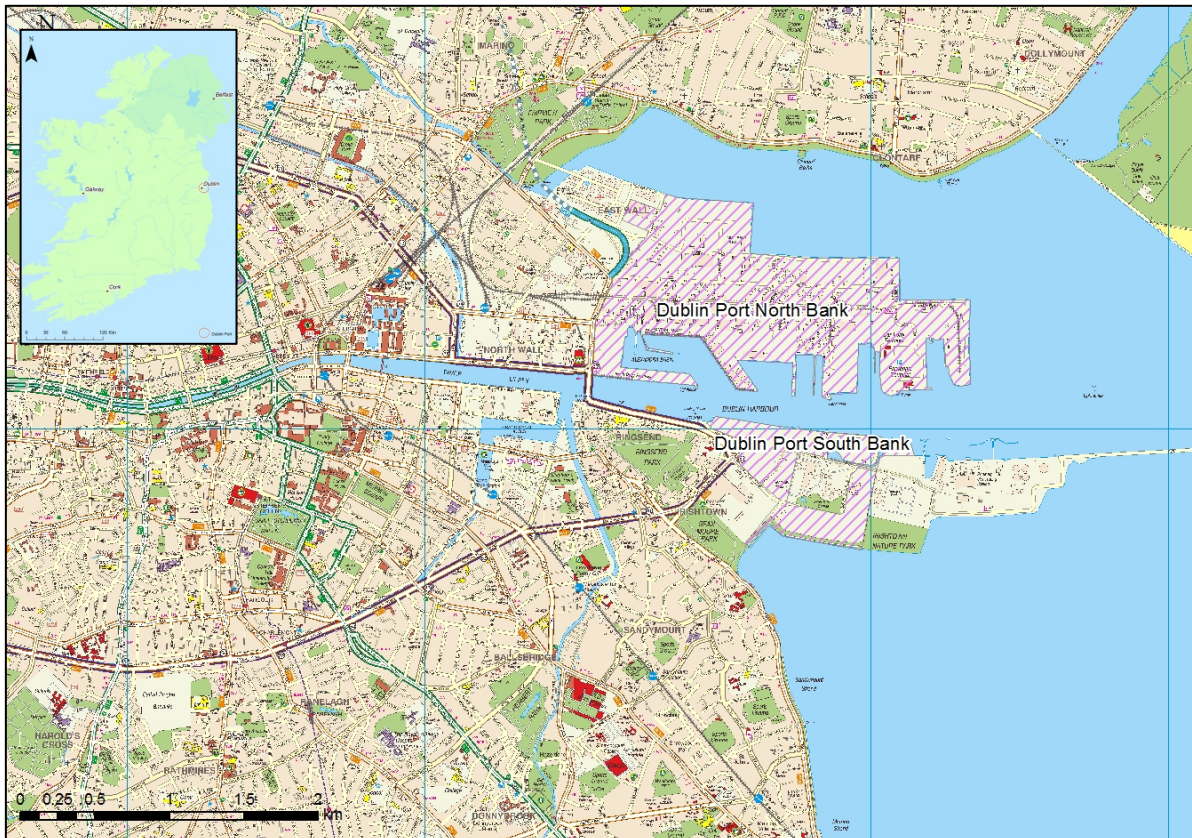


Figure 3.1 Location of Dublin Port

The proposed ABR Project comprises works to be undertaken in Alexandra Basin West, Berths 52 / 53 and the navigation channel .

Alexandra Basin West and Berths 52 / 53 lie entirely within the Dublin Port Estate and are used solely for Port related activities.

The navigation channel is controlled by DPC which is the competent authority with responsibility for the safe passage of all shipping entering and leaving the Port. No other commercial activities are permitted within the navigation channel for safety reasons. Maintenance dredging of the navigation channel takes place on a regular basis to maintain a depth of -7.8m CD.

The locations of Alexandra Basin West and Berths 52 / 53 in Dublin Port are shown in Figure 3.2.

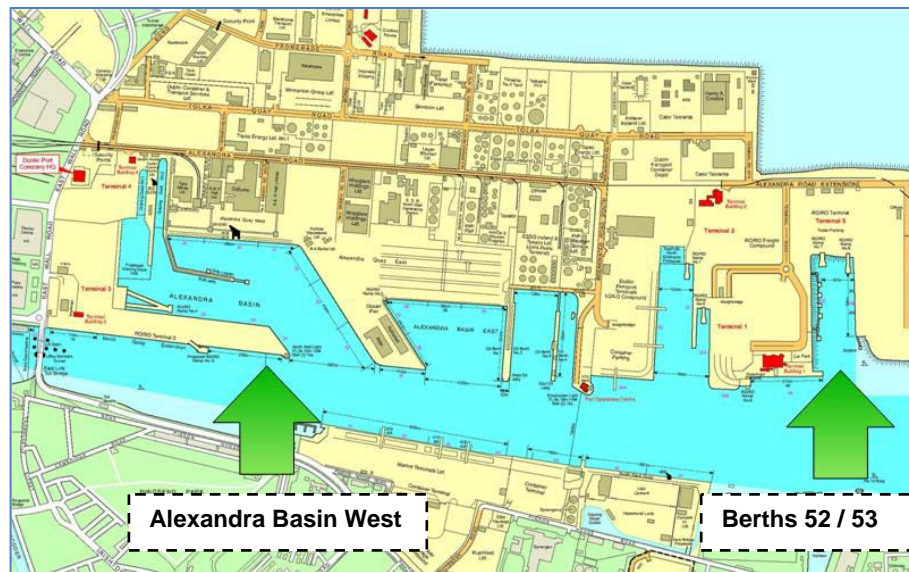


Figure 3.2 Location of Alexandra Basin West and Berths 52 / 53

A capital dredging scheme is an integral part of the development. Its purpose is to deepen Alexandra Basin West and the navigation channel and fairway from Dublin Port into Dublin Bay from its current depth of -7.8m Chart Datum (CD) to a depth of -10m CD as shown in Figures 3.3 and 3.4.

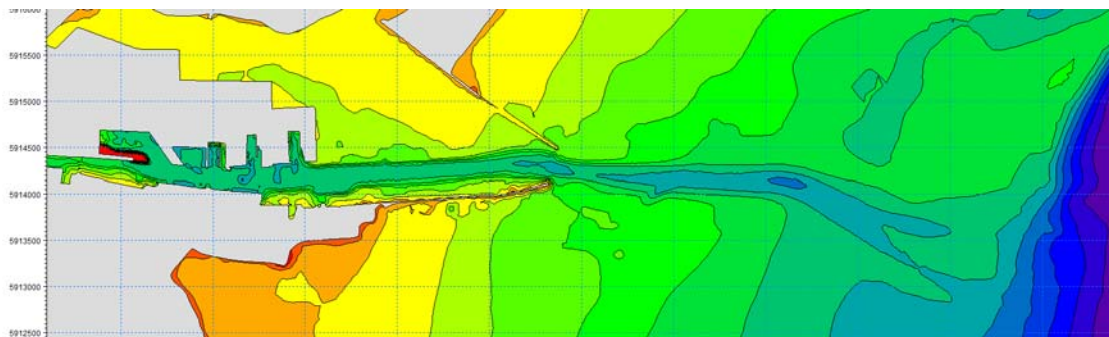


Figure 3.3 Existing navigation channel and fairway bathymetry to Mean Sea Level (MSL)

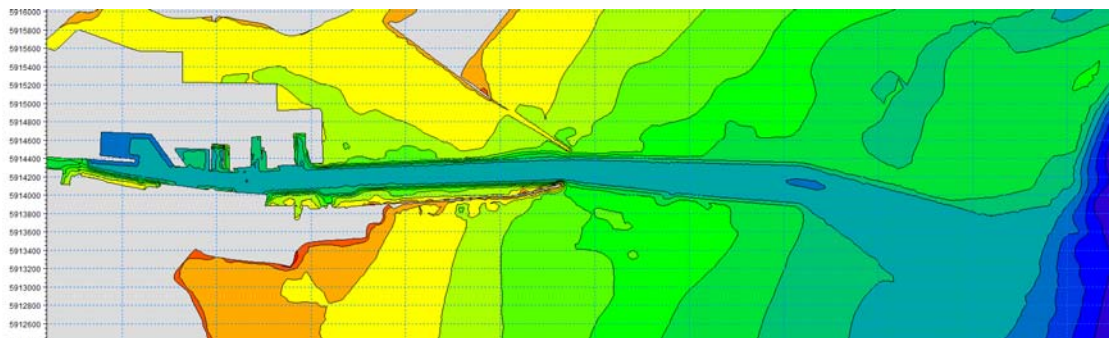


Figure 3.4 Proposed navigation channel and fairway bathymetry to Mean Sea Level (MSL)

4 PROJECT DESCRIPTION

The extent of the ABR Project is presented in Figure 4.1A

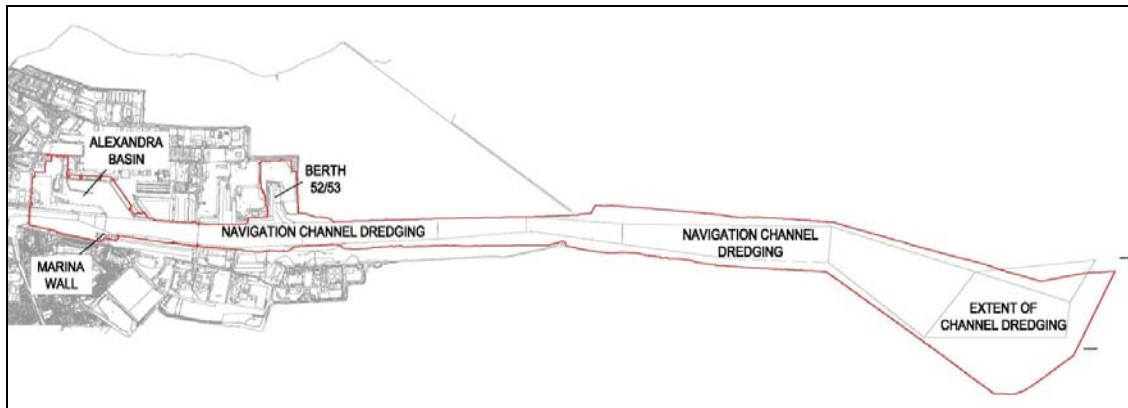


Figure 4.1A Site Location Plan

The proposed development works comprise the following elements:

Navigation Channel (see Figure 4.1A)

- Dredging of Liffey Channel to -10m CD, from East Link Bridge to the Dublin Bay Buoy over a six year period
- Construction of a surge protection/retaining wall at Poolbeg Marina

Alexandra Basin West (see Figure 4.1B)

- Dismantling of infrastructure and removal of infill material
- Quay wall refurbishment/construction (designed to accommodate future dredging to a level of -15m CD)
- Installation of Ro-Ro ramps
- Ro-Ro jetty construction
- Dredging of basin and berths to -10m Chart Datum (CD)
- Treatment of contaminated dredged material and re-use as infill on site
- Excavation and restoration of Graving Dock # 1
- Infilling of Graving Dock # 2 with treated dredged material
- Relocation of ore concentrates loading operations to Alexandra Quay West Extension
- Development of cultural heritage interpretative space

Existing Berth 52/53 (see Figure 4.1C)

- Dismantling and removal of existing infrastructure
- Infilling of existing Berth 52/53 with treated dredged material
- Raising of existing surface levels by approx. 1.4m

- Quay wall construction
- Mooring jetty construction
- Installation of Ro-Ro ramp

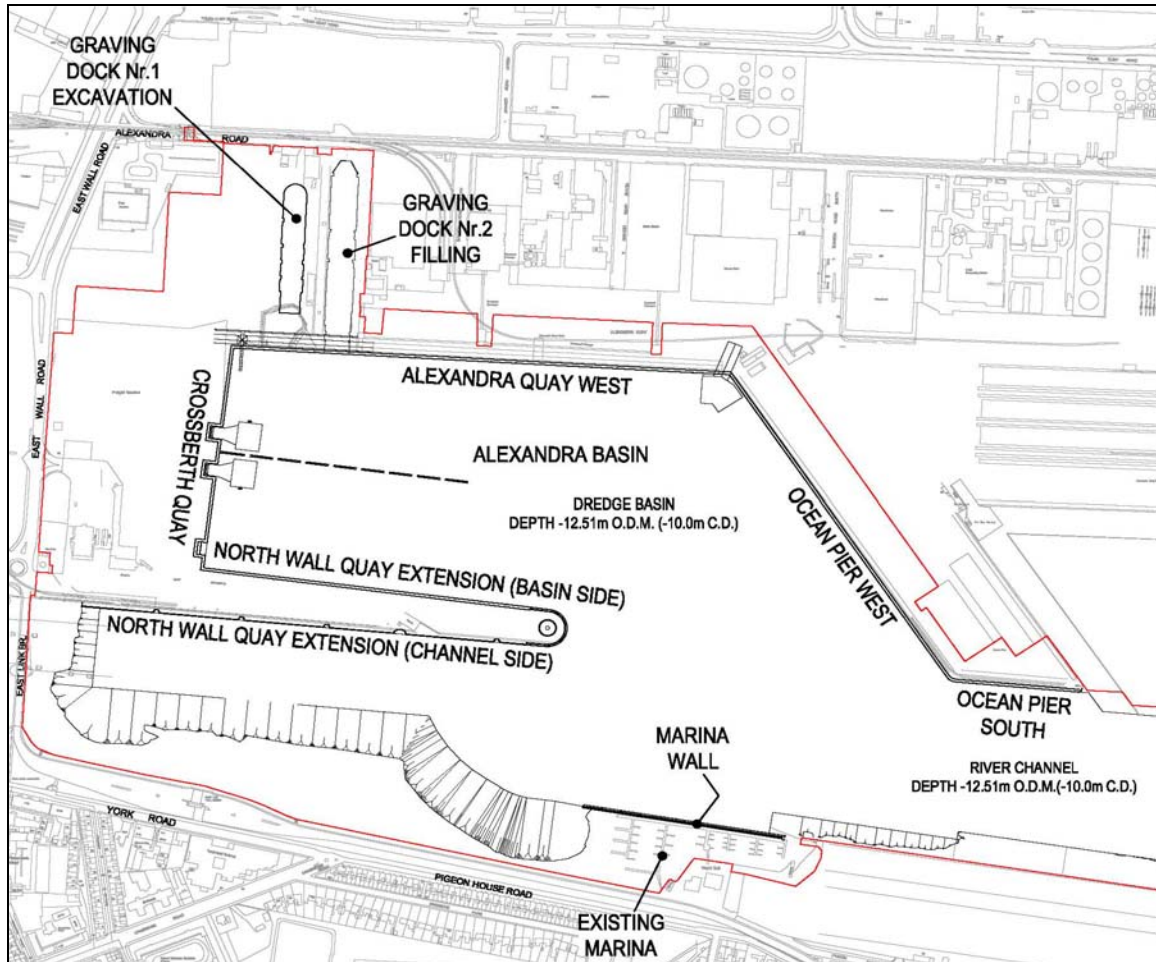


Figure 4.1B Works at Alexandra Basin West

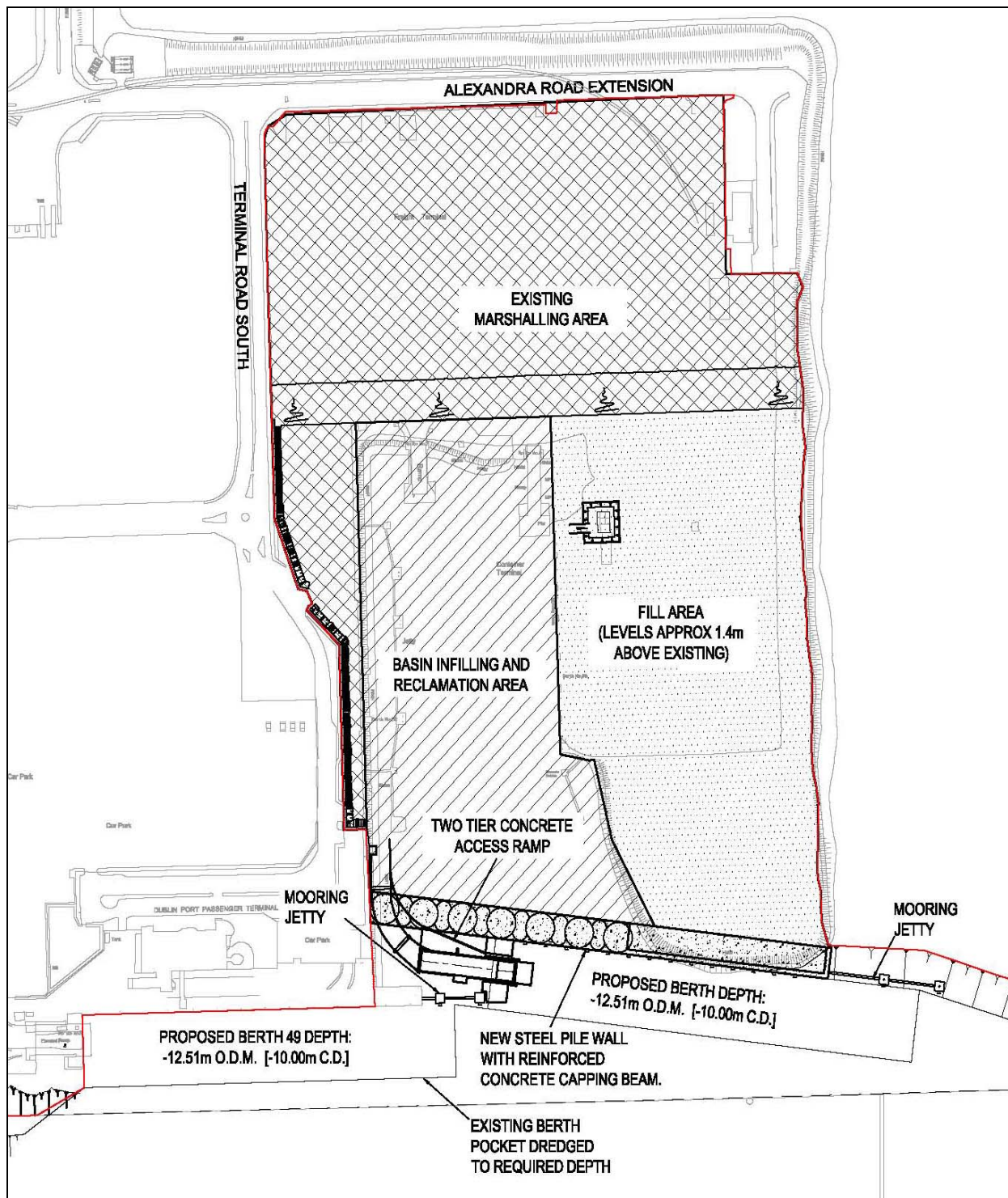


Figure 4.1C Works at Berth 52/53

Port Equipment

The works associated with this scheme are required to permit a reconfiguration of the existing operations within Alexandra Basin West and at Berth 52/53. It is therefore envisaged that all operations within these areas will be similar to current operations.

In order to facilitate the operations within the proposed basin layout and at the new river berth at 52/53, it is necessary to reconfigure existing equipment and install new equipment including:

- Relocation of existing ramp No. 8 from Berth 52/53 to Crossberth Quay;
- Installation of ramp No. 8 and 1nr new Ro-Ro ramp to serve the 273m long Ro-Ro jetty;
- Relocation of double deck ramp No. 4 from Alexandra Basin West to new river berth at 52/53;
- Installation of a double Ro-Ro ramp at intersection between Alexandra Quay West and Ocean Pier West; and
- The relocation of the ore concentrates loading operations to a new quay across the entrance to Graving Dock No.2.

There is no proposal for additional cranes within the port, as part of this scheme, other than normal upgrading of harbour mobile cranes as and when required.

5 FLORA AND FAUNA

An assessment of the impact of the ABR Project on the natural environment in terms of birds, marine mammals, terrestrial ecology and marine ecology has been completed.

An Appropriate Assessment was also undertaken in accordance with the EU Habitats Directive and EU Birds Directive for the qualifying interests within the candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPA) within Dublin Bay, estuary and surrounding area. The Appropriate Assessment is presented as a separate Habitats Directive Assessment - Natura Impact Statement supporting the Planning Application.

Birds

A comprehensive series of field surveys have been undertaken to support the environmental assessment in relation to birds comprising:

Winter bird surveys

Brent Geese

The berths at Alexandra Basin West are used for the unloading of agricultural products and occasional spillage of these materials attracts flocks of Brent Geese to forage here. A series of surveys of Brent Geese was undertaken in Alexandra Basin West between January and April 2013 (12 surveys) and between October 2013 and January 2014 (five surveys).

Winter Bird Surveys in the Tolka Estuary

A total of 27 monthly low tide surveys have been undertaken between the months of September and April, over four winters, covering all of the intertidal areas in the Tolka Estuary from Fairview to the Bull Wall.

Breeding bird surveys

Black Guillemots

Black Guillemots breed throughout Dublin Port, mainly in the piers and other structures. A total of five surveys were undertaken in Alexandra Basin West and a full survey of the port from Butt Bridge to the Poolbeg Power Station was carried out on 17th May 2013.

Tern colonies

Dublin Port has held a breeding colony of Common Terns and Arctic Terns since at least 1949. In recent years the colony has established on two mooring dolphins close to the Poolbeg Power Station and this has been well-monitored since 1995. This monitoring has been continued since 2011 by BirdWatch Ireland. A total of six visits were made to the colony, as part of the Dublin Bay Birds project, between 3rd May and 9th September 2013 to census nesting terns. Breeding productivity of the terns has also been recorded by BirdWatch Ireland.

Bird surveys within the shipping channel

A series of six surveys of all birds located within the shipping channel, from the Alexandra Basin West to the Dublin Bay Buoy, was undertaken in the period June 2013 to January 2014.

Impacts on birds – Alexander Basin West

Brent Geese are present in Alexandra Basin West each winter from approximately November to April. The geese are attracted to feed from spilled agricultural products on the quays, mainly on Berths 29-33. They also swim in flocks on the water in the Basin. These birds move frequently between different parts of Dublin Bay and the species is one of the special conservation interests of the two Special Protection Areas in Dublin Bay. Numbers of geese recorded in Alexandra Basin West peaked at 450 birds in both winters 2012/13 and 2013/14. Recording of marked birds indicates that there is a high degree of site fidelity among the individual geese using the Basin.

Redevelopment of the quays and jetties in the Basin will take place on a phased basis so that shipping can continue to use parts of the Basin at all times. As agricultural products will continue to be unloaded here, albeit in different locations, the geese will continue to be attracted to the spillages. They are already habituated to high levels of shipping activity and associated noise so that construction noise is unlikely to have any additional effects.

Black Guillemots are present in Alexandra Basin West, mainly in spring and summer months. A maximum of 16 birds was recorded within the Basin in May 2013 and this represents about 20% of the total breeding population in Dublin Port. The birds breed in cavities within the existing quays and jetties, including a number of disused drainage pipes. Mitigation measures will be introduced to provide alternative nest sites in neighbouring areas of the port, in advance of the redevelopment. Concrete nest boxes will be incorporated into the new quays and jetties, at appropriate locations selected at the detailed design stage, to encourage the birds to return to these areas in subsequent breeding seasons.

The breeding tern colonies on the mooring dolphins in Dublin Port are sufficiently remote from Alexandra Basin West and will not be affected by the redevelopment works.

Impacts on birds – Berth 52 and 53

The only breeding birds present in the vicinity of Berths 52/53, are Black Guillemots which use the area mainly in spring and summer months. A maximum of four birds was recorded within this Basin in May 2013 and this represents about 5% of the total breeding population in Dublin Port. The birds breed in cavities within the existing quays and jetties. These cavities will be removed preceding the redevelopment works to prevent their use by the birds during demolition. Mitigation measures will be introduced to provide alternative nest sites in neighbouring areas of the port, in advance of the redevelopment. Black Guillemots are rarely seen foraging in the water areas of the Basin as it is unlikely that their preferred fish prey occurs here in sufficient density. The infilling of this area will not cause any significant impacts on Black Guillemots.

Impacts on birds – Capital dredging Scheme

Direct impacts of dredging

The shipping channel is used by a range of seabirds and other species throughout the year. The dredging works in the channel will be carried out in phases over six years. The work will be confined to winter months (October to March) and will thus not affect birds foraging during the breeding season. Maintenance dredging was carried out in the channel in 2012 and no significant changes in bird populations in the Tolka Estuary area in winter 2012/13 were recorded that could be connected with the dredging activity. All birds using Dublin Port's shipping channel and approaches are habituated to high levels of shipping activity. A single dredging vessel, involved in the proposed capital dredging for this project, would not cause any significant additional disturbance potentially affecting wintering waterbirds and seabirds within the shipping channel.

Indirect or long-term impacts of dredging

The intertidal areas of the Tolka Estuary are an important habitat for wintering birds. The simulations carried out for this project have modelled the deposition of suspended sediment during the dredging process. The deposition of suspended material in the Tolka Estuary has been shown to have no significant impact on the inter-tidal areas of the Tolka Estuary.

A review of the impacts of capital and maintenance dredging in the Tamar estuary, in south-west England, was published by Widdows *et al.* (2007). This estuary is a Special Protection Area under the EU Birds Directive which requires annual maintenance dredging as well as occasional capital dredging for new installations. Maintenance dredging here involves annual removal of between 5,000 and 200,000 tonnes of dry sediment per year. During two periods of capital dredging in the Tamar, the amount of sediment dredged was between 500,000 and 700,000 tonnes per year. Annual estimates for ten species of wildfowl and waders were analysed over several decades in the Tamar Estuary. There were no significant correlations between overwintering bird numbers and dredging activity. Declines in Teal and Wigeon over 30 years were related to milder winters which changed the migratory patterns of these species.

The large breeding colony of Common Terns within Dublin Port has been monitored closely since 1995. Breeding productivity (number of fledged young per nesting pair) between 1995 and 2002 averaged at 1.50 (range 1.20 to 1.79) (Merne 2004). In 2013 the estimated productivity for this colony was in the range 1.05 to 1.91 (median 1.48) (BirdWatch Ireland, unpublished data). This suggests that the overall productivity of the terns is relatively stable over the medium term and has not been negatively affected by dredging of the Liffey Channel in 2012. The breeding colonies in Dublin Port are principally occupied by terns from late April to August. From July to September, large flocks of migratory terns gather in Dublin Bay and roost on Sandymount Strand (Merne *et al.* 2008). By early October, the majority of these birds have left the bay completely. As the proposed dredging of the navigation channel will take place in winter months only, when the terns are absent, there will be no residual increase in suspended sediments from dredging by the time the terns return to the colonies in late April.

It is concluded that the ABR Project will have no significant impacts on birds in the channel itself or in the surrounding intertidal areas of the Tolka Estuary or other intertidal parts of Dublin Bay.

Marine Mammals

Marine mammals are protected by national legislation and by a number of international regulations which Ireland is a signatory. The main legislation that affords protection to marine mammals in Irish waters is the Wildlife Act (1976) amendment Act (2000), which prohibits wilful interference to wild mammals and disturbance of resting and breeding sites.

In light of the legislation and conservation status of marine mammals, careful assessment and consideration has been made with respect to the potential for effects on these species and their habitat.

In particular, Rockabill to Dalkey Island was designated as a candidate Special Area of Conservation (cSAC) in 2012. Harbour porpoise is listed as a qualifying interest for this site. The proposed capital dredging scheme extends into the new Rockabill to Dalkey cSAC. The licensed offshore disposal site for dredge spoil, located to the west of the Burford Bank, also lies within the cSAC. Surveys of harbour porpoise, carried out at specific sites around the Irish coast, identified Dublin Bay as an important area for the species with high densities in Dublin Bay of 1.19 per km² reported, representing one of the highest densities of the species recorded in Ireland to date.

Given the sensitivity of marine mammals, particularly to noise generated from construction works such as piling activity, the following precautionary measures will be undertaken to minimise the risk of direct injury to marine mammals in the area of operations:

- A trained and experienced Marine Mammal Observer (MMO) will be put in place during piling, dredging, dumping, and demolition operations. The MMO will scan the surrounding area to ensure no marine mammals are in a pre-determined exclusion zone in the 30-minute period prior to operations. It is suggested that this exclusion zone is 500m for demolition and dredging activities, and 1,000m for piling activities.
- Noise-producing activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring is not possible, the sound-producing activities will be postponed until effective visual monitoring is possible. Visual mitigation for marine mammals (in particular harbour porpoise) will only be effective during daylight hours and if the sea state is 2-3 (Beaufort scale) or less.
- For piling activities, a ramp-up procedure will be employed over a period of 20-40 minutes.
- Once operations have begun, operations will cease temporarily if a cetacean or seal is observed swimming in the immediate (<50m) area of piling and dredging and work will be resumed once the animal(s) have moved away.
- Dumping of material at sea will not take place if a cetacean or seal is within 50m of the vessel.
- Any approach by marine mammals into the immediate (<50 m) works area will be reported to the National Parks and Wildlife Service.
- If there is a break in piling activity for a period greater than 30 minutes then all pre-activity monitoring measures and ramp-up procedures will recommence as for start-up.

- Once normal operations commence (including appropriate ramp-up procedures), there is no requirement to halt or discontinue the activity at night-time, nor if weather or visibility conditions deteriorate, nor if marine mammals occur within a radial distance of the sound source that is 500m for dredging and demolition works, and 1000m for piling activities.
- The MMO will keep a record of the monitoring using an 'MMO form location and effort (coastal works)' available from the National Parks & Wildlife Service (NPWS) and submit to the NPWS on completion of the works.
- In order to reliably quantify the zone of responsiveness associated with the proposed programme of piling activities associated with the ABR Project, one of the following methods will be used:
 - Modelling of sound propagation calibrated using field measurements; or
 - Deployment of hydrophones in combination with passive acoustic monitoring.

With full implementation of the mitigation measures outlined above, there will be no significant impacts of the proposed development on mammal mammals, including harbour porpoise. It is concluded that there will be no significant impacts of the proposed development on the conservation objectives of the Special Areas Conservation in Dublin Bay or neighbouring coastlines, including the Rockabill to Dalkey Island cSAC.

Terrestrial Ecology

An extended Phase 1 Habitat Survey of Alexandra Basin West and Berth 52/53 Basin was undertaken in May 2013 to identify any or all of the following ecological features:

- Plant habitats;
- Invasive Flora & Fauna species;
- Invertebrates;
- Protected Amphibians: smooth newt *Lissotriton vulgaris* and common frog *Rana temporaria* breeding habitat; and
- Protected Reptiles: Potential Common Lizard breeding habitat

Surveys were also undertaken for Badger, Otter and Bat. The foraging potential of the site for bats is considered 'low' in accordance with BCT: Good Practice Guidelines (2012). Habitats typically associated with Irish bats (hedgerow, tree lines, fresh watercourses) are entirely absent from both development sites. Nevertheless, as a precaution, a bat detector was used to record bat activity between dusk and dawn night over two weeks in June 2013.

The results of the surveys showed that there would be no negative residual impact of the proposed works on terrestrial flora and fauna in the area.

Benthic ecology and fisheries

The benthos and fisheries aspect assessment was based on comprehensive field surveys supported by literature review.

The baseline surveys comprised the collection and analysis of 25 sub-tidal grab samples and one anchor trawl sample to establish the existing benthic ecology of the seabed which has the potential to be impacted by the capital dredging scheme. This data was complemented by sub-tidal video surveys. The fisheries assessment was supported by surveys using beam trawls and fyke nets.

The results of the benthic ecology and fisheries assessments are summarised below:

Alexandra Basin West

The proposed development at the Alexandra Basin West will result in a gain of about 3.1ha of new subtidal habitat associated with the reduction in size of the North Wall Quay Extension and the removal the spoil deposit in the North West corner of the basin. Results from the present survey indicate that the communities present are typical of enriched, muddy sediments. The sites are dominated by large numbers of highly opportunistic species such as *Capitella capitata*, with low species diversity present in the area.

In addition, it is proposed to dredge Alexandra Basin West. The sediment to be removed consists of sandy muds and muds. The dominant taxa present in the Alexandra Basin West consist of highly opportunistic infauna species. The removal of these faunal communities would be considered locally severe, but minor. Recovery in the area would be expected rapidly (<1 year).

Berth 52/53

The proposed development at Berth 52/53 will result in the loss of about 4.5 ha of subtidal benthic habitat as a result of the infilling of the basin. The sediment at these sites consists of sandy muds / muddy sands and the associated faunal communities present in the area consist of highly opportunistic taxa, common throughout the inner Dublin Bay site. Although the infilling of the basin will result in the permanent removal of this habitat, the impact of this is considered minor due to the nature of the faunal community present in the area and to the new habitats which will be gained at Alexandra Basin West, which when balanced against the infilled area will result in a net overall habitat loss of approximately 1.4ha. This overall change in habitat is considered to be negligible in the context of the Lower Liffey Estuary as a whole.

Dredging of the shipping channel

The ABR Project requires the deepening of the shipping channel from -7.8m CD to -10m CD. This will include an extension of the shipping channel at its seaward end to where it meets the natural -10m CD contour. The new navigation channel will encroach into the western edge of the Rockabill to Dalkey Island candidate Special Area of Conservation (cSAC Code: 003000). This cSAC has been designated for the Annex II species Harbour Porpoise (*Phocoena phocoena*) and the marine habitat – reefs.

The faunal community identified in the inner section of the dredge channel, within the port area, is dominated by highly opportunistic species. These species are expected to rapidly re-

colonise the seabed commencing immediately following cessation of dredging, resulting in a rapid recovery to the pre-dredge community within about 12 months. Faunal communities identified in outer Dublin Bay are similar to those identified in the surveys of Walker & Rees (1980) from 1971 and 1972, which points to the stable nature of the communities present in the area.

Dredging occurred in 2012 and results from the present survey indicate that there are no differences in community structure between sites subjected to dredging and adjacent sites which had not been dredged. This indicates that the faunal communities present in the bay recover quickly to pre-dredge levels following cessation of dredging.

The proposed extension to the existing shipping channel will result in the temporary removal of the benthic invertebrate community associated with the surface layer of 67.5 ha of soft-sediment from the cSAC. The area to be removed consists of fine muddy sands and fine sands, and is typical of the benthos found across a large area of Dublin Bay. Recovery of the benthic communities in this area will commence immediately following cessation of dredging and is expected to take about two years. The overall size of this cSAC is approximately 27,315ha, so the temporary disturbance to the benthic community is less than 0.25% of the area of the cSAC and would be considered minor. This coupled with the temporary nature of the impact, means the expected impacts would be considered negative, though minor and temporary in extent.

No reef habitats were identified in or adjacent to the area to be dredged. The proposed capital dredging scheme will therefore have no impact on this qualifying interest of the Rockabill to Dalkey Island candidate Special Area of Conservation.

Footprint of the dumpsite

The main impact associated with dredge spoil disposal is smothering of the benthos following deposition of large volumes of inert sediment on the seabed. The sediments that will be dredged will consist primarily of sands in the middle and outer parts of the bay, and silts along the inner port channel.

The sandy sediment to be collected from the outer areas of Dublin Bay are similar in nature to the sediments identified in large parts of the dump site and for this reason the recovery of benthic communities present at the site will proceed more rapidly than if there were large differences in composition between the spoil and the sediment already at the site. This feature of disposal site recovery has been noted in several studies reported in the scientific literature (Smith & Rule, 2001; Ware *et al.*, 2010; Bolam *et al.*, 2006).

In contrast, the deposition of silt from the inner parts of the shipping channel will result in a more pronounced impact in terms of smothering with the likelihood that few, if any, invertebrates from the existing community below the deposited spoil will be able to burrow vertically through the deposited layers, thus leading to a more pronounced drop in the diversity of species present and their density and biomass.

Hydrodynamic factors associated with the disposal site will mean that the finer sediments will disperse away from the disposal site, due to a combination of tidal and wind-driven forcing, leaving sands and coarser materials on the seabed. Once this occurs, it is expected that recovery of the benthic community to a sand community will follow.

The dumpsite is a dispersive, site, which was used in 2012 for the disposal of 650,000m³ of dredge spoil from Dublin Port. The depths at the disposal site range from -12m CD to -24m

CD. The peak tidal flow recorded at the site is 0.82 m/s (1.59 knots). Surveys undertaken elsewhere at dispersive sites, i.e. sites which are subjected to regular physical stress (such as sediment bed load movement, wave action, strong currents) indicate that the benthic communities present have a higher resilience to disposal events (Bolam & Rees 2003; Bolam *et al.*, 2011).

The fauna identified at the Dublin site contains species common throughout the bay. Dublin Bay is a shallow coastal environment with biological communities well adapted to frequent disturbances due to water and sediment movement. Results from previous surveys highlight the stable nature of the biological communities throughout the embayment, including the disposal site and reflect the adaptive nature of the fauna within Dublin Bay to hydrodynamic disturbance.

The area has been subjected to regular deposition of sediment over many decades. Kennedy (2008) recorded high ecological quality values for the site, indicating Good Status under the Water Framework Directive, which reflects the ability of the site to rapidly recover following dredge spoil disposal. In view of the dispersive nature of the site and the findings of previous studies which recorded a fairly typical community for the habitats present, despite regular spoil disposal, it is considered that the impacts associated with the deposition of 5.9 million m³ of mixed sediment over a six year period will be temporary negative in nature, principally affecting the direct footprint of the disposal site, and that substantial recovery can be expected to occur within 12 months of the cessation of disposal.

Fisheries

The key potential impact with regard to fisheries relates to the passage of salmonids, particularly out-migrating smolts from March to May. The potential sources of the impacts are from the capital dredging works and from underwater noise generated from piling activities.

Within the open waters of Dublin Bay, commercial fishing is quite limited and none is undertaken within the footprint of the development including the main shipping channel, due to considerations of navigational safety. Recreational fishing is limited and mostly takes place outside the winter months.

The following key mitigation measures are proposed:

- The capital dredging scheme will be undertaken during the winter months only (October to March) to avoid the out-migrating smolts. Consultations will be held with IFI to determine the effective date in March to cease dredging works to tie in with the actual smolt run.
- Limiting the dredging works to the winter months will also negate any impact on breeding birds, particularly terns.
- The proposed six year dredging campaign will divide the shipping channel into six separate areas and dredging will be confined to one of the areas each winter period. This is the preferred approach from a benthic and fisheries perspective as it will enable the benthic communities to recover over the shortest period of time.
- Piling works along the River Liffey Channel will not be permitted between March and May to avoid noise impact during the smolt run.

The provision of these mitigation measures will effectively negate any residual impact of the ABR Project with respect to benthic ecology and fisheries.

6 LANDSCAPE AND VISUAL

A Landscape and Visual Impact Assessment (LVIA) of the ABR Project during both the construction and operational stages has been completed.

The ABR Project is located within a landscape character area identified as Harbour Based Industrial Landscape. This landscape character area has been identified as having a low sensitivity to change. The magnitude of landscape resource change will be low and the significance of landscape impact will be slight negative.

The Zone of Visual Influence (ZVI) has been established for the ABR Project to allow any potential areas of significant visual impact to be identified. Actual visual impacts from within the ZVI have been predicted by site survey and assessment during the operational phase on potential views from sensitive visual receptors including residential properties.

There are large areas of Dublin and the adjacent settled coastline that will not have views of the proposal due to intervening vegetation and buildings and it is only in close proximity to the site that there will be potential direct views (East Toll Plaza area). The existing port facilities including ships and cranes and traffic are all features of the existing views and there will few new features visible from the wider ZVI.

The main area with potential views of the proposals during construction and operation stages are located immediately south at York Road and Pigeon House Road from where the predicted significance of visual impact will be slight/moderate negative.

A total of 13 viewpoints have been assessed and no viewpoints have been predicted to have significant visual impacts.

Overall the proposed ABR Project will be difficult to discern from the existing activities and features at Dublin Port.

As no significant landscape or visual impacts have been predicted there is no requirement for specific landscape mitigation measures.

In conclusion the broader landscape character area and visual context around Dublin Port area has the capacity to absorb a development of this scale.

7 MATERIAL ASSETS

Transportation

Dublin Port is well connected to the national road network and in particular the Dublin Port Tunnel which opened in 2006 providing fast and direct access to the strategically important M50 and M1 routes within minutes of leaving the Port. Dublin Port Tunnel has also assisted in removing congestion within the Dublin Port Estate and in the environs of the Port.

DPC has invested significantly in improvements to the internal road network of the Port to facilitate the efficient movements of goods to and from the various terminals and facilities in the Port. These internal improvements have been delivered to ensure that the investment in the Dublin Port Tunnel and the expansion of the capacity of the M50 are adequately utilised by freight traffic to and from the Port. The Dublin Port Tunnel and expansion of the capacity of the M50 and the implementation of the Dublin City Council HGV Management Strategy have assisted in reducing the times involved in moving goods to and from the Port.

Dublin Port is at the heart of the national rail network with direct connections to all major centres of population. DPC has maintained and developed the main rail infrastructure within the Port and is committed to the provision of rail connections and sidings within the Port. The level of freight that is transported by rail remains comparatively low but DPC believe that there is a significant potential for rail freight to grow over the period of the Masterplan.

The ABR Project will assist in achieving the objectives of DPC Masterplan, that is, to cater for 60m gross tonnes of cargo by 2040 which equates to a growth of 2.5% per annum from 2012 to 2040.

The ABR Project will result in the closure of two existing accesses to the port and therefore an associated re-distribution of existing traffic within the port will occur. The two accesses are:

- Terminal 3 Access (left in / left out) on East Wall Road; and
- Alexandra Road Access on East Wall Road to all operational traffic with the exception of access to DPC Head Offices.

A Traffic Assessment (TA) has been undertaken to determine the impact of the associated 2.5% per annum growth in port traffic upon the surrounding highway network.

The results of the TA show that there is a predicted significant increase in traffic using the Dublin Port Tunnel by 2040. However, the Dublin Port Tunnel has sufficient spare capacity to accommodate this predicted increase. The two-way predicted daily traffic flow at the Port Tunnel by 2040 is 36,351 vehicles which is circa 21% of its capacity with the objectives of the Masterplan fully achieved.

The TA also shows that there will be a significant reduction in the volume of traffic along the frontage of Dublin Port from East Wall Road to North Wall Quay due to the closure of Alexandra Road and Terminal 3 accesses as part of the ABR Project. The reduction in daily traffic volume along this frontage represents a significant planning gain as the closure of these accesses removes a significant portion of traffic which currently has to U-turn at North Wall Quay roundabout due to the permitted 'left turn only exit' at both Alexandra Road and Terminal 3 accesses. This will also permit the future signalisation of this junction (plans proposed by

Dublin City Council) thereby allowing controlled pedestrian crossings and improved pedestrian safety.

The predicted impacts upon the other local routes including North Wall Quay, Pigeon House Road and Sheriff Street Upper are marginal even by 2040.

Overall, the results of the assessment show that the impact of the DPC Masterplan predictions of 2.5% growth per annum up to 2040 is less than 10% [proposed port related traffic as a percentage of base traffic] upon the surrounding highway network.

The growth in traffic associated with the planned expansion of the cruise line business was found to have no significant impact upon the surrounding highway network

Similarly, the impact of construction traffic was found to have no significant impact upon the surrounding highway network.

Services

The ABR Project will have no impact on the water supply, electricity supply or gas supply to tenants within the Dublin Port Estate or on neighbouring communities.

There are no significant new buildings associated with the ABR Project and therefore no significant increase in the volume of wastewater arising from the project.

8 AIR & CLIMATE

Noise and Vibration

An assessment of the likely noise and vibration impacts associated with the ABR Project has been completed.

The assessment considered the following:

Construction phase - there is potential for noise impacts at the nearest noise sensitive properties from the use of noisy plant and equipment and vibration impacts from the use of certain construction phase activities such as piling.

Operational phase - there is potential for noise impacts at the nearest noise sensitive properties from new plant/equipment, road traffic and changes to the port usage as a result of the proposed development (e.g. change in number of vessels using the port, change in the times when vessels are using the port etc.).

Two different noise surveys were completed in order to gather the appropriate noise data for the purposes of completing the noise assessment. The first survey involved completing day and night-time surveys to record the existing noise environment at the nearest noise sensitive receptors to the proposed redevelopment. The second survey was completed to record actual noise levels from a number of typical cruise liner vessels using the port.

The noise environment was modelled using CadnaA noise modelling software. The CadnaA noise modelling software package uses the ISO9613 prediction methodology along with a range of topographical and ordnance data collected on the surrounding area to build up a picture of the noise environment in the vicinity of sensitive receptors in the study area. The software was used to build a 3-dimensional model of all features which may affect the generation and propagation of noise in the vicinity of the existing and proposed port.

The CadnaA noise model was used for predicting cumulative noise levels at various stage of the construction phase and for predicting the cumulative noise levels from existing and proposed scenarios for the operational phase of the proposed development.

The results of the noise and vibration assessment determined that during the construction phase, worst-case construction activities may contribute to elevating the noise levels at some of the nearest noise sensitive properties, although worst-case predicted noise levels from construction phase activities are within the required thresholds outlined in the relevant noise guidance documents.

There will be no significant noise impact associated with traffic flow changes as a result of the construction or operational phase of the proposed development. Any minor traffic flow changes associated with the proposed development will not be in the range whereby they would be audible at the nearest noise sensitive properties.

The changes in the location of plant/equipment within the Port will not result in any significant increase in the noise impact at any of the nearest noise sensitive properties. The potential noise impact associated with future changes to Port activities cannot be predicted in advance

and therefore noise mitigation measures have been put forward to safeguard against increased noise impacts at the nearest receptors.

There will be no significant vibration impact associated with the proposed development.

Air & Climate

An assessment of the likely air quality and climate impacts associated with the ABR Project has been completed.

Impacts to air quality will arise during the construction phase, such as from the generation of construction dusts. The construction activities have been examined to identify those that have the potential for air emissions. Where applicable, a series of suitable mitigation measures have been listed.

Activities during the construction phase of the development have the potential to generate greenhouse gases. These emissions are produced by the use of construction materials, materials transport, construction machinery, etc. Greenhouse gas emissions from these sources have been quantified using standard procedures.

The operational development will give rise to emissions from road traffic and shipping similar to the existing operation. Each of these sources has been identified and emissions have been quantified using standard procedures.

Baseline air quality has been determined from the air quality data available from the EPA monitoring network to determine compliance with relevant ambient air legislation. Existing climate has been derived from the Met Éireann 30 year averages.

To simulate the potential emissions of the proposed construction stage, emissions have been assessed using a standard air dispersion modelling assessment. The assessment has followed the procedures presented in the EPA Guidance Note AG4 "*Air Dispersion Modelling for Industrial Installations*". The model used for Air Dispersion Modelling is the US EPA approved AERMOD Prime model, which is the current regulatory model in the US and a recommended model under EPA guidance. This model is a third generation model utilising advanced boundary-layer physics. AERMOD is run with a sequence of hourly meteorological conditions to predict concentrations at receptors for averaging times of one hour up to a year. It is necessary to use many years of hourly data to develop a better understanding of the statistics of calculated short-term hourly peaks or of longer time averages. Emission factors for the proposed construction operations have been derived from the AP 42 *Compilation of Air Pollutant Emission Factors* (5th Edition, USEPA).

A series of mitigation measures have been put forward including those to control dust emissions during the construction phase from site roads, site vehicles, material handling systems etc. in line with good working practices.

The construction Contractor will be required to monitor monthly dust deposition levels each month for the duration of construction for comparison with the guideline of 350mg/m²/day. This monitoring will be carried out at a minimum of four locations at sensitive receptors around the proposed works. Where dust levels are measured to be above this guideline the mitigation measures in the area will be reviewed as part of the dust minimisation plan.

When the development becomes operational, compliance with all the relevant limit values will be achieved at the nearest sensitive receptors including air emissions from traffic.

With respect to shipping emissions, a number of EU Directives and the requirements of the Marpol Convention regulate the fuels and emissions employed in the shipping industry. These requirements will remain in practice throughout the operation of the proposed development and may be replaced with more stringent emission limits. No project specific mitigation is proposed for shipping.

With the proposed mitigation in place there are no predicted residual impacts.

Seveso Sites

There are a number of Seveso sites located in the general vicinity of the ABR Project (as regulated under the *European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2006*, S.I. 74 of 2006). These Seveso sites store large volumes of solvent, fuel or gas and hence have the potential to have impacts to atmosphere through fugitive emissions as opposed to scheduled emissions to stack.

As part of the pre-planning consultation undertaken for the ABR Project with An Bord Pleanála, the Board requested the identification and assessment of all Seveso sites in Dublin Port as part of the planning application. This assessment has been completed and is included in Appendix 7 of the EIS. The assessment identifies the Seveso sites located in Dublin Port and provides an assessment of the potential impact of the ABR Project on these sites. The Dublin City Development Plan 2011 to 2017 identifies a series of consultation distances for Seveso sites that require further assessment and these consultation distances have been used for risk screening of impacts. The two elements of this project, i.e. the Alexandra Basin West and Berth 52/53, lie within the consultation distances of a number of Seveso sites and, as such, further assessment is provided for each of the Seveso sites affected. Where sites are identified as posing a potential risk, (i.e. within the consultation distances supplied by Dublin City Council) a more detailed review has been undertaken. In all cases the nature of the proposed development, coupled with the distances to the Seveso sites has resulted in a low risk of impact. It is therefore concluded that the proposed elements of the ABR Project will have no impact on the Seveso site network in the area.

9 COASTAL PROCESSES

An extensive programme of model simulations, supported by fieldwork and literature review, has been undertaken to evaluate how the proposed ABR Project would impact the coastal processes and the stability of the approach channel as well as to investigate the disposal of dredged spoil at the existing licensed offshore spoil site within Dublin Bay.

This programme included:

- Fieldwork comprising hydrographic surveys, geophysical surveys, sediment sampling and analysis and tidal current surveys;
- Review of previous maintenance dredging campaigns;
- Model simulations of the Spring and Neap tidal flow regime;
- Model simulations of the wave climate under a range of storm conditions;
- Model simulations of the sediment transport regime;
- Morphological simulations combining the results of tidal flow, storm waves and sediment transport;
- Model simulations of the dispersion, fate and settlement of dredge spoil dumped at the licensed offshore disposal site located close to the Burford Bank; and
- Model simulations of the dispersion, fate and settlement of dredge spoil released to the water environment during dredging operations; and
- Use of 3D modelling within the inner harbour to take into account the presence of salinity gradients within the water column (salt wedge) of the Liffey Channel.

The computational modelling was undertaken using RPS's in-house suite of MIKE coastal process modelling software developed by the Danish Hydraulic Institute (DHI). The models were calibrated using the results of the fieldwork and other data held by RPS.

These models are currently being used to inform the Irish National Coastal Protection Strategy being developed by RPS on behalf of the OPW. The models are also currently being run on a 24/7 basis to support the OPW Storm Surge Forecasting Programme. The models provide predictions of extreme tide and storm surge levels along the eastern coastline of Ireland which are provided to the Local Authorities in order to provide early warning of potential coastal flood events.

The results of the model simulations show that:

- There will be no significant change to the tidal flow regime of Dublin Bay;
- There will be no significant change to the wave climate within Dublin Bay;
- There will be no perceptible change in the tidal velocity within the deepened, realigned navigation channel or in its power to cause scouring of the sea bed;

- The new navigation channel will require maintenance dredging of a similar magnitude to that required with the existing channel;
- There will be no significant change to the sediment transport regime within Dublin Bay, including the Tolka Estuary;
- The proposed offshore disposal site to the west of the Burford Bank is dispersive for the silt fractions within the dredged spoil material. The sand fractions within the dredged spoil will remain on the disposal site under normal tidal conditions. However under storm conditions the sand will gradually be assimilated into the overall sediment regime of Dublin Bay.
- The existing disposal site at the Burford Bank is the preferred disposal option as the fine sand material from the navigation channel will not be lost to the overall sediment supply to Dublin Bay;
- Model simulations of the dispersion, fate and deposition of sediment plumes arising from the dredging and disposal operations have been used to inform the environmental assessment of the natural environment and the water environment.
- Restricting the navigation channel dredging operations to the winter months (October to March) provides suitable mitigation to ensure that the dredging operations will have no significant impact on the qualifying interests of Natura 2000 sites.
- The dispersion, fate and deposition of sediment plumes arising from the dredging and disposal operations not expected to impact on other users of the waters within the River Liffey channel or Dublin Bay.

The comprehensive studies undertaken, as outlined above, show that the ABR Project is not expected to have a significant detrimental impact on the coastal processes of Dublin Bay. It can therefore be concluded that the proposed works will have no residual impact.

10 WATER

An assessment of the potential impact of the ABR Project on water quality in the receiving environment has been completed. A Flood Risk Assessment (FRA) was also completed for the proposed scheme.

Water Quality in the receiving environment

The ABR Project lies within the Liffey Estuary and Dublin Bay. The works are located within two water bodies: 'Liffey Estuary Lower' transitional water body and 'Dublin Bay' coastal water body. These water bodies are within Hydrometric Area No. 09 which is within the Eastern River Basin District (ERBD).

The EU Water Framework Directive (WFD) establishes a legal framework for the protection, improvement and sustainable management of rivers, lakes, transitional waters (estuaries), coastal waters (to a distance of one nautical mile) and groundwater.

The aim of the WFD is to prevent deterioration of the existing status of waters and to ensure that all waters are classified as at least 'good' status (by 2015 in most cases, with all waters achieving good status by 2027 at the latest). A water body must achieve both good 'ecological status' and good 'chemical status' before it can be considered to be at good overall status.

In order to establish the WFD status of water bodies, the EPA developed a new, WFD-compliant monitoring programme which began in 2006. Interim status classifications were published in 2009 based on monitoring information collected between 2006 and 2008. Final status classifications, based on the results of a complete monitoring cycle, i.e. 2007 to 2009, were reported in 2011 (EPA, 2011).

The available monitoring information for the water bodies in the immediate vicinity of the ABR Project indicates that:

- The overall WFD status of the water bodies is 'moderate' due to general components and morphology;
- Tropic status is 'unpolluted';
- Dissolved oxygen levels are satisfactory and capable of supporting nearly all forms of aquatic life;
- The level of oxygen demand in the water bodies is acceptable; and
- The designated bathing areas in the vicinity of the ABR Project are compliant with bathing water quality standards.

A series of construction phase mitigation measures have been put forward including adherence to the construction techniques and timing of works (outlined in this Environmental Impact Statement) which form an integral part of the engineering design and which have been developed to minimize the impact of the project on the receiving water environment.

The new port facilities, when complete, will be subject to the Port's existing Environmental Management Plan.

Provided appropriate mitigations measures are fully implemented during the construction and operational phases, the impact of the proposed development on the water quality in the area will be neutral to minor. The ABR Project is therefore not expected to have a significant detrimental impact on the water quality of the receiving waters or make a significant change to the existing morphology. It can therefore be concluded that the proposed works are compliant with the requirements of the EU Water Framework Directive.

Flood Risk Assessment

A Flood Risk Assessment (FRA) of the ABR Project has been completed:

- To assess the flood risk at the site of the proposed development; and
- To assess the change in flood risk to the neighbouring areas as a result of the development including Clontarf, South Quays and North Quays.

The FRA was undertaken in accordance with The Planning System and Flood Risk Management Planning Guidelines (2009).

An assessment of the flood risk to the proposed development has determined that the predominant source of flood risk emanates from coastal flooding.

The assessment concluded that the ABR Project complies with the requirements of the Planning System and Flood Risk Management Planning Guidelines (2009).

Model simulations have been undertaken to determine any change to the flood risk associated with neighbouring areas of Clontarf, South Quays and North Quays, particularly as a result of the proposed capital dredging scheme.

The results of the model simulations have shown that the proposed works are not expected to increase the flood risk to any of these areas.

11 GEOLOGY AND SOILS

An assessment of the impact of the ABR Project on soils, geology and hydrogeology has been completed including the treatment of contaminated marine sediments within Alexandra Basin West.

The sediment quality and particle size analysis of the marine sediments within Alexandra Basin West and the Navigation Channel from the East Link Bridge to the Dublin Bay Buoy was established through a comprehensive sampling and analysis programme. The Marine Institute advised on the location of the samples and the range of contaminants to be analysed.

The results of the analysis were compared against Marine Institute Guidelines for the Assessment of Dredge Material for Disposal in Irish Waters to assess their suitability for disposal at sea. The results were also sent to the Marine Institute for their independent assessment.

Sediment Quality – Alexandra Basin West

The sediments within the Alexandra Basin West were found to be unsuitable for disposal at sea at the majority of locations within the basin.

Parameters which exceeded the upper level guideline were heavy metals (Nickel, Lead, Zinc, Cadmium Copper and Mercury), Tributyltin (TBT), Dibutyltin (DBT) and Total Extractable Hydrocarbons.

Parameters which were between the lower and upper level guideline were Polycyclic Aromatic Hydrocarbons (PAH's) and Polychlorinated biphenyls (PCBs)

The Marine Institute confirmed the results of the assessment and advised that the sediments within Alexandra Basin West are unsuitable for disposal at sea.

The sediments within Alexandra Basin West were also assessed with regard to their suitability for use as fill material. Based on the sediment analysis undertaken to date, the sediments do not meet the acceptance criteria for inert waste. Treatment of the sediments is therefore required and proposed prior to use as a fill material within the Berth 52/53 basin and Graving Dock #2.

Best practice industry techniques will be used to treat the contaminated material yielded from the dredging of Alexandra Basin West. Ex-situ Stabilisation/Solidification (S/S) is proposed for the treatment of the contaminated material.

Ex-situ Stabilisation/Solidification (S/S) is a remediation technology that reduces the mobility of contaminants. Immobilisation is achieved by reaction of contaminants with reagents to promote sorption, precipitation or incorporation into crystal lattices, and/or by physically encapsulating the contaminants.

The method produces a high strength monolith-like product that physically reduces the mobility and chemically binds contaminants to the produced matrix. The treated mass can then be recovered/recycled to serve as infill material or for beneficial use.

The treatment and recovery of the dredging spoil on site will take place in accordance with the conditions of an Industrial Emissions Licence to be obtained from the EPA.

Sediment Quality – Navigation Channel

The sediments within the Navigation Channel were found to be suitable for disposal at sea.

There is however an area immediately adjacent to Alexandra Basin West where slight/moderate levels of contamination have been identified requiring this material to be disposed of at sea only at slack tide and immediately covered by sand or gravel.

It is proposed to dispose of the dredged at the licensed sea disposal site located to the west of the Burford Bank at the entrance to Dublin Bay, subject to the granting of a Dumping at Sea Permit by the EPA.

Dredging Requirements

The ABR Project requires a capital dredging scheme to achieve the following design depths:

- Dredging of Alexandra Basin West to -10m CD
- Dredging of the Navigation Channel to -10m CD from circa East Link Bridge to the Dublin Bay Buoy.

The volumes of material to be dredged are outlined in Table 11.1 and the location of these areas is shown in Figure 11.1.

Table 11.1 Dredge Volumes

Source Location	Material Status	Volume (m ³)
Alexandra Basin	Heavily Contaminated	470,000
Navigation Channel	Slightly – moderately Contaminated	500,000
Navigation Channel	Uncontaminated	5,400,000
Total		6,370,000

Temporary impacts on water quality and potentially groundwater can occur during the construction phase of the works. Pollution from mobilised suspended sediment is the prime potential risk.

A series of construction phase mitigation measures have been put forward including adherence to the construction techniques and timing of which form an integral part of the engineering design and which have been developed to minimize the impact of the project on the receiving water and groundwater environment.

The new port facilities, when complete, will be subject to the Port's existing Environmental Management Plan. Dublin Port is accredited to ISO 14001 to ensure that all employees

undertake their work with due consideration for the environment and that guidance is given to tenants to promote the principles of sustainability.

Dublin Port has been designated an 'Ecoport' at European level, for its environmental management system.

DPC also maintains and operates an emergency management plan and has the emergency management structures and arrangements in place which are compatible with the requirements of the 2006 Framework for Major Emergency Management. These include procedures for dealing with, amongst others: a major oil spill from a vessel, jetty or on land including storage areas; a major spill of hazardous material from a vessel, jetty or on land including storage areas and vehicle accidents involving hazardous material.

Training of staff and exercises are undertaken in line with best practice.

Dublin Port's Environmental Management Plan does not permit any discharges from vessels using the port, or travelling through Dublin Bay, to the receiving waters.

Human beings will not be exposed to treated contaminated sediment as the material will be covered with concrete hard-standing thereby negating any direct contact, ingestion or inhalation pathways.

Provided appropriate mitigations measures are fully implemented during the construction and operational phases, the impact of the proposed development on the surface water quality and groundwater quality will be neutral to minor. There is no residual impact with regard to geology.

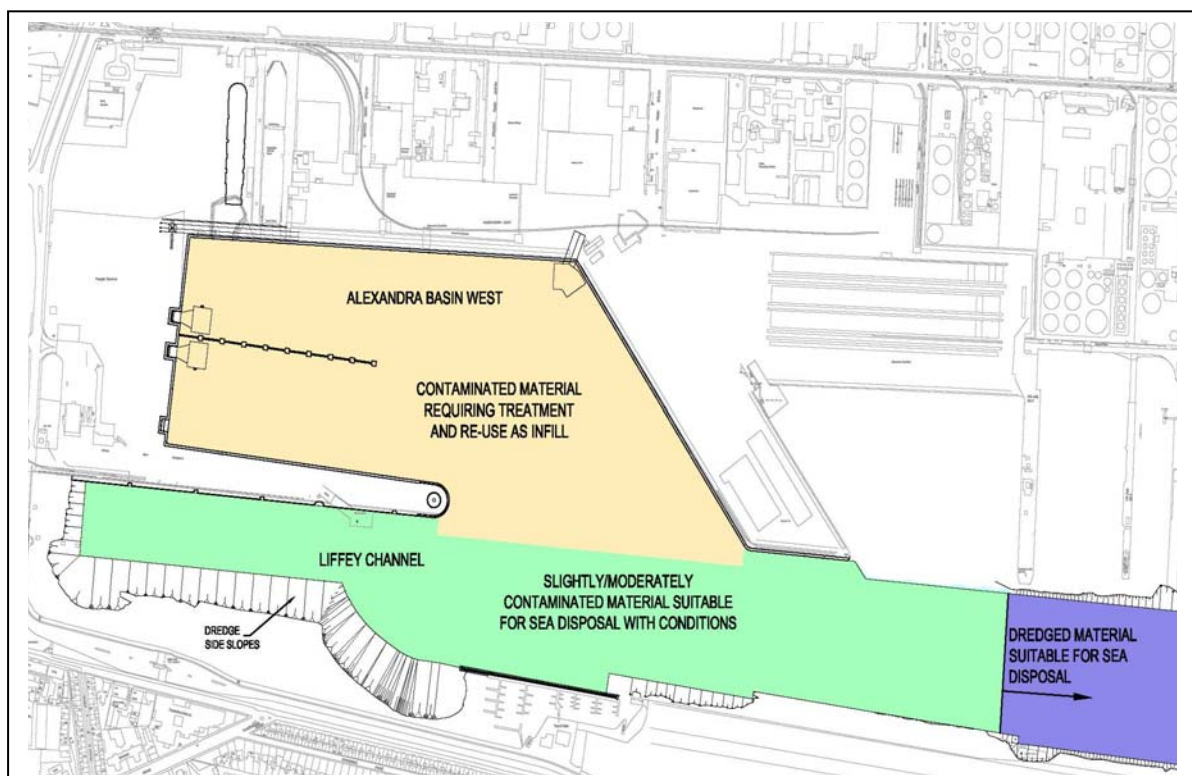


Figure 11.1 Dredge Material Locations

12 CULTURAL HERITAGE

A cultural heritage assessment has been undertaken to identify and record the location, nature, and dimensions of any archaeological and architectural features, fabric or artefacts that may be impacted by the ABR Project.

The assessment includes an examination of existing sources and the acquisition of new data arising from site inspections and surveys, under licence from the Department of Arts, Heritage and the Gaeltacht (DAHG).

The assessment gauged the level of development impact, and included detailed recommendations for the mitigation of any archaeology present within the development area.

The receiving environment is informed by historic cartographic information, which conveys the consistent process of development since the 1600s. Many of the hydrographers whose work features in the maps and charts were commissioned to assist in developing measures to improve navigation along the Liffey. Records that deal with the dredging of the Approach Channel extend back to 1800. Since then the channel has been deepened by more than 5.8m.

The project area remained undeveloped from a terrestrial perspective until the 19th century, when the deepwater harbour of Alexandra Basin was constructed to facilitate growth and development within the port. The contribution of Bindon Blood Stoney is seen in many features across the Port area, and North Wall Quay Extension is one location where he used an innovative cost-effective engineering design of pre-cast cement and stone foundation blocks to support the overlying quay.

The number of recorded shipwrecking events associated with Dublin Bay area and the approaches to the Port approximates 600, of which almost 300 are associated with the Dublin Bar. The number of known wreck sites is much smaller. There are five instances of known wreck locations that occur within the proposed impact area for the ABR Project. One wreck location occurs within Alexandra Basin West, that was observed during seabed surveys in a location that has since been buried by infill beside the lead-in jetty. The remaining four sites are located close together at the south eastern extent of the dredge area. All four sites are described in a similar manner, being 3m long, 3m wide and standing 3m above the seabed. Multi-beam survey of the seabed some years ago by the Geological Survey of Ireland did not observe any indication of wreckage in the four locations. It is possible that the coordinates recording their positions are inaccurate as they are historic observations noted in early seabed surveys carried out by the UK Hydrographic Survey office.

Licensed archaeological work completed to date helps to confirm aspects of the Port's development that are indicated in the cartographic and historical records. It also demonstrates the high archaeological potential that lies in those parts of the bay which have not been disturbed previously by dredging. The areas of greatest potential for new discoveries appear to be the sand flats and sand bars that populate larger areas of the Bay. The dredging conducted previously within the Port and along the Navigation Channel will have effectively removed these surface deposits that elsewhere retain shipwreck.

DPC commissioned new work to inform the EIS. It has included site investigations on the quays, consisting of boreholes. The boreholes have revealed a sequence of information that confirms aspects of the constructions used in the building up of the quays. No issues or material of archaeological concern were noted.

A terrestrial walkover survey of the quay areas has been conducted to contribute a consideration of the quay areas at the present time.

An extensive and comprehensive marine geophysical survey of the Navigation Channel has been carried out. The combination of side-scan sonar, magnetometry and sub-bottom profile survey has provided a robust dataset with which to detect anomalies on the seabed and within its sedimentary levels. The survey grid is based on very close line-spacing (20m intervals), to maximise information gain.

Some 120 side-scan sonar anomalies were detected. There are no clearly or obviously defined anomalies indicative of shipwreck. There are no boat-shaped features lying on the seabed, and there are no obvious composite features indicative of areas of timber-framing suggestive of ship's structure.

Magnetometry recorded small-scale variations through much of the survey area. The survey highlighted clearly the line of the Cross-Bay sewer pipeline that crosses beneath the Navigation Channel between Buoys 5 and 6. There was, however, little correspondence with the distribution of side-scan sonar anomalies, indicating that the magnetic anomalies are buried.

The sub-bottom profiles survey recorded a small number of reflectors that cannot be explained as natural geological features. The reflectors are indicative of archaeological potential only; in no case does any of the reflectors present unqualified evidence for a wrecksite or other significant feature. In three instances, the reflector occurs within the sandy silts that are considered ideal entrapment areas for wreckage, but only one of these reflectors lies within the proposed impact area. Some of the reflectors may indicate the presence of palaeo-channels.

The marine geophysical survey data acquired at the charted locations of recorded wreckage within the survey area did not record any features indicative of wreckage at these sites. The observation supports existing marine geophysical survey data of the seabed, and suggests that the historic coordinates are inaccurate.

A programme of archaeological underwater inspection was undertaken to examine a representative sample of the 120 side-scan sonar anomalies to further inform the EIS. A total of 42 targets were inspected. No material of clear archaeological significance was observed. Archaeological underwater inspection of the remaining 78 anomalies will be undertaken April to May 2014.

A series of archaeological mitigations will be put in place to ensure the proper archaeological resolution of the ABR Project prior to and during construction. It is not expected that there will be any archaeological requirement associated with works at Berths 52/53.

Subject to the granting of permission for the ABR Project, archaeological and architectural/industrial heritage pre-construction mitigation will include a metrically-accurate detailed survey of North Wall Quay Extension above and below the waterline.

North Wall Lighthouse will be recorded in detail and a management plan devised to ensure its safe custody during construction and its safe repositioning post-construction.

All activity associated with removing sediment within Alexandra Basin West will be archaeologically monitored, as will all demolition works and dredging works, to safeguard the possibility of uncovering material of archaeological interest during construction.

Archaeological investigations will be conducted on the deck area of North Wall Quay Extension, to assess the presence and extent of features that relate to the early use of the quay, which may be buried beneath the current working surface.

Demolition works will be archaeologically monitored under licence from the DAHG, and the opportunities will be taken to record more fully the nature of the quay's construction.

It is intended to recover an exemplar of Bindon Blood Stoney's foundation blocks, to examine the as-built block in terms of its construction method and materials, and to retain for public view as part of the Port's cultural heritage assets. It is also intended to reinstate Graving Dock #1. A detailed Conservation Strategy has been developed for this element of work (under separate cover).

Archaeological monitoring of all dredging activities conducted within the Navigation Channel will be carried out with the provision to resolve fully any material of archaeological significance observed at that point.

A series of archaeological management protocols will be put in place to facilitate these works.

13 HUMAN BEINGS

An assessment of the human environment of the hinterland surrounding Dublin Port in terms of population profile and trends, employment and community aspects has been completed, including the impact of ABR Project on tourism.

Cruise Tourism

Between 2009 and 2012, 3.64 million overseas visitors spent almost €1.3 billion in Dublin and the wider Dublin region. This spending has a significant effect in terms of business profitability and employment. Many businesses and their suppliers benefit directly from the demand for goods and services created by tourism, as do the state and local authorities as a result of increased tax revenue. It is estimated that around 50,000 people in Dublin depend wholly or largely on tourism for their income.

Dublin Port offers easy access to local amenities, the capital city and its various attractions, and to other modes of transport. The strong transport links of Dublin Port are key to tourism as it widens the sphere of influence and socio-economic benefits that the Port provides.

Fáilte Ireland identifies the tourism sectors offering the best potential for Dublin as:

- Leisure Tourism;
- Events Tourism;
- **Cruise Tourism;** and
- Business Tourism.

There has been significant expansion of the cruise liner holiday industry on a global scale in recent years and Ireland is benefiting from this. There has been very strong growth in cruise ship and passenger numbers coming through Dublin Port in recent years. The number of cruise ships visiting Dublin Port has increased from just 24 in 1992 to 100 in 2013. Over the past decade, the number of cruise passengers into Dublin has tripled, with an average annual growth rate of 12.8%. In 2013 the number of cruise visitors to Dublin passed 100,000 for the first time.

It is estimated that the average cruise visitor spends €100 in the local economy per day and cruise ship crew members spent an average of €63. For Dublin the current annual economic impact for direct spending based upon 2013 cruise throughput is circa €12.7 m (RPS analysis based on data sourced from Bermello, Ajamil & Partners Inc report 'Preparation of a Plan for the Development of Cruise Tourism in Dublin'). Additionally, the cruise lines spend monies on port charges, pilotage, provisions, fuel, stevedoring, etc. each time they are in port.

Developing cruise tourism therefore offers an opportunity to attract additional revenue to Dublin. This can be achieved by attracting more, and larger, cruise ships to Dublin as well as by encouraging cruise passengers to consider choosing an itinerary that includes Dublin.

Construction Phase

The construction phase will offer benefits to the local economy through:

- Employment opportunities in the construction and related industries; and
- Increased revenue for the services sector as a result of spending by construction workers.

It is estimated that 375 workers will be employed on the site for varying lengths of time on different aspects of the project. Due to these employment levels it is estimated that over the construction period the following financial flows will occur:

- Gross wages paid out €22.8 million;
- Labour tax payments to the Exchequer €5.7 million;
- Net wages paid out €17.1 million; and
- Assuming a conservative income multiplier effect of 2, this net wage could result in an injection of €34.2 million into the broader economy.

Operational Phase

The ABR Project is a key element in Dublin Port's plans to meet the demands of a predicted 60 million tonnes cargo throughput by 2040. The Irish economic model is heavily based on exports. In 2012, merchandise exports accounted for 52.4% of GDP and merchandise imports accounted for 30.2% of GDP. Irish seaports handle around 84% of Ireland's trade in volume and 62% in value terms based on data from Irish exporters Association (2012). Dublin Port dominates Ireland's merchandise trade movements. It handles more than two thirds of containerised trade to and from Ireland and half of Ireland's imports and exports.

The ABR Project will also play a key role in supporting cruise tourism. A recent study by Bermello, Ajamil & Partners for Dublin Port estimates that cruise traffic can continue to grow at a rate exceeding 8% a year, reaching 200,000 passengers by 2020 and circa 350,000 by 2032.

The cruise industry provides a wide variety of direct and indirect socio-economic benefits to the communities they visit based upon passenger and crew spending; provisions required by the vessels including food & beverage, fuel and other supplies; tourism venues, guides, coaches; taxis; port and operational charges; air and hotel for homeport operations; and numerous secondary impacts based upon trickle down spending. In terms of potential employment, Fáilte Ireland suggests that 1,000 additional tourists support 15 jobs in the tourism and associated industries.

DPC employs more than 140 people directly, but a further 4,000 people are employed in what is Ireland's largest industrial estate. The ABR Project will help to secure existing employment at the Dublin Port Estate and provide opportunities for further employment associated with the continued growth in trade.

The ABR Project will provide an overall positive socio-economic benefit through direct and indirect employment opportunities associated with the predicted growth in trade and in tourism associated with cruise ships.

Increased port activity will lead to increased employment in Dublin Port. The EU Commission has indicated that for every additional million tonnes passing through a port creates an average of 300 new jobs. If the targets set out in the Masterplan of doubling capacity by 2040 are achieved, this will involve an average of an additional 320 jobs being created annually as a consequence of the growth in volumes between 2012 and 2040. The ABR Project will support the delivery of these jobs.

There will, however, be an unavoidable loss associated with ship repairs as a result of the closure of Graving Dock #2 within Alexandra Basin West.

14 INTERACTIONS AND IN-COMBINATION EFFECTS

A Construction Environmental Management Plan (CEMP) will be developed in the next stage of the process, should planning permission be granted by An Bord Pleanála (ABP). The objective of the CEMP is to capture all mitigation measures within the Environmental Impact Statement together with any conditions imposed by ABP and to provide additional detail in order to develop a practical programme of measures for the Contractor. The CEMP will form part of the specification of the Contract Documents for the construction stage.

The CEMP will include:

- Traffic Management Plan
- Waste Management Plan
- Noise Management Plan
- Dust Management Plan
- Contamination Strategy
- Marine Mammal Observation Plan
- Marine Archaeology Management Plan
- Industrial Heritage Conservation Plan
- Water Quality Management Plan
- Establishment of lines of communication, reporting and actions

The preparation of the CEMP will require continual engagement with a range of interested parties/stakeholders including Dublin City Council, EPA, National Parks & Wildlife Service, Department of Arts, Heritage & Gaeltacht, National Roads Authority, Inland Fisheries Ireland, Commissioners of Irish Lights, Dublin Port tenants and local community groups.

A Construction Environmental Monitoring Programme will also be developed. The objective of the Construction Environmental Monitoring Programme is to provide additional safeguards to the receiving environment during the construction phase of the works. The monitoring programme will form part of the specification of the Contract Documents for the construction stage.

The design of the Construction Environmental Monitoring Programme will include the following elements:

- An assessment using hydrodynamic and water quality modelling to design the placement of a number of water quality monitoring buoys and telemetry based warning systems
- The establishment of water quality trigger levels and corresponding actions
- The design of noise and dust monitoring programmes

- Scheduling of Marine Mammal Observers and Marine Archaeological Observers

The preparation of the Construction Environmental Monitoring Programme will also require continual engagement with all key stakeholders and interested parties.

Monitoring programmes already established, particularly in relation to birds, will continue prior to construction, during construction and post construction. This will provide additional information on seasonal and annual variations particularly with respect of the qualifying interest species within the adjacent SPA and for the tern colonies within the harbour estate.

Interactions and cumulative impacts

Interaction between the environmental experts who have undertaken the environmental impact assessments has taken place on a continual basis throughout the preparation of the EIS. This has enabled the environmental assessment of each topic to take into consideration the issues associated with all other topics and to develop appropriate mitigation measures to eliminate the risk of potential impact or to reduce the potential risk to an acceptable level. Interaction has also taken place between the environmental experts and the engineering design team on a continual basis in order to integrate the environmental mitigation measures with the engineering design of the project. During the preparation of the EIS, fortnightly meetings were held among the Environmental team, Engineering team and Dublin Port Company. Two formal workshops were also held specifically to address interactions among the teams.

Each environmental topic has also taken into consideration other proposed projects, plans or programmes in order to assess the in-combination (cumulative impacts) of the projects, plans and programmes.

The EIS was prepared over a one year period during which time extensive baseline surveys were undertaken. The EIS benefited from earlier work undertaken for the Port's Masterplan and associated Strategic Environmental Statement, as well as the assessments undertaken as part of the Dublin Gateway Planning application. No technical difficulties arose during the preparation of the EIS.

This Non Technical Summary was prepared by:

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
Telephone 048 90 667914
Facsimile 048 90 668286
email Ireland@rpsgroup.com
Web www.rpsgroup.com/ireland

**On behalf of:**

Dublin Port Company
Port Centre
Alexandra Road
Dublin 1
Telephone 01 887 6000
Facsimile 01 836 5142
email info@dublinport.ie
Web www.dublinport.ie

**The following sub-consultants carried out specialist studies:**

ADCO Ltd
Aquatic Services Unit
Coastal and Marine Research Group
Natura Environmental Consultants
MacCabe Durney Barnes
Macroworks
Dr. Colin Rynne, UCC

Archaeology
Fisheries and Benthic Ecology
Marine Mammals
Birds
Planning
Photomontages
Industrial Archaeological Heritage