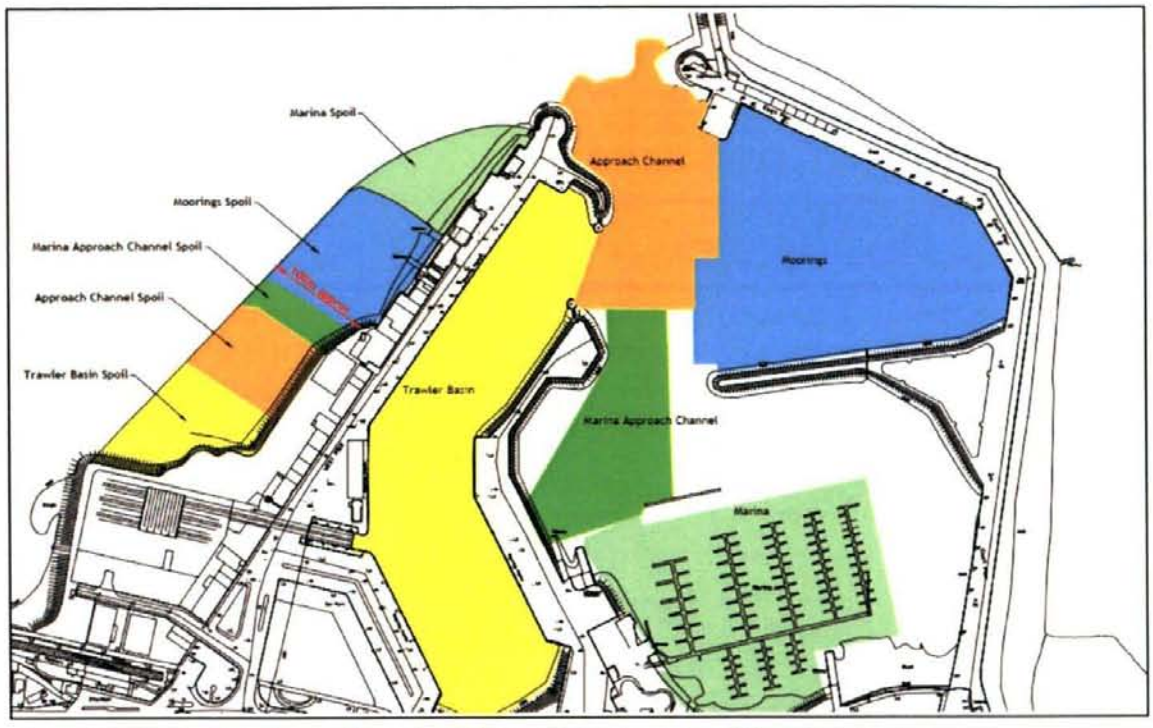

Figure 3.4 - Potential extent of a reclamation area to the west of the West Pier

This option re-uses the dredge material in a beneficial manner. New land (approx. 4.8Ha) is created for mixed use in Howth. The other alternatives investigated dispose of the material in different ways. This method is a sustainable use of resources.

Based on the cost estimate and the sustainable re-use of dredge material this option is considered the preferred option.

3.4 Alternative Layouts of the Reclamation Area on the West Pier

Nic de Jong and Associates carried out an assessment of a number of layout options for the West Pier reclamation based on land uses e.g. marine related, mixed use, open space etc. Layouts were assessed based on planning policies, natural heritage context, built heritage context, preliminary photomontages and harbour character.

The proposed layout was finalised as the preferred layout.

3.4.1 Summary of Alternatives

Several options were considered for the management of proposed dredge material from Howth Harbour. These included the beneficial re-use and disposal of material. Disposal of dredge material either to landfill or to sea is not considered a beneficial re-use of material. The international trend is now towards more sustainable use of dredge material which has been driven by economic and environmental considerations.

Reclamation to the west of the West Pier was selected as the preferred method of disposal of dredge spoil for the following reasons:

- Disposal at sea is not feasible;
- Disposal to land/landfill is not considered to be feasible, cost effective or sustainable;
- It is considered to be of greater benefit in terms of future development of the harbour;
- It is less exposed than the East Pier and therefore less costly to reclaim and to protect;
- Measures to improve the structural integrity and reduce overtopping of the East Pier can be implemented in a more suitable and cost effective way without recourse to land reclamation.
- Reclamation of areas within the harbour would reduce the water area potentially reducing the value of the harbour.

3.4.2 Governing Legislation and Policy

3.4.2.1 National Legislation and Policy

Fishery Harbour Centres Acts 1968

DAFM owns and directly manages six Fishery Harbour Centres. The centres, located at Castletownbere, Dunmore East, Howth, Killybegs, Rossaveel and Dingle, are managed and operated in accordance with the provisions of the Fishery Harbour Centres Acts 1968 which requires the Minister to manage, control, operate and develop each of the Harbours. It also places specific responsibility on the Minister in relation to maintenance, repair, improvement, extension and modification of the harbours including buildings and road access.

If dredging works are not carried out, the Fishery Harbour will not be able to provide for larger vessels with consequential detrimental effect on the local economy from fishing, leisure, vessel repair, emergency services and contrary to the Ministers responsibility.

National Marine Planning Framework Baseline Report (DHPLG, 2018)

The report has highlighted issues for the delivery of the framework. The framework is majorly targeted at the ports but harbours are within the remit. Below are the most relevant sections;

17.0 Ports, Harbours and Shipping

Part 2: Issues for Delivery

- *17.16 Dredging is essential to maintain channels and deepen berths especially as the sector is moving to ever larger ships with greater capacity. Dredged material may be disposed of at marine sites licensed by the EPA or, if possible, used for alternative purposes such as land reclamation or beach nourishment to minimise disposal at sea. Locations of disposal sites may change over time for a variety of reasons – exhaustion of site capacity, monitoring requirements, need for new sites in additional locations. Designated areas are required to dispose dredged material to ensure that ports subject to silting can be kept operational and maintain their depths, in particular when urgent dredging is required after storm activity.*
- *17.25 Dredging and disposal of the dredged material may impact on other uses and activities on a temporary basis. Dredging activity and disposal sites may not be compatible with other specific uses.*
- *17.30 Dredging and disposal are licensed activities and their environmental impacts are assessed by DHPLG/EPA during licensing procedures*

National Planning Framework, Project Ireland 2040.
National Policy Objective 40. Ensure that the strategic development requirements of Tier 1 and Tier 2 Ports, ports of regional significance and smaller harbours are addressed as part of Regional Spatial and Economic Strategies, metropolitan area and city/county development plans, to ensure the effective growth and sustainable development of the city regions and regional and rural areas.

3.4.2.2 Waste Policy and legislation

Waste Framework Directive (WFD)
The WFD Directive (EU) 2018/851 of the European Parliament, amending Directive 2008/98/EC on waste (WFD) (2008/98/EC) outlines the basic concepts relating to the management of waste material, including what defines waste, waste recovery and recycling. The following points outline some of the key aspects of the WFD, relevant to the proposal:

- The WFD *"establishes a legal framework for treating waste in the EU. This is designed to protect the environment and human health by emphasising the importance of proper waste management, recovery and recycling techniques to reduce pressure on resources and improve their use."*
- The legislation establishes a waste hierarchy: prevention, re-use, recycling, recovery for other purposes such as energy and disposal.
- It makes a distinction between waste and by-products. Under the Directive, a by-product is defined as the result of a production process that was not the primary aim of that process. Unlike waste, it must be able to be used afterwards. The Directive allows the European Commission to set criteria to be met by substances so as to differentiate by-products from waste.
- Article 28 of the WFD sets out the grounds by which a material which is recovered or recycled from waste can be deemed to be no longer a waste.
- Competent national authorities must establish waste management plans and waste prevention programmes.
- It introduces recycling and recovery targets to be achieved by 2020 for construction and demolition waste (70%).

The waste hierarchy is regarded as the cornerstone of European and National waste policy and legislation, and epitomises the fundamental principle of Circular Economy.

European Communities (Waste Directive) Regulations 2011 (S.I. 126 of 2011)
These Regulations amend the Waste Management Act 1996 which implements a large part of the WFD Directive 2008/98/EC of the European Parliament and of the Council on waste and provide measures to prevent or reduce the adverse impacts of the generation and management of waste in Ireland. The Regulations seek to reduce the overall impacts of waste recycling and re-use and to improve the efficiency of the use of waste. The regulations concern waste prevention and re-use of waste as by-product and end-of-waste.

A Resource Opportunity – Waste Management Policy in Ireland 2012
The Waste Framework Directive (Directive (EU) 2018/851 of the European Parliament, amending Directive 2008/98/EC on waste (WFD) (2008/98/EC) outlines the waste hierarchy in order of priority: prevention, re-use, recycling, recovery for other purposes such as energy and disposal. The hierarchy

is regarded as the cornerstone of European and National waste policy and legislation, and epitomises the fundamental principle of the circular economy.

In 2012, The Department published the most recent Waste Policy Document entitled 'A Resource Opportunity – Waste Management Policy in Ireland'. This policy provides a roadmap on how Ireland will disengage from an over-dependence on disposal in landfill, by putting in place the most appropriate technologies and approaches to reduce waste, while at the same time maximising the resources that we can recover from waste. The Circular Economy, which aims to reduce waste and ensure that materials are used as efficiently as possible. Every year, Ireland generates over 100 million tonnes of material. A huge proportion of this material is treated as waste, being disposed of in landfill or being incinerated after only a short period of use *(A Resource Opportunity, 2012).* The WFD and the government drive for a circular economy condemns this consumer based throwaway culture whereby material which has the potential for use as a valuable resource is otherwise disposed of.

The proposal to re-use the suitable site-won material on the site of origin with a beneficial end use is in accordance with the aims and objectives of this Policy.

Closing the loop - An EU action plan for the Circular Economy COM/2015/0614

The value of the Circular Economy is fully recognised by the UN, OECD and EU. 'Closing the Loop' An EU Action Plan for the Circular Economy 2015 considered the whole lifecycle of products and adopted a systemic approach that promotes partnerships along the entire value chain and across different sectors. The EU Action Plan identified five priority sectors, including construction and demolition. The target for C&D non-hazardous waste to reuse, recycle or recover, including beneficial backfilling operations using waste as a substitute of 70% by weight.

Waste Action Plan 2019

In line with EU policy, the Department of Communications, Climate Action and Environment is currently undertaking public consultation on a new Waste Action Plan for a Circular Economy. Circular Economy is defined as one in which we keep resources in use for as long as possible, extracting the maximum value from them while in use, then recovering and regenerating products and materials at the end of each service life. Preventing waste, including construction waste, not only makes environmental and economic sense, it also reduces the pressure on our waste infrastructure to manage waste. Less waste will mean less demand on finite resources and helps us transition to a circular economy.

The consultation paper on the Waste Action Plan for a Circular Economy states that *"We need to increase the recycling of construction waste radically and replace our reliance on the recovery of waste at landfill in order to comply with the waste hierarchy and our 70% recycling/recovery EU target. At the same time, the success in reducing the number of municipal landfills has meant that there are currently limited outlets for certain C&D waste streams which were traditionally recovered by being used as cover or used for engineering purposes at landfill".*

There are only two landfills in Ireland that are licensed for the acceptance of C&D waste; Integrated Material Solutions (IMS) in Hollywood, North County Dublin and Walshestown Landfill in Naas, Co. Kildare. Costs associated with landfill of material from the proposed project are prohibitive and landfilling is not the preferred option in terms of the waste hierarchy.

Eastern-Midlands Waste Management Plan 2015 - 2021

The Waste Management Plan for the Eastern Midlands Region is the framework for the prevention and management of wastes in a safe and sustainable manner. The waste management plan is a statutory document prepared by the local authorities in the region: Dún Laoghaire-Rathdown, Dublin City, South Dublin, Fingal, Louth, Offaly, Meath, Wicklow, Westmeath, Dún Laoghaire, Kildare, Laois & Longford.

The implementation of the Eastern-Midlands waste plan must ensure that European and national mandatory targets are achieved and, in doing so, that the health of communities in the region, its people and the environment are not compromised.

The strategic vision of the regional waste plan is to rethink the approach to managing waste, by viewing waste streams as valuable material resources. Making better use of resources and reducing the leakage of materials, as wastes, from economies will deliver benefits economically and environmentally to the region. The move to a circular economy, replacing outdated industrial take–make–consume and dispose models, is essential if better use is to be made of resources and become more resource efficient. The strategic approach of the plan places a stronger emphasis on preventing wastes and material reuse activities.

The proposal to re-use the suitable site-won material in the reclamation site is in line with the objectives of the Eastern-Midlands Waste Management Plan.

3.4.2.3 Local Planning Policy

Fingal Development Plan 2023-2029 Strategic Issues Paper (Fingal County Council, 2021)

Key issues within the paper that are relevant to this project are as follows;

- *The new Development Plan will build on and further enhance Fingal's network of high-quality recreational spaces which range from regionally important public demesnes to smaller pocket and local neighbourhood parks* (pg27). The new development plan will look to increase recreational space.
- *The impact of climate change* (pg 59). The project design chosen is considered the one with the smallest carbon foot print amongst all the alternatives.
- *Land development, urban planning, transport infrastructure, environment protection, and agriculture all have a direct and detrimental impact on the archaeological heritage. Town and village centres are historic places with their own distinct identities. Sustaining these is a complex process that in many cases involves the conservation and re-use of existing buildings, the care of public spaces, the provision of community facilities, and the communication and interpretation of what makes the place interesting and unique. The ongoing challenge is to facilitate development while protecting our heritage resource* (pg 59). The protection of Heritage will be important in the next plan and is assessed within this EIAR.
- *The beaches in Fingal are stunning natural amenities for example, that are visited by many thousands of people every year. Similarly, the coastal pathway in Howth attracts around half of million people a year. The opportunities for healthier living and developing a much wider tourism offer in Fingal need to be balanced with wildlife disturbance and damage issues caused*

by recreation to ensure that the designated sites and their associated species are not significantly impacted upon (pg 63). The impact upon wildlife from the project is assessed within this EIAR.

- *Fingal has been and continues to be impacted by coastal erosion. The National Coastal Change Management Strategy Steering Group was set up and had its first meeting in September 2020. The group, tasked with considering the development of an integrated, whole of Government coastal change strategy. These recommendations, when published, will play an important part in any Coastal Change Management Policy of the Development Plan. Best practice in coastal zone management suggests non-interference with the coast and coastal processes if at all possible. This is mainly due to the often complex and unforeseen consequences on other parts of the coast that can be caused by protective measures and the costs associated with the installation and future maintenance of coastal protection structures* (pg 63). The impact of coastal erosion from the development is assessed within the EIAR.

Fingal Development Plan 2017-2023 (Fingal County Council, 2017)

Howth has been given an Urban Place Designation of a Town and District Centre (TC). Under this designation the objectives relevant to this project are:

- Objective PM01, support the development of sustainable low-carbon climate resilient communities.
- Objective PM06, protect the primacy and maintain the future viability of the existing major towns in the County and develop them with an appropriate mix of commercial, recreational, civic, cultural, leisure, tourism and residential uses.
- Objective PM07, ensure each Rural Village develops in such a way as to provide a sustainable mix of commercial and community activity within an identified village core which includes provision for enterprise, residential, retail, commercial, tourism and community facilities.

Howth development plan is outlined within the Fingal Development Plan 2017-2023. The Howth development plan states that today the harbour is important for the fishing industry and the marina is an important amenity. Objective 5 for Howth is to continue to encourage the development of the harbour area for fishing and marine related industry and tourism. The proposed works support this Objective 5.

Figure 3.5 below, outlines the zones within the Fingal Development Plan 2017-2023. The design of the reclamation area has specifically taken into account the preservation of the views at the end of the western pier. The general employment zone on the west pier has also been preserved with the potential in the future to increase onto the reclaimed land.

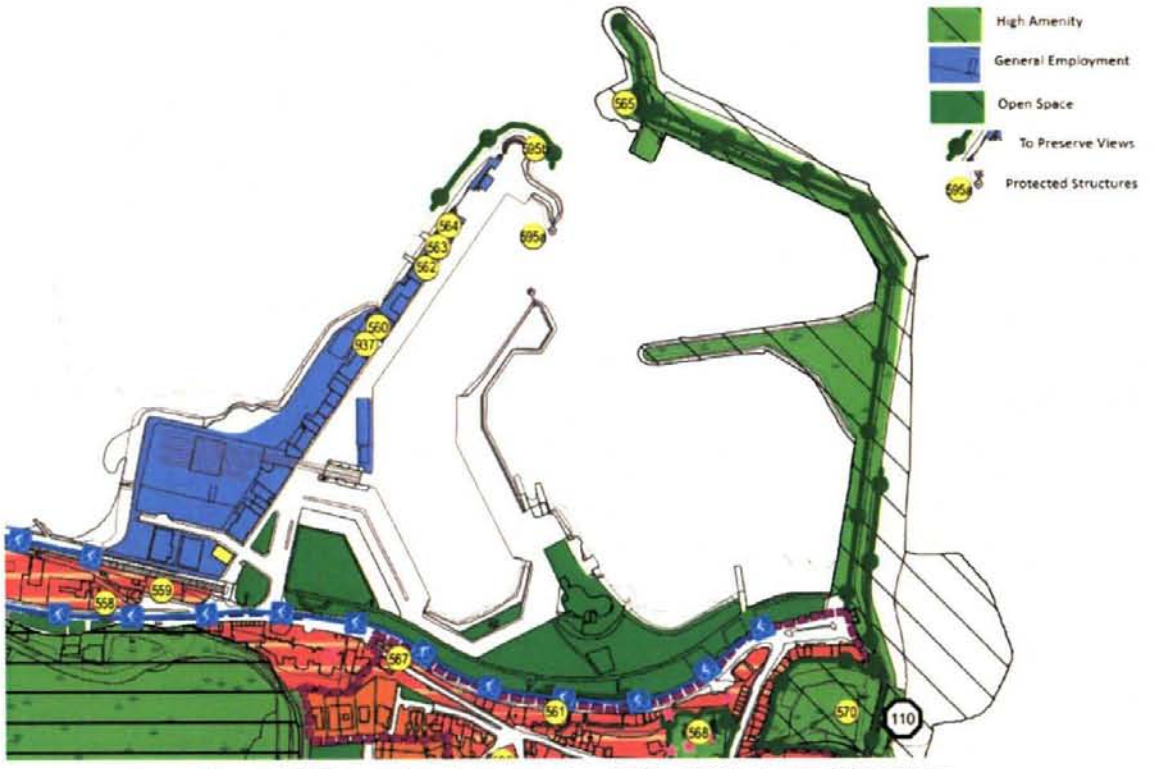

Figure 3.5 Fingal development plan 2017- 2023, Zoning Objectives

3.5 References

European Communities (Waste Directive) Regulations 2011 (S.I. 126 of 2011).

Fingal Development Plan 2017-2023 (Fingal County Council, 2017)

Fingal Development Plan 2023-2029, Strategic Issues Paper (Fingal County Council, 2021).

Fishery Harbour Centres Acts 1968

National Marine Planning Framework Baseline Report (DHPLG, 2018).

National Planning Framework, Project Ireland 2040.

Waste Action Plan 2019, Department of Communications, Climate Action and Environment, 2019.

Waste Framework Directive (WFD) The WFD Directive (EU) 2018/851 of the European Parliament, amending Directive 2008/98/EC on waste (WFD) (2008/98/EC)

4 POPULATION AND HUMAN HEALTH

4.1 INTRODUCTION

This chapter of the EIAR provides an assessment of the potential impacts to population and human health arising from the proposed development. This assessment focuses primarily on the area local to the proposed harbour dredging works, treatment and land reclamation at Howth Fishery Harbour Centre (FHC). The assessment comprises of the following:

- a review of existing human environment,
- prediction and characterisation of impacts;
- evaluation of effects significance;
- consideration of mitigation measures, where appropriate.

This chapter considers population and human health in the receiving environment and the potential significant impacts associated with all stages of the proposed development. This includes consideration of impacts on human health, population, land-use, socio-economic activity and employment, tourism, amenities and recreation, and health and safety.

Other environmental assessments undertaken as part of this EIAR that have potential to have impacts on Population and Human Health include **Air Quality and Climate (Chapter 8)**; **Noise and Vibration (Chapter 12)**; **Water (Chapter 7)**; **Landscape and Visual Resource (Chapter 9); Traffic and Transportation (Chapter 15);** and **Land and Soils (Chapter 6)**.

4.1.1 Proposed Development

This project encompasses dredging and reclamation works at the Howth (FHC) in Howth, 15km east of central Dublin City. A full description of the proposed development is provided in **Chapter 2 Description of the Proposed Development**. In summary, the proposed development will comprise of the following main elements:

The proposed development involves the following main elements:

- Dredging the harbour;
- Treatment of the dredged material;
- Reclaiming land on the west side of the west pier using treated dredge material;
- Coastal protection works to the perimeter of the reclaimed area;
- Landscaping on the reclaimed area;
- Provision of pavements e.g. footways, roadways and parking areas;
- Construction of slipway for access to the water;
- Provision of storage areas for harbour activities; and
- Provision of services.

Subject to obtaining planning approval and other relevant regulatory consents, construction of the proposed development will commence in summer 2022. The works programme is estimated to be 24 months from commencement on site.

The enhancement of the West Pier, as part of the proposed dredging and reclamation works, will benefit the local and wider community. As with any works, there is the potential for nuisance during construction but no significant issues are anticipated and the works are of a temporary basis. The project will involve nuisance such as restricted access to the pier and construction traffic and noise.

4.1.2 Scope of the Assessment

This chapter has been assessed in accordance with Schedule 6 of the Planning and Development Regulations 2001 (as amended). Section 2 of Schedule 6 sets out the additional information relevant to the specific characteristics of the project required, which includes a description of the likely significant effects on the environment of the proposed development resulting from, among other things;

> *(IV) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters)*

The study area for the assessment of potential impacts on Population and Human Health includes Howth, Sutton, Baldoyle and North-East Kilbarrack. For the purposes of this assessment, the proposed project is not expected to have a significant impact on Baldoyle or North-East Kilbarrack due to the geography of Howth as a peninsula. As such, these study area suburbs (Baldoyle and North-East Kilbarrack) are only addressed in terms of traffic.

A number of key receptors in the study area have been identified as follows;

- Members of the public including tourists, Howth Fishery Harbour Centre users, visitors and staff, and people employed in nearby business;
- Tourists visiting the Howth Harbour area and the local amenities including the Howth Cliff Walk path and the Howth Summit lookout point;
- Members of the public, customers or staff of nearby amenities including beaches (Quarry Bay), Baltray Tennis Courts, Baltray Tennis Courts, Deer Park Golf, Howth Castle, the weekend Howth market and all local bars and restaurants, including those along the Western Pier;
- Students of the local nearby schools and visitors of the three local churches all located within Howth town centre;
- Users of the regional R105 road and car parking facilities located near the West and middle Pier.

4.1.3 Methodology

The assessment considers attributes and characteristics associated with population, community and residential settlement, economic activities and employment, community infrastructure and tourism and recreation. The assessment was carried out in accordance with the following guidance:

- Guidelines for Planning Authorities and An Bord Pleanala in carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, August 2018)
- Revised draft Guidelines on the Information to be Contained in Environmental Impact assessment Reports (Environmental Protection Agency (EPA), draft August 2017); and
- Advice Notes for Preparing Environmental Impact Statements (EPA, draft September 2015).

The Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017) state that:

'..in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc.'

Recital 22 to the EIA Directive provides that "*In order to ensure a high level of protection of the environment and human health, screening procedures and environmental impact assessments should take account of the impact of the whole project in question, including, where relevant, its subsurface and underground, during the construction, operational and, where relevant, demolition phases*".

The EPA advice notes (EPA, 2015) recommend considering the following issues when assessing the potential impacts and effects of a proposed development on Population and Human Health;

- ***Economic Activity*** *likely to lead to projects - will the development stimulate additional development and/or reduce economic activity, and if either, what type, how much and where?*
- ***Social Consideration*** *- will the development change the intensity of patterns and types of activity and landuse?*
- ***Land-use*** *- will there be severance, loss of rights of way or amenities, conflicts, or other changes likely to ultimately alter the character and use of the surroundings?*
- ***Tourism*** *– will the development affect the tourism profile of the area?*
- ***Health*** *– have the vectors through which human health impacts could be caused been assessed, including adequate consideration of inter relationships between those assessments.*

4.1.4 Baseline Data Gathering

The assessment of the likely significant effects of the proposed development on population and human health was conducted by reviewing the current socio-economic environment of the environs of Howth FHC. This included visual assessments of the proposed site and the surrounding area, as well as an analysis of aerial photography and Ordnance Survey (OS) mapping.

Demographic trends were analysed at State, County, and local level, with the latter comprising the Electoral Divisions in closest proximity to the Howth FHC (Howth ED and Sutton ED). Information was gathered with respect to the demographic and employment characteristics of the resident population within the study area sourced from 2011 and 2016 Census data. The data included information on population, structure, age profile, travel patterns and employment. A desk based review of the following publicly available information and websites relevant to the proposed development in terms of population, employment and economic activity, land-use, tourism, community facilities, health and safety and human health with the following data sources referenced:

- Ordnance Survey of Ireland (OSI) - current and historic mapping
- Aerial photographs
- CSO Small Area Population (SAP) Statistics: http://census.cso.ie/sapmap/
- Regional Planning Guidelines for the Greater Dublin Area 2010-2022

- Dublin City Development Plan 2016-2022
- Department of Housing, Planning & Local Government: http://www.myplan.ie/webapp/
- Central Statistics Office (CSO) information including CSO Labour Force Survey 2018
- An Post, Geodirectory (2017)
- Dublin City Development Plan 2016 – 2022
- Fingal Development Plan 2017 – 2023
- Previous Environmental reports undertaken for Howth.

4.2 EXISTING ENVIRONMENT

This section provides a description of the relevant aspects of the existing baseline environment in relation to Population & Human Health. The baseline environment is considered in this Section under the following headings:

- Site Location and Description
- Settlement and Social Patterns
- Land-use
- Economic Activity and Employment
- Roads and Access
- Tourism and Amenities
- Human Health

4.2.1 Site Location and Description

Howth Harbour is a multi-purpose harbour facilitating both commercial fishing and recreational activities, providing mooring facilities and pontoons for private enterprises such as Howth Yacht Club and Howth Sailing and Boating Club. Howth Harbour operates as a Fishery Harbour Centre under the Department of Agriculture, Food and the Marine. The harbour is protected by three piers; the West, Middle, and East Piers. The west and middle piers are primarily used by fishing trawlers for commercial purposes, while the East Pier is used primarily for recreational purposes, including boaters and walkers. The consolidating areas associated with the Dublin Gateway include locations such as Baldoyle, Sutton, Portmarnock, Howth and Malahide which primarily function as self-sustaining settlements where the economic activities are aimed at meeting the locally generated demand for services, with Howth and Malahide demonstrating a wider range of economic functions due to their performance as centres for tourism and marine activities.

Howth Harbour FHC is situated on the northern shore of Howth Head, or Howth Peninsula, to the north of Dublin Bay (**Figure 4.1**). It is approximately 2.4km east of Sutton and 1km south of Ireland's eye. The harbour itself comprises three main areas; a trawler basin entered between two bull-noses to the north, swing moorings area to the east and a marked channel to the yacht club marina.

For the purposes of the dredging project the harbour is considered to comprise of five areas:

1. Trawler Basin;
2. Harbour Approach Channel;

3. Mooring area;
4. Marina Approach Channel;
5. Marina Area.

Howth Harbour operates as a Fishery Harbour Centre under the Department of Agriculture, Food and the Marine. The core fishing fleet is in the order of 65 vessels, and there is significant marine leisure activity including the Howth Yacht Club and the Howth Sailing and Boating Club. There are also a number of restaurants and shops along the West Pier. Fish processing and boat repair works are also undertaken on the harbour.

The proposed site is situated in proximity to several Special Protection Areas (SPA) and Special Areas of Conservation (SAC), the closest of which are Howth Head SAC, Baldoyle SAC, Ireland's Eye SPA and Howth Head Coast SPA. There are a total of eighteen designated Natura 2000 sites within 15km of the proposed works. Howth Harbour is not a registered archaeological monument, however the harbour and its nineteenth-century structures are registered in the National Inventory of Architectural Heritage (NIAH) and are protected structures. The nineteenth-century pier walls are also protected structures. Although there are no known archaeologically significant material, it remains possible that archaeological material is *in situ* in areas and depths that were not dredged previously.

The Fingal County Development Plan (2017 – 2023) identifies Howth's natural and built environment and recognizes the importance of protecting the Special Amenity Area, as well as the Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) located on and around the Peninsula. Equally, the maritime heritage is included in the Plan and the importance of the harbour to the fishing industry. This Development Plan includes an objective (No. 5) to continue to encourage the development of the harbour area for fishing and marine related industry and tourism. The harbour area is included with the village in the Development Plan's Urban Centre Strategy/Study Area.

Figure 4.1 Location of Howth Harbour Fishery Centre (FHC)and greater area

For further information on the site location and description please refer to **Chapter 2 Description of the Proposed Project**.

4.2.2 Population and Settlement Patterns

Howth harbour is a busy fishery centre and public amenity on Howth Head, or Howth peninsula, in north-east Co. Dublin. Howth is situated in the Fingal, an administrative County in North Co. Dublin. There are a total of seven Electoral Divisions (ED) in Fingal. Howth FHC lies in Howth Electoral Division which encompasses the entire Howth peninsula. Howth Head includes the harbour, the village, the agricultural areas, recreational and residential areas, and the forest areas and amenity areas. For the purposes of this section, only the population and settlement patterns of the study area (as defined in **Section 4.1.2)** will be included. The immediate area of Howth Harbour in terms of potential socio-economic impacts, includes the areas of Howth peninsula and Sutton. Other nearby EDs in the area include Sutton ED, Baldoyle ED, Portmarnock South ED, Raheny – Foxfield, Raheny – Greendale, Raheny St. Assam and Clontarf East B ED. Please Refer to **Figure 4.2** below.

Figure 4.2 Electoral Divisions (EDs) near Howth Harbour

In the 2016 census, the population of Howth ED was calculated at 8,294 persons. This indicated a small increase in population of approximately 0.5% from the 2011 Census of population (8,256). The population of Sutton ED which is situated adjacent to Howth ED was 5,609 in 2011, which increased by 1.4% to 5,680 in 2016. Fingal's population increased from 273,991 persons in 2011 to 296,020 persons in 2016, representing an increase of 7.5%. Census 2016 results show that Ireland's population increased by 173,613 persons over the five years since April 2011, to reach 4,761,865 persons in April 2016. This represents a total increase of 3.8% over the 5 years, or 0.8 % on an annual average basis. The population growth of Fingal signifies a significant increase in population in this constituency when compared to that of the national average of 3.8% over the same four year period. The fact that both Howth ED (0.5%) and Sutton ED's (1.4%) population increase is significantly below that of Fingal Constituency's average (7.5%) indicates that both Howth and Sutton ED had less opportunities (i.e. housing) for people to move to in recent years compared with other ED areas in Fingal Constituency.

The population age structures of Howth ED and Sutton ED within the Study area are included in **Table 4.1.** Figures for the State, Dublin County, Dublin City, Fingal (Constituency), Howth ED and Sutton ED are provided to allow for comparison.

Table 4.1 Population age structure (based on 2016 Census Results)

Area	Age 0-4	Age 5-11	Age 12-18	Age 19-34	Age 35-64	Aged 65+	Total Population
State	331,515	484,368	435,913	990,618	1,881884	637,567	4,761,865
As *percentage of total population	6.9%	10.2%	9.2%	20.8%	40%	13.4%	n/a
Dublin County	91,125	122,195	108,421	343,938	516,696	164,984	1,347,359
As percentage of total population	6.7%	9%	8%	25.5%	38.3%	12.2%	n/a
Dublin City	30,683	37,706	36,781	171,064	205,965	72,355	554554
As percentage of total population	5.5%	6.7%	6.6%	30.8%	37.1%	13%	n/a
Fingal	24899	35017	27224	63345	118500	27035	296020
As percentage of total population	8.4%	11.8%	9.1%	21.3%	40%	9.1%	n/a
Howth ED	401	702	731	1167	3250	2043	8,294
As percentage of total population	4.83%	8.46%	8.8%	14%	39.1%	24.6%	n/a
Sutton ED	347	449	403	937	2259	1285	5,680
As percentage of total population	6.1%	7.9%	7%	16.4%	39.7%	22.6%	n/a

*all percentages rounded to nearest decimal. Source: Central Statistics Office www.cso.ie

These results indicate that there is a higher percentage of people in the 65+ age cohort in Howth compared to Dublin County, Dublin City and the greater Fingal area. At 24.6%, the age cohort of Howth for 65+ is over double that of both the Fingal area and Dublin City and well above the state average which may be indicative of an ageing population in this suburb. Sutton has a similarly high percentage of the over 65 age category (22.6%), which is likely due to the Howth/ Sutton area being considered an attractive location for retired individuals.

Both Howth and Sutton have a considerably lower percentage of people in the 0-18 and the 18-64 age cohorts relative to the overall state average. This suggests that the areas of Howth area Sutton are not considered as desirable accommodation locations for a higher proportion of families with younger children than in other parts of Fingal and the country. The cost of housing and other similar financial pressures may be attributed to these lower population figures for 0-64 year olds. The location, the significant number of schools and amenities in the area and the recreational facilities available would be considered attractive to families and people in these age categories to an area in normal circumstances.

Table 4.2 below indicates the variations in population growth based on comparison between the 2011 and 2016 census results. County Dublin and the Fingal Constituencies have grown at a significantly higher rate than the state average, while the growth of population of Howth ED and Sutton ED is signficantly lower. This may be attributed to a lack of significant suburban development in Howth and Sutton. Other factors such as property prices, a lack of available property, and the increasing cost of living in a popular area may also be the cause of the low growth in population in both areas.

Table 4.2 Percentage population increase (based on CSO Data from 2011 and 2016)

Area	2011	2016	% Population Increase
State	4,588,252	4,761,865	3.6%
Dublin County	1,273,069	1,347,359	5.6%
Dublin City	527,612	554,554	4.9%
Fingal	273,991	296,020	7.5%
Howth ED	8,256	8,294	0.5%
Sutton ED	5,609	5,680	1.4%

4.2.3 Economic Activity and Employment

Employment

The Fingal Development Plan 2017 – 2023 refers to the higher proportion of young people and families in Fingal in relation to the rest of Ireland. Howth ED and Sutton ED display a very different scenario to the rest of the Fingal in terms of age structure as presented in **Table 4.1** above. There is an aging population in Howth with close to 25 percent of the population in the 65+ age cohort for Howth ED in comparison to the 9.1 percent for Fingal Constituency overall. Although the population consists of much fewer young families and children and many more people in the older age categories, there is a similar age percentage of the 35 – 64 age cohort. All areas examined in **Table 4.1** range between 37 percent to 40 percent of the total population. At 39.1 percent (Howth ED) and 39.7 percent (Sutton ED), the employment rate of the Howth and Sutton Study area is therefore expected to be of a similar employment percent to that of all other areas examined.

At present the large majority of employment in Howth is concentrated on the West Pier of Howth Harbour. The next closest main area of significant employment is the Baldoyle industrial estate which is located 5km from Howth Harbour. Sutton village also has an area of significant employment as located on **Figure 4.3** below. This figure highlights the main locations of employment in Howth and the surrounding areas. These areas are zoned in accordance with the Finglas Development Plan 2017 – 2023 and fall under the zoning objective of General Employment.

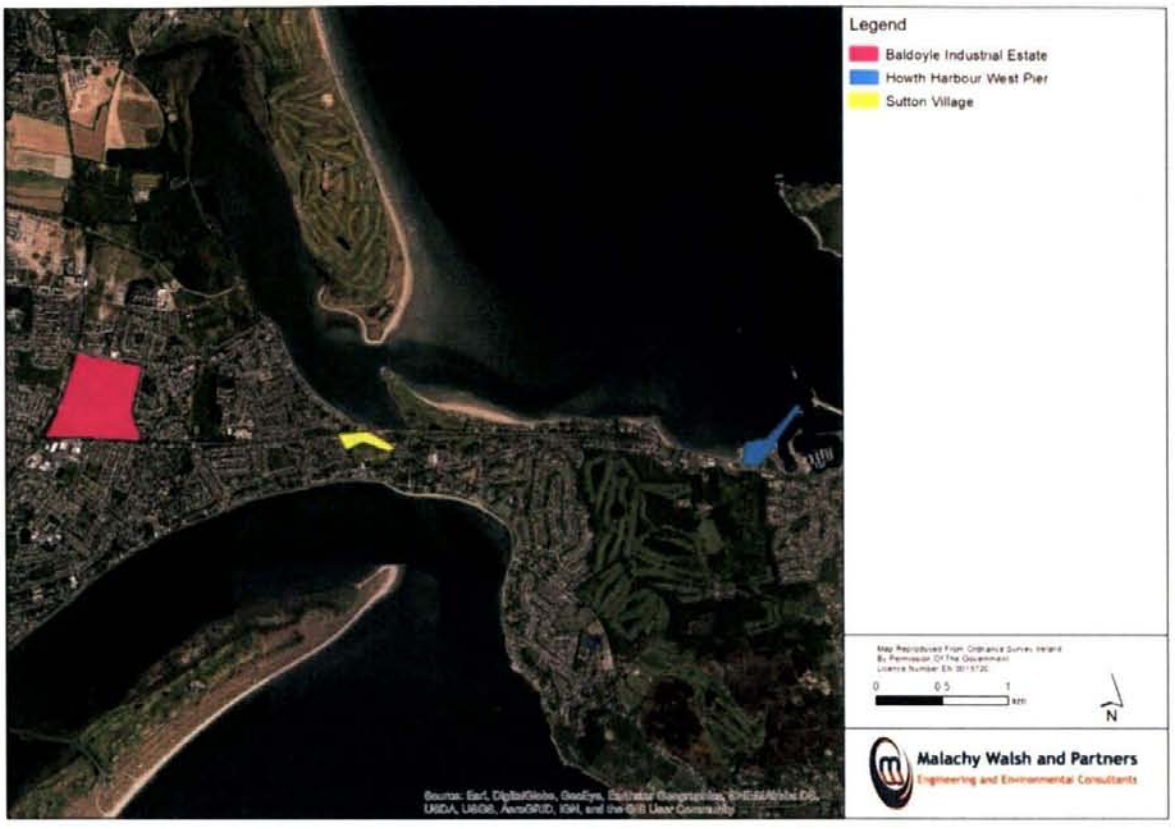

Figure 4.3 Location of Areas of Significant Employment

As previously discussed, the Howth harbour is a busy fishery centre and public amenity. According to the CSO 2016 figures for employment, there were an estimated total of 670 people working in the immediate harbour area as represented by the areas in red and orange in **Figure 4.4** below.

Of the total 670 people working in the immediate harbour area, the area in orange (Workplace Zone: FL0191 & FL0192) had an estimated daytime population of 576 people, of which 353 or 61% of people were at work. This area covers the middle and east pier sections of the harbour along with the main central area of Howth town and harbour front.

The area in red (Workplace Zone: FL0201 & FL0200) had an estimated daytime population of 285 people, of which all 285 (100%) people were at work. This represents the high employment rate of the West pier at Howth Harbour. The primary types of employment in this area are bar and restaurants, art galleries, retail, fish processing and boat repair works.

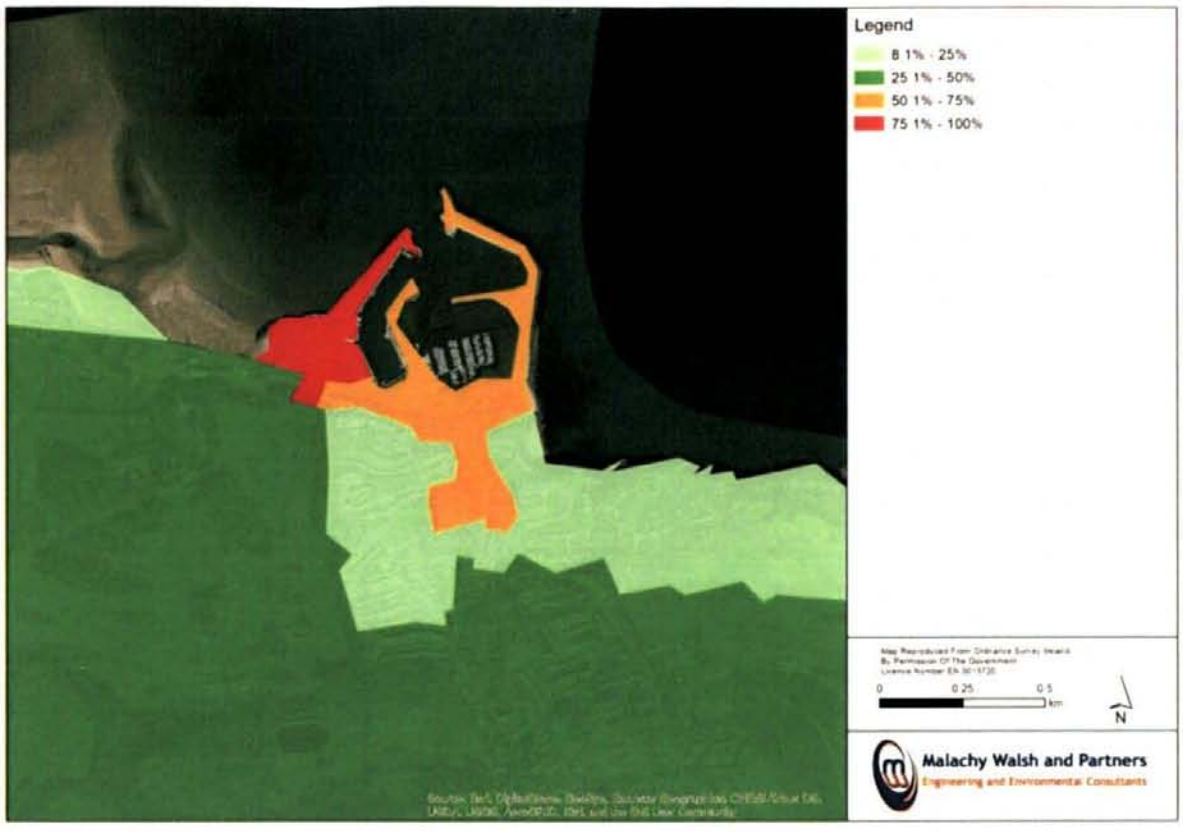

Figure 4.4 Howth estimated daytime employment population

Local Development Plans

The main aims of the Fingal Development Plan 2017 -2023 include providing for the future wellbeing of the residents of the County by:

- Supporting economic activity and increasing employment opportunities
- Protecting and improving the quality of the built and natural environments
- Ensuring the provision of adequate housing, necessary infrastructure and community facilities
- Promoting and improving quality of life and public health

Further objectives relating to future economy activity strategies include Objective ED85 of the Fingal Development Plan 2017 – 2023 which is to:

> *"Ensure that settlements and locations within the Metropolitan Area pursue development policies of consolidation, and maximise their economic strengths and competitive advantages such as tourism and marine sectoral activities in Malahide and Howth..."*

This objective ties in with Howth Objective 5; to *'Continue to encourage the development of the harbour area for fishing and marine related industry and tourism.'*

4.2.4 Land-use and Amenity

Howth Head is a rocky peninsula situated on the northern side of Dublin Bay and comprises Cambrian rock including sea cliffs of up to 90 metres in height. Ireland's Eye, an uninhabited island, lies approximately 1km north of the harbour. Baldoyle Bay occurs to the immediate west of Howth Harbour and extends northwest to Portmarnock village. The highest point of the headland is the Ben of Howth, a topographic rise of 171m towards the south.

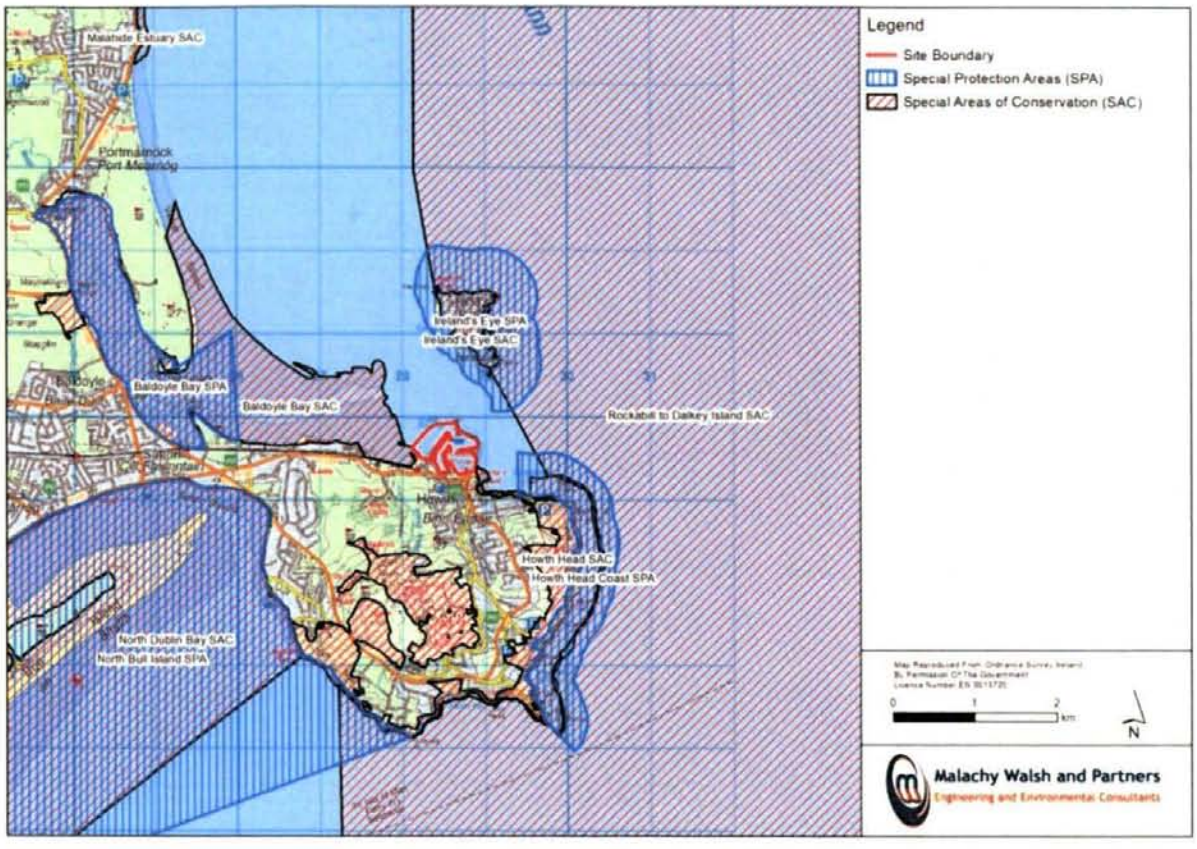

Figure 4.5 Howth Harbour and local area

According to the Fingal County Development Plan (2017 – 2023), much of Howth Head, including the East Pier, is included in a Special Amenity Area and covered by a Special Amenity Area Order. The Middle and West Piers are not included in the order but are proximal to lands included. The Plan includes objectives to protect and enhance high amenity areas and to preserve and provide for open space and recreational amenities. Included in these areas are the east pier and the harbour front, the area at the harbour immediately north of the village core. The Howth Special Amenity Area has a total area of 547 hectares and includes Ireland's Eye and the heathland (1km North of Howth Harbour), local woods, cliffs, shingle beaches and wooded residential areas of the south-eastern half of the Howth peninsula. These areas are considered to have rich diversity of flora and fauna and include protected species such as the Green-winged Orchid and the Red Squirrel. The order designated a total of 35 sites and areas of special natural, historical, architectural, archaeological and geological interest. A 21km network of rights-of-way as public footpaths is also included. Every large area of heathland and woodland on the peninsula can be reached by these paths. Please refer to **Figure 4.1** and **Figure 4.5** above of Howth peninsula.

Howth ED consists of a mixture of land uses as displayed in **Figure 4.6** below.

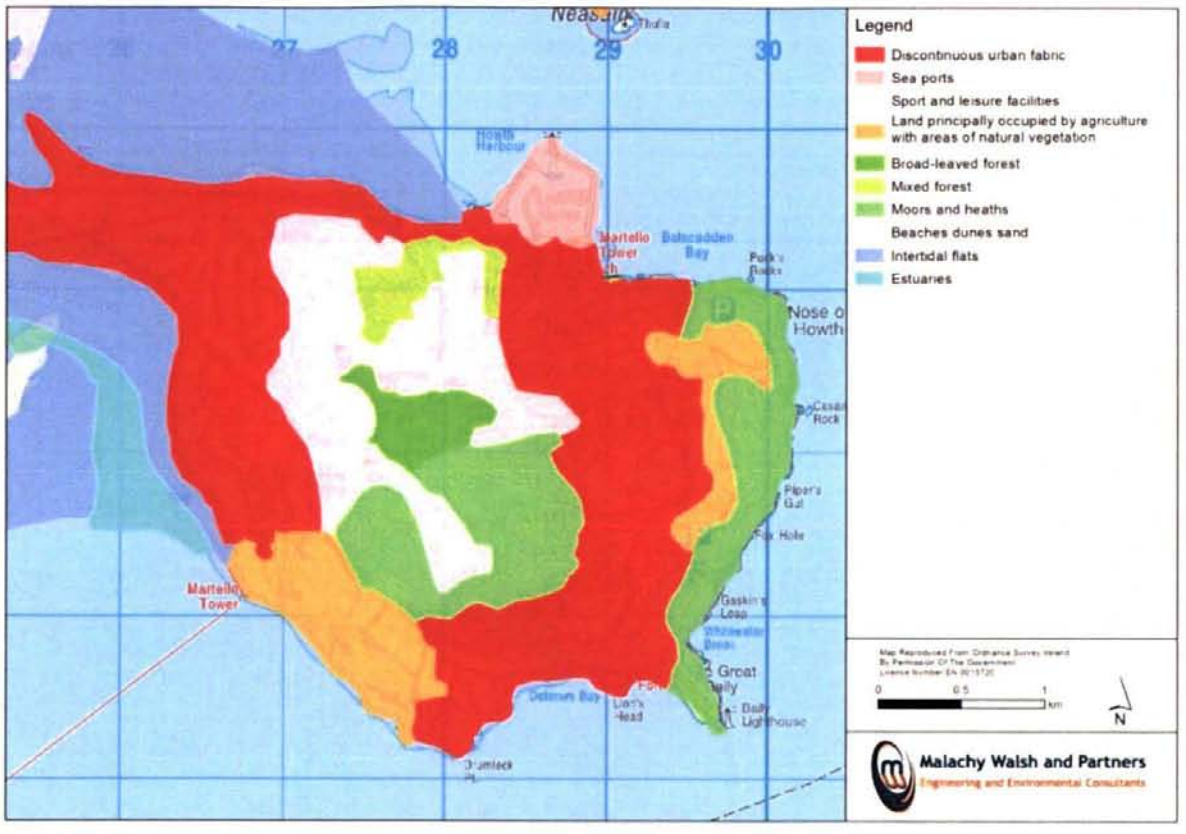

Figure 4.6 Land Uses in Howth (Corine Land Cover, Copernicus)

From **Figure 4.6** above it is estimated one third of the land use is regarded as residential or 'Discontinuous urban fabric'. The majority of residential land-use is located to the far west of the peninsula between the boundaries of Howth and Sutton, and also stretching from the mid North of the peninsula down to the South/ South-east of the region. The second biggest primary land-use on the Howth peninsula is the sport and leisure/ recreational facilities which consist predominantly of golf facilities. These are located in the centre of the peninsula. Following on from this, there is mixed land use in the form of the harbour itself, agricultural and areas of natural vegetation, broad- leaved and mixed forest, moors and heath, and intertidal flats which are located to the North-West and South-West of the peninsula.

4.2.5 Roads and Access

The Howth FHC site and harbour area is assessed via the R105 which runs perpendicular to the road leading to the West pier. See **Figure 4.7** below. Howth Railway Station lies directly adjacent to Howth harbour making the site also accessible via the dart. Dublin Bay cruises also operate a route between Dun Laoghaire and Howth and Dublin City Centre and Howth from Monday to Friday each week.

Howth FHC has a road connecting the west pier to the middle pier which also joins up with several shorter roads. These shorter roads allow access to the south-western industrial section of the Harbour. Along the main road in the harbour are parking facilities and a separate public car park located between

the Western and Middle pier. There are also two smaller dedicated parking facility areas for the harbour, both of which are located south of the East pier. There is one main road entrance to the harbour area which intersects with the R105 regional road. This R105 road runs adjacent to the harbour area before diverging South into Howth town just before it meets the East pier. The R105 road connects the Howth Harbour FHC to the greater Howth peninsula and serves as the main road around the peninsula. There is pedestrian access along each of the roads mentioned above and public access on the full perimeter of each of the three piers.

Figure 4.7 Local Road Network Map

4.2.6 Tourism and Amenities

Howth village is located 15 kilometres from Dublin city centre and is a very popular coastal destination for day-trippers; both those resident in Dublin and tourists visiting Dublin. Dublin residents are more likely to visit the village on weekends from April-October, while overseas tourists are more likely to visit year-round. Quality recreation, leisure and amenity facilities are in plentiful supply in Howth. Howth harbour is an increasingly popular visitor location owing to its scenic setting, its wildlife (including numerous harbour seals) and the range of cafes, restaurants and bars the village and West Pier offer. There is a mix of a working fishing fleet with multiple recreational or sailing craft, including Howth Yacht Club alongside the harbour's middle pier.

The village is often used by day-trippers as the start and end point for clifftop and hillside walks across the peninsula, which provides panoramic views of Dublin Bay, the Leinster coastline and the Irish Sea. Year-round, the peninsula is a popular destination for cyclists, joggers, golfers, walkers, sailors and kayakers. Due to the growing number of tourists in the area a tourist information office opened in Howth in the summer of 2014 on the West pier of the harbour.

The Fingal Development Plan (2017 – 2023) includes an objective (No. 5) to continue to encourage the development of the harbour area for fishing and marine related industry and tourism. The plan states that the *"Development will be encouraged which utilises the recreational and educational potential of the area"* as part of the development strategy for the area. As previously discussed in **Section 4.2.3**, the plan refers to maximising the economic strengths and competitive advantages including marine sectoral activities and tourism in Howth.

4.2.6.1 Community Facilities and Services

Howth FHC provides significant marine leisure facilities and services including the Trawler Basin, Howth Yacht Club Marina, Howth Sailing and Boasting Club, and the Swing Moorings area. A passenger ferry pontoon is located on the West Pier allowing boat trips from the Harbour. The RNLI operate a lifeboat station within the Marina Area, just west of the Yacht Club Marina. There is a functioning shipyard, with electric power supply and fresh water, for use to all types of vessels. Engine repairs can be undertaken locally. Electronic and radio repairs are carried out by agents for all gear. The Harbour offers a service to lift and transfer of vessels to the shipyard. There are also a number of restaurants and shops along the West Pier. Fish processing and boat repair works are also undertaken on the harbour.

4.2.7 Air Quality

According to the EPA's Air Quality Index for Health (AQIH), current air quality in the Dublin area is ranked as '3 – Good'. The impact of urban emissions on ambient air quality in the region is most likely as a result of urban activities such as home heating and emissions from road traffic. Existing traffic consists of commercial and recreational vehicle movements to and from the harbour and local residential traffic along the R105. The main pollutants of concern from traffic emissions are NO_x and PM_{10}. The R105 which borders the harbour to the south, is one of two main access roads to Howth peninsula, and therefore sees the largest volumes of road traffic.

4.2.9 Do Nothing Scenario

The do nothing scenario would be not to dredge the harbour. Continued deposition of sediments in the harbour would further increase the bed level and decrease the available water depth navigation in/out and around the around. The harbour will lose its functionality in time. In the event of reduced functionality of the harbour this would ultimately result in reduced economic and employment opportunities for the area and a potential long-term decline of harbour-related business and commerce. This would result in a negative impact on the local and regional economy and employment overall.

4.3 LIKELY SIGNIFICANT IMPACTS

The potential effects with regards to construction noise and vibration and air quality and climate are described in detail in **Chapter 12 Noise and Vibration** and **Chapter 8 Air and Climate** respectively.

Economic Activities

The construction phase will take approximately 24 months and is anticipated to commence in the summer of 2022. Pedestrian and vehicular access to the west pier will continue during the construction of the project. There will be no significant obstruction to public access. Construction compounds will result in the temporary loss of approximately 90 car parking spaces during the dredging and treatment works (about 18 months) which may impact negatively on the local economy. However, the construction work will contribute positively overall towards the local economy due to workers accommodation and construction spending. This negative and positive balance is likely to have a short term imperceptible negative effect.

Land use and Amenity Resources

During the construction phase there will be disruption to some existing amenity resources within the harbour. Construction compound areas on the west pier and middle pier will take up approximately 90 car parking places for the duration of the dredging and stabilisation works which are estimated to be 18 months in duration. The Howth Yacht Club is situated within the Marina section of the harbour with floating marina berths on the water. Dredging will be within the area of the marina berths. The berths will have to be moved in sections in order to allow access for the dredge to work in that area. The RNLI lifeboat will have to be moved into the Trawler Basin as dredging occurs at the lifeboat station and its access channel.

During the construction phase, commercial fishing operations on the middle pier that are situated in the proposed development compound on middle pier, will be moved to the west pier. This may cause short term inconvenience to the fishermen who work on the middle pier. The increased use of West pier for commercial fishermen will need to be coordinated with DAFM and all users. It is expected to be a short term moderate negative impact on commercial operations within the harbour.

During the construction phase, the walkway on top of the pier wall near the end of the East Pier will be closed for about 6 months of the year during the Autumn and Winter period in order to reduce the disturbance on a winter bird roost at this location. People will still be able to access the full length of the pier by walking on the main pier itself inside the pier wall. On Middle Pier there is potential for the whole pier to be closed off for public access. The amount of closure will depend on the stockpile sizes required for the dredged coarse material.

There is expected to be a short term moderate negative impact on land use and amenity resource during the construction phase of the project. Mitigation measures are outlined below in **Section 4.4**.

During the operational phase there will be an impact on the land use. The proposed development is the reclamation of a sea area. As such it will create a land use where there currently is none. The development will add to the potential area for development by DAFM within the harbour as well as

creating an amenity area on the west pier that would be on a par with the current high value amenity area on the east pier. The likely impact of this will be a permanent significant positive impact on land use and amenity resources in the harbour area.

Tourism Resources

The construction phase of the proposed development will have no significant impact on access to the touristic places within Howth harbour, such as the East and West Pier. Noise generated by construction activities will be local to the activity area. Mitigation measures such as hoarding are outlined in **Chapter 12 Noise** to reduce nuisance noise. The harbour is a working harbour and there is an expectation of works going on at such a location. The majority of the harbour area will be free of the construction impact at any one time.

Overall, the likely effect on tourism resources during the construction phase is a short term, not significant negative effect.

The impact during the operational phase is a permanent moderate positive effect due to the increase in amenity area and facilities at the proposed reclamation area.

Human Health

Construction sites pose potential risk to the health and safety of the public. A preliminary Construction Environmental Management Plan is provided in **Appendix 8** which will be further detailed by the appointed contractor in advance of works commencing. To reduce the potential for health and safety risks, the project developer will require that all contractors prepare a site-specific health and safety plan before initiating construction activities. The plan will inform those on site of the measures to take in the event of an emergency and will be maintained for the duration of the construction phase.

A detailed Construction Traffic Management Plan will be prepared by the main contractor prior to works commencing. This Plan will comprise the construction traffic mitigation measures which are set out in this EIAR and any additional measures which are required by the conditions attached to the Planning Authority's decision. The Construction Traffic Management Plan will also include any specific requirements of Dublin County Council during the construction phase including any monitoring and reporting requirements.

Potential negative effects as a result of the construction phase of the project include a temporary reduction in local air quality, or a reduction in water quality as a result of discharge of pollutants to groundwater or surface waters. The assessment on **Air Quality and Climate** (**Chapter 8**) focused on the potential impacts to local air quality and included the assessment of potential impacts of site clearance and construction activities. The assessment of potential impacts to local air quality highlights fugitive dust and vehicle emissions as the two main potential impact sources on air quality. Activities such as the transportation and unloading of materials off and around the site, and vehicular movement over material potentially carried off site and deposited on public roads. The project is not expected to result in any negative impacts to human health however, provided all appropriate controls and standard mitigation measures are adhered to throughout the construction phase of the project.

Once operational, there will be no direct impact from emissions to the atmosphere from the proposed development. As such, no impact to human health is envisaged.

There is a potential impact on human health from the contaminated sediments. The generic quantitative risk assessment (**Appendix 10**) addresses this impact. Direct contact is possible with the sediments during the construction stage. Standard construction health and safety measures such as hygiene will minimize this impact. The GQRA indicates that there will be no significant impact on human health from suspended solids that may exit the harbour during the dredging works. Potential effects on water quality are assessed in **Chapter 7 Water**. The water chapter assesses that there is no significant residual impact on water quality from the development.

4.3.1 Operational Phase

There are no known negative impacts of the proposed project during the operational phase. The reclaimed land will serve as an amenity area with maintained grass and landscaped areas which will be open to the public. New paths and roadways will be monitored and maintained and will be open to public traffic and pedestrians and there will be limited parking for cars and buses. Access to water for water sports activities is to be provided by a slipway. Storage areas will also be provided for water sports equipment adjacent to the slipway. As such, any impacts of the project during the operational phase on population and human health will be positive.

4.3.2 Project Health and Safety

The proposed project will be designed, constructed, operated and decommissioned in accordance with the following safety and health regulations and guidelines:

- Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016);
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013);
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007); and
- Safety, Health & Welfare at Work Act 2005.

A Safety and Health Plan covering all aspects of the construction and operation process will comprehensively deal with safety and health related issues.

4.3.2.1 Potential impact on Safety and Health during construction

As with any project during the construction phase, there is the potential for construction related hazards or injuries. However serious risks to human health and safety are not envisaged as the site will be managed in accordance with all applicable guidelines listed above. This should ensure a high standard of safety on site. Access to the middle pier and the reclamation areas will be restricted during the construction phase.

4.3.2.2 Potential Impact on Safety and Health during operation

Similarly during operation, appropriate safeguards will be in place. As well as appropriate floating navigational aids, navigation beacons will be constructed at the end of the breakwaters in order to provide both visual aid and warning to those using the Harbour. The proposed plan also intends to

improve on existing safety conditions. The marina breakwater will have barriers / safety railings. There will be safety notices in place to warn users of the area to be mindful of the quay / breakwater edges and there will be restrictions in place with regard to pedestrian access to the marina. Therefore the proposed improvements represent a positive impact.

3.1.1 Cumulative Effects

A search of existing developments in the area that may have a cumulative effect with the proposed project was carried out and none was found that would create a likely significant impact on population and human health.

The Middle pier development includes dredging, land reclamation and a new 134m length of quayside. The construction for this project started in Late 2020 and there will be no overlap of construction works with the proposed project.

A search of the Fingal County Council Planning register identified the following permitted developments which may result in cumulative impacts when considered together with the construction phase of the proposed project. **Table 3.1** below lists the approved developments with potential for cumulative impact. Potential cumulative impacts mainly relate to a temporary increase in traffic on the R105 and surrounding road network during construction.

During the operational phase of the project, cumulative impacts are not considered likely.

Table 3.1 List of approved developments with potential for cumulative impact

Planning Application Reference	Description of Proposed Development	Possible cumulative impacts
Fingal county council F15A/0362 and An Bord Pleanála (ref SHD/009/19). Atlas GP Ltd.	County council planning permission for 178 residential units and 2,756sq m of commercial space at Project Pier located approximately 190m south west of the reclamation area immediately west of the Dart Station. An Bord Pleanála (ABP) permission for 512 residential units (including parking for 439 cars). Both these permissions are at the same site with the ABP permission the newest and most current plan for the site.	Potential overlap with construction phase and cumulative negative impact on traffic on the R105. There is no date for construction works to start at this site. If construction works do start they will include a traffic plan to keep the R105 clear of construction traffic. Once built the Howth FHC Dredge project will have a positive effect in cumulation with the residential area as an amenity area and potential area for employment as businesses are built in the future.

4.4 MITIGATION

To reduce potential impact on the resources using the marina harbour close contact communication and coordination will be carried out with the commercial fishermen, Howth Yacht Club and the RNLI. This communication has already started in the consultation phase and DAFM will facilitate the lifeboat moving into the Trawler Basin (a location it has been in the past). Communication and close contact with the Yacht club will enable the Marina berth area to be dredged in sections with only some berths having to be moved at a time. DAFM already have a close working relationship with the commercial users of the harbour and this will be used to coordinate harbour activities and lessen the impact on the fishing activities.

Potential impacts to human health have been identified elsewhere in this EIAR and mitigation measures proposed where considered appropriate. Mitigation measures and monitoring where appropriate are identified in **Chapter 12 Noise and Vibration**, **Chapter 9 Landscape and Visual Resource, Chapter 15 Traffic and Transportation, Chapter 8 Air Quality and Climate, Chapter 7 Water** and **Chapter 6 Land and Soils**.

4.5 RESIDUAL IMPACTS

Once mitigation measures are implemented regarding communication and co-ordination the population and human health residual impacts on from the proposed development range from range from a construction phase short term a slight negative effect and an operational phase permanent significant positive effect.

4.6 REFERENCES

Central Statistics Office (CSO) (2020) *Small Area* Population (SAP) Statistics: http://census.cso.ie/sapmap/

Regional Planning Guidelines for the Greater Dublin Area 2010-2022

Dublin City Development Plan 2016-2022

Department of Housing, Planning & Local Government (2020) http://www.myplan.ie/webapp/

Central Statistics Office (CSO) information including CSO Labour Force Survey 2018

An Post, Geodirectory (2017)

Dublin City Development Plan 2016 – 2022

Fingal Development Plan 2017 – 2023

Copernicus. (Accessed June 2021) https://land.copernicus.eu/pan-european/corine-land-cover/clc2018

5. BIODIVERSITY

5.1 Introduction

This chapter of the EIAR describes the biodiversity and ecological characteristics of the proposed dredging and reclamation works at Howth Fishery Harbour, Co. Dublin, with an emphasis on designated sites, habitats, flora, fauna and water quality. The information provided describes the baseline ecological environment; provides an accurate prediction of the likely effects of the proposed development on biodiversity; prescribes mitigation as necessary; and describes any residual ecological effects.

While areas designated for nature conservation are considered in this chapter, a Natura Impact Statement (NIS) report which considers the potential impacts on the integrity of Natura 2000 site(s) of the proposed project, either alone or in combination with other plans or projects, with respect to the Conservation Objectives of Natura 2000 sites in question, has also been prepared. The NIS is provided as a standalone document in the planning application.

5.1.1 Scope of Assessment

The specific objectives of this assessment are to:

- Undertake baseline ecological surveys of the development site;
- Evaluate the conservation importance of the ecological resources recorded using a scientifically robust methodology based on current international best practice;
- Assess the direct, indirect and cumulative ecological implications or impacts of the project during its lifetime;
- Where necessary propose mitigation measures to remove or reduce those impacts at the design and construction stage; and
- Achieve the best possible biodiversity outcome of the change from current land use.

This ecological assessment was carried out with regard to *inter alia*, the following publications:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, Draft 2017);
- Guidelines for Ecological Impact Assessment in the UK And Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2019); and
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009).

Flora and fauna in Ireland are protected at a national level by the Wildlife Acts, 1976 to 2000 and the European Communities (Birds and Natural Habitats) Regulations, 2011. They are also protected at a European level by the EC Habitats Directive (92/43/EEC) and the EU Birds Directive (79/409/EEC) amended in 2009 as the Directive 2009/147/EC.

Under this legislation, sites of nature conservation importance are then designated in order to legally protect faunal and floral species and important/vulnerable habitats.

The categories of designation are as follows:

- Special Areas of Conservation (SAC) are designated under the European Communities (Birds and Natural Habitats) Regulations 2011 to comply with the EC Habitats Directive (92/43/EEC);
- Special Protection Areas (SPAs) and designated under the EU Birds Directive (79/409/EEC) amended in 2009 as the Directive 2009/147/EC; and
- Proposed Natural Heritage Areas (pNHA) are listed under the Wildlife (Amendment) Act, 2000. They have limited legal protection under Local Authority Development Plans.

Overall, reference was made to the following key legislation and plans:

European

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (The Habitats Directive);
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (codified version of Directive 79/409/EEC as amended) (The Birds Directive);
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (The Water Framework Directive);
- Directive 2006/44/EC of the European Parliament and of the Council of 6 September 2006 on the quality of fresh waters needing protection or improvement in order to support fish life (The Fish Directive (consolidated)).

Republic of Ireland

- The Wildlife Act 1976 as amended by the Wildlife Act 1976 (Protection of Wild Animals) Regulations, 1980, the Wildlife (Amendment) Act 2000, the Wildlife (Amendment) Act 2010, European Communities (Wildlife Act, 1976) (Amendment) Regulations 2017. (The Wildlife Act);
- European Communities (Conservation of Wild Birds) Regulations 1985 (S.I. 291/1985) as amended by S.I. 31/1995;
- European Communities (Natural Habitats) Regulations, S.I. 94/1997 as amended by S.I. 233/1998 & S.I. 378/2005 (The Habitats Regulations);
- Fisheries (Consolidation) Act, 1959 (as amended), hereafter referred to as the Fisheries Act.
- European Communities (Birds and Natural Habitats) Regulations 2015 (S.I. 355/2015);
- The Flora (Protection) Order, 2015 (S.I. No. 356/2015);
- National Biodiversity Action Plan 2017-2021;
- Threat Response Plan: Otter 2009-2011 (DEHLG, 2009);
- The Planning and Development Act (2000) (as amended).

5.1.2 Assessment Methodology

The ecology of the area surrounding the proposed development was first assessed in terms of habitats and species. The area over which the proposed development has the potential to result in effects (one of influence) is then determined. The zone of influence (ZOI) has been determined by careful scientific analysis of the receiving environment within which the development is located. The ZOI includes areas

of adjoining habitats and coastal waters, which include the designated sites which are hydrologically linked with the development site. Habitats and foraging routes remote from the development, particularly for marine mammal species, were all considered in the establishment of the ZOI. In this regard, the ZOI includes the development site, European Sites (cSACs and SPAs), coastal catchments and mammal dwelling and foraging locations. The areas within the zone of influence are identified and specifically addressed within this assessment.

This chapter quantifies any potential effects relating to marine and terrestrial ecology and identifies the measures required to avoid, reduce and mitigate likely significant effects. Identification of effects and prescribed mitigation has been derived following a collaborative approach working with a multi-disciplinary team including project engineers, ecologists, hydrologists and hydrogeologists. The results of ecological surveys have been utilised to inform the design of the proposed development, thereby minimising potential effects on sensitive habitats and species of conservation interest.

Following the desk studies, including a review of previously completed ecological surveys, a number of multi-disciplinary ecological surveys (marine and terrestrial) were conducted of the development site and surrounding area. The multi-disciplinary surveys, which included marine benthos, sediment analysis, cetaceans, pinnipeds, terrestrial habitats, otters and birds, aimed to undertake ecological assessment through classification, mapping and compilation of species lists and habitat suitability assessments for faunal species. The ecological surveys undertaken provided vital baseline information regarding the existing ecology of the study area.

The information provided in this EIAR chapter, accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the proposed development; prescribes mitigation as necessary; and describes the residual ecological effects. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines as fully described in the methodology section below.

The assessment was carried out in three stages, desktop study, site surveys followed by impact assessment. The desktop study determined existing records in relation to habitats and species present in the study area. This included research on the NPWS metadata website and a literature review of published information on flora and fauna occurring in the development area.

The desk study undertaken for this assessment included a thorough review of the available ecological data including, inter alia, the following:

- Online resources:
  - OSI Aerial photography and 1:50000 mapping, and other mapping sources (online);
  - National Parks and Wildlife Service (NPWS);
  - National Biodiversity Data Centre (NBDC);
  - Bat Conservation Ireland – http://www.batconservationireland.org;
  - Birdwatch Ireland - http://www.birdwatchireland.ie/;
  - British Trust for Ornithology (BTO)-www.BTO.ie;
  - Irish Whale and Dolphin Group-https://iwdg.ie/
  - Teagasc;
  - Environmental Protection Agency (EPA);
  - Water Framework Directive Ireland;

- Geological Survey of Ireland (GSI).
- Fingal Development Plan 2017 – 2023;
- Protecting Howths Habitats (Doogue, date unknown);
- Howth Harbour FHC Proposed Dredging and Reclamation Works Terrestrial Habitat, Otter and Bat Survey 2019 (Woodrow, 2020);
- Howth Harbour FHC Proposed Dredging and Reclamation Works Bird Surveys 2019 / 2020 Report (Woodrow, 2020);
- Howth Harbour Biological Survey (ASU, 2019);
- Rare and Protected Species records retained by NPWS for the hectads which overlap with the study area received in response to a Data Request

The site of the proposed development lies within Ordnance Survey National Grid hectad O23. Biodiversity Maps, the online mapping resource of the NBDC[1], allows users to search 4 million records that are retained across 22 dataset groups. Data analysis tools enable users to refine data base searches using eight different search criteria including 1km, 2km or 10km grid squares on an interactive map. All species records retained for the selected grid square are then available for download in 'Excel' spreadsheet format. The results of the database search for records of protected fauna and flora recorded from hectad O23 are provided below in the relevant sections.

5.1.3 Brief Summary of Surveys and Studies

Site surveys were conducted, by specialist ecologists at Howth Harbour and the surrounding land during 2019 and 2020. These surveys were designed to compile comprehensive baseline information regarding the existing ecology of the development site.

The lack of evidence of any one particular protected species does not necessarily preclude its presence at the site either at this current time or in the future. It is considered however, that the timing of the site visits were suitable for protected species and their habitat-based assessment, as most species would have been active during the survey period and provided evidence of their presence.

Woodrow Sustainable Solutions Ltd. ('Woodrow') was commissioned by the DAFM to undertake ecological surveys and compile a number of reports in relation to;

- Coastal Habitats;
- Wintering and Breeding Birds;
- Terrestrial Mammals.

Additionally, as part of the EIAR, Aquatic Services Unit (ASU) on behalf of the DAFM, undertook a survey of the intertidal and sub-tidal benthos within the Howth Marina area and environs to identify the biological communities in the footprint of the proposed dredge area within the harbour and the reclamation area to the west of the western pier.

The Irish Whale and Dolphin Group (IWDG) Consulting were also commissioned on behalf of the DAFM to carry out a Marine Mammal Risk Assessment (MMRA) in relation to the proposed works at Howth

[1] Available at https://maps.biodiversityireland.ie/Map

Harbour. This risk assessment was based on a review of available literature and data sources, including the IWDG's cetacean sightings database.

5.1.4 Impact Assessment Criteria

An assessment of the likely significant impacts of the proposed development on the identified key ecological receptors is completed in **Section 5.7** below. This is carried out with regard to the criteria outlined in various impact assessment guidelines (CIEEM 2018, IEEM, 2006; NRA, 2009; EPA, 2017) that set down a number of parameters, such as approximate magnitude, character, duration and reversibility that should be considered when determining which elements of the proposed development could constitute impact or sources of impacts. Once impacts are defined, their significance are categorised using EPA Guidelines.

With regard to assessing impacts on marine habitats, cognisance was taken of guidance provided in NPWS guidance (2012a) which pertains to the assessment of impacts on marine habitats that may be caused by anthropogenic disturbance. NPWS (2012a) recognizes that the inherent capacity of marine habitats to recover from change due to disturbance (i.e. habitat resilience) is an important factor. When characterising impacts, the main considerations outlined in NPWS (2012a) are:

I. Whether the disturbance that may occur is of such intensity and/or frequency as to effectively represent a continuous or ongoing source of disturbance over time and space (e.g. effluent discharge within a given area); or
II. Whether the activities that occur may cause significant disturbance but may not necessarily represent a continuous or ongoing source of disturbance over time and space.

It is clear therefore, that while some activities are deemed to be incompatible with the long-term maintenance of the attributes that ensure protection of more sensitive marine habitats' favourable conservation condition; other habitats have an inherent resilience to a range of activities. With regard to sedimentary habitats, NPWS (2012b) outlines the Department's view that disturbance of each community type should not exceed an approximate area of 15%; below this threshold disturbance is deemed to be non-significant.

5.1.5 Evaluation

Guidance on Ecological Impact Assessment (CIEEM, 2018) recommends categories nature conservation value that relates to a geographical framework (International, through to Local). The evaluation set out in this chapter and the assessment of the effects of the proposed development follows methodologies set out in 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009). The guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned based on the importance of any particular species/receptor. The guidelines provide a basis for determination of whether any particular site is of importance on the following scales:

- International;
- National;
- County;
- Local Importance (higher value); and
- Local Importance (lower value).

The NRA guidelines (NRA, 2009) clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna. All habitats and species within the development site were assigned a level of significance on the above basis and the ZOI and key ecological receptors (KERs) were established and classified on this basis. The criterion used to evaluate the Value of Ecological Resources and Impact Significance follows the NRA guidelines (NRA, 2009).

This evaluation scheme seeks to provide value ratings for ecological receptors, with values ranging from internationally to locally important. Internationally important receptors would include candidate Special Areas of Conservation (cSAC) or Special Protected Areas (SPA) while those of national importance would include Natural Heritage Areas (NHA). The value of habitats is assessed based on its condition, size, rarity, conservation and legal status. The value of fauna is assessed on its biodiversity value, legal status and conservation status. Biodiversity value is based on its national distribution, abundance or rarity, and associated trends. All Irish bat species are protected under the Wildlife (Amendment) Act 2000 and under the EU Habitats Directive.

Key ecological receptors (KER's) are referred to by NRA (2009) as those ecological features which are evaluated as Locally Important (higher value) or higher and are likely to be impacted significantly by the proposed development. The features that were evaluated as being of Local Importance (higher value) and higher in this study were selected as key ecological features and then the impact significance on each of these features was assessed.

5.1.6 Assessing Impact Significance

Once the value of the identified ecological receptors (features and resources) is determined, the next step is to assess the impact of the proposed development on the identified key ecological receptors. This was carried out with regard to the criteria outlined in various impact assessment guidelines (NRA, 2009; CIEEM 2018, IEEM, 2006). The impacts were assessed under a number of parameters such as magnitude, extent, duration and reversibility. Once impacts are defined, their significance was categorised using EPA Guidelines.

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying duration:

- Momentary: few seconds to minutes;
- Brief: less than a day;
- Temporary: up to 1 year;
- Short-term: from 1-7 years;
- Medium-term: 7-15 years;
- Long-term: 15-60 years;
- Permanent: over 60 years;
- Reversible: effects that can be undone;

- Frequency: once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually;
- Irreversible: character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
- Residual: Degree of environmental change that will occur after the proposed mitigation measures have taken effect
- Synergistic: Where the resultant effect is of greater significance than the sum of its constituents
- Worst Case: The effects arising from a development in the case where mitigation measures substantially fail.

The criteria used to assess the potential significance follow EPA guidance (EPA, 2017). See **Table 5.1**.

Table 5.1 Significance of Effects (definitions) [adapted from EPA (2017)]

Significance of Effects	Definition
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable[2] changes in the character of the environment but without significant consequences
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound Impact	An effect which obliterates sensitive characteristics.

5.1.7 Cumulative Effects

The cumulative impacts of the proposed development are also assessed in **Section 5.7.11** by discussing the impact of the proposal, in terms of other developments that have planning permission, that are under construction, or are in existence in the area. A cumulative impact assessment has also been undertaken of the concurrent construction phase for the future developments on the site.

5.1.8 Mitigation: Rationale and Design

Where potential effects are assessed to be significant, mitigation measures have been incorporated into the project design to remove or reduce these effects. These are outlined in **Section 5.8** below. The residual effects after mitigation are then assessed in **Section 5.9** below.

[2] for the purposes of planning consent procedures

5.2 Existing Environment

5.2.1 Site Location

Howth Head is a rocky peninsula situated on the northern side of Dublin Bay and comprises Cambrian rock including sea cliffs of up to 90 metres in height. Ireland's Eye, an uninhabited island, lies approximately 1.0km north of the harbour. To the east of the harbour are Howth Head and the Irish Sea; to the west a large sandy intertidal area towards Baldoyle/Portmarnock. The coastal water quality is classified as 'unpolluted' by the EPA[3].

Figure 5.1. Site location map showing proposed project extent and location

Howth Harbour is situated on the north side of Howth Peninsula, to the north of Dublin Bay (see **Figure 5.1** above). The harbour itself comprises of three main areas; a trawler basin entered between two bull-noses to the north, swing moorings area to the east and a marked channel to the yacht club marina.

Howth Harbour operates as a Fishery Harbour Centre under the Department of Agriculture, Food and the Marine. The harbour area is enclosed by a west pier and an east pier. Within this enclosed area is a further pier, the middle pier, extending northwards from the south side of the harbour, and, a breakwater extending westwards from the east pier.

The proposed site is situated in proximity to several Special Protection Areas (SPA) and Special Areas of Conservation (SAC), the closest of which are Howth Head SAC, Baldoyle Bay SAC, Ireland's Eye SPA and Howth Head Coast SPA. There is a total of eighteen designated Natura 2000 within 15km of the proposed works.

[3] http://gis.epa.ie/Envision [Accessed 11/02/2020]

5.3 Designated Conservation Sites and Other Ecologically Significant Areas

Howth Harbour and the proposed reclamation area do not lie within the boundary of any designated site. Thus, the site of the proposed development does not form part of any Natural Heritage Area (NHA), Special Protection Area (SPA), Special Area of Conservation (SAC) or candidate Special Area of Conservation (cSAC), Nature Reserve, or National Park.

5.3.1 European (Natura 2000) Sites

Natura 2000 sites are sites of international importance, protected under European legislation. Two types of sites are incorporated within the Natura 2000 network; Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites.

In accordance with the European Commission Methodological Guidance (EC2001), a list of Natura 2000 Sites that can be potentially affected by the proposed project has been complied. All candidate SAC's (cSAC) and SPAs sites within a 15km radius of the proposed development have been identified and listed in **Table 5.2** and relevant Natura 2000 sites are shown in **Figure 5.2**. It is noted that use of a 15km radius was chosen as a precautionary measure, as impacts at this distance from the proposed development are highly unlikely in the absence of significant aqueous emissions.

Table 5.2. Designated sites and location relative to the proposed development area.

Designated Site	Proximity of site to nearest point of designated site	Qualifying features of conservation interest
Howth Head SAC (000202)	SAC located approx. 0.3km to south-east	• Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] • European dry heaths [4030]
Ireland's Eye SPA (004117)	SPA located approx. 0.5km to north-east	• Cormorant (*Phalacrocorax carbo*) [A017] • Herring Gull (*Larus argentatus*) [A184] • Kittiwake (*Rissa tridactyla*) [A188] • Guillemot (*Uria aalge*) [A199] • Razorbill (*Alca torda*) [A200]
Howth Head Coast SPA (004113)	SPA located approx. 0.5km to east	• Kittiwake (*Rissa tridactyla*) [A188]
Rockabill to Dalkey Island SAC (003000)	SAC located approx. 0.5km to east	• Reefs [1170] • Harbour porpoise (*Phocoena phocoena*) [1351]
Baldoyle Bay SAC (000199)	SAC located immediately adjacent	• Mudflats and sandflats not covered by seawater at low tide [1140] • *Salicornia* and other annuals colonizing mud and sand [1310] • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]

Designated Site	Proximity of site to nearest point of designated site	Qualifying features of conservation interest
		• Mediterranean salt meadows (Juncetalia maritimi) [1410]
Ireland's Eye SAC (002193)	SAC located approx. 0.8km to north-east	• Perennial vegetation of stony banks [1220] • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
North Dublin Bay SAC (000206)	SAC located approx. 1.9km to south-west	• Mudflats and sandflats not covered by seawater at low tide [1140] • Annual vegetation of drift lines [1210] • *Salicornia* and other annuals colonizing mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] • Humid dune slacks [2190] • Petalwort (*Petalophyllum ralfsii*) [1395]
North Bull Island SPA (004006)	SPA located approx. 1.9km to south-west	• Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Teal (*Anas crecca*) [A052] • Pintail (*Anas acuta*) [A054] • Shoveler (*Anas clypeata*) [A056] • Oystercatcher (*Haematopus ostralegus*) [A130] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Dunlin (*Calidris alpina*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162] • Turnstone (*Arenaria interpres*) [A169] • Black-headed Gull (*Larus ridibundus*) [A179] • Wetlands & Waterbirds [A999]
Baldoyle Bay SPA (004016)	SPA located approx. 2.2km to west	• Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Ringed Plover (*Charadrius hiaticula*) [A137] • Golden Plover (*Pluvialis apricaria*) [A140]

Designated Site	Proximity of site to nearest point of designated site	Qualifying features of conservation interest
		• Grey Plover (*Pluvialis squatarola*) [A141] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Wetlands & Waterbirds [A999]
Malahide Estuary SAC (000205)	SAC located approx. 5.8km to north-west	• Mudflats and sandflats not covered by seawater at low tide [1140] • *Salicornia* and other annuals colonizing mud and sand [1310] • *Spartina* swards (*Spartinion maritimae*) [1320] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]
Malahide Estuary SPA (004025)	SPA located approx. 6.4km to north-west	• Great Crested Grebe (*Podiceps cristatus*) [A005] • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Pintail (*Anas acuta*) [A054] • Goldeneye (*Bucephala clangula*) [A067] • Red-breasted Merganser (*Mergus serrator*) [A069] • Oystercatcher (*Haematopus ostralegus*) [A130] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Knot (*Calidris canutus*) [A143] • Dunlin (*Calidris alpina*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Redshank (*Tringa totanus*) [A162] • Wetlands & Waterbirds [A999]
South Dublin Bay and River Tolka Estuary SPA (004024)	SPA located approx. 7.3km to south-west	• Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed Plover (*Charadrius hiaticula*) [A137] • Grey Plover (*Pluvialis squatarola*) [A140] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Dunlin (*Calidris alpina*) [A149] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Redshank (*Tringa totanus*) [A162] • Black-headed Gull (*Croicocephalus ridibundus*) [A179] • Roseate Tern (*Sterna dougallii*) [A192] • Common Tern (*Sterna hirundo*) [A193]

Designated Site	Proximity of site to nearest point of designated site	Qualifying features of conservation interest
		• Arctic Tern (*Sterna paradisaea*) [A194] • Wetlands & Waterbirds [A999]
South Dublin Bay SAC (000210)	SAC located approx. 8.3km to south-west	• Mudflats and sandflats not covered by seawater at low tide [1140] • Annual vegetation of drift lines [1210] • *Salicornia* and other annuals colonising mud and sand [1310] • Embryonic shifting dunes [2110]
Lambay Island SPA (004069)	SPA located approx. 10km to north-east	• Fulmar (*Fulmarus glacialis*) [A009] • Cormorant (*Phalacrocorax carbo*) [A017] • Shag (*Phalacrocorax aristotelis*) [A018] • Greylag Goose (*Anser anser*) [A043] • Lesser Black-backed Gull (*Larus fuscus*) [A183] • Herring Gull (*Larus argentatus*) [A184] • Kittiwake (*Rissa tridactyla*) [A188] • Guillemot (*Uria aalge*) [A199] • Razorbill (*Alca torda*) [A200] • Puffin (*Fratercula arctica*) [A204]
Lambay Island SAC (000204)	SAC located approx. 10.3km to north-east	• Reefs [1170] • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] • Grey seal (*Halichoerus grypus*) [1364] • Harbour seal (*Phoca vitulina*)
Rogerstown Estuary SPA (004015)	SPA located approx. 10.7km to north-west	• Greylag Goose (*Anser anser*) [A043] • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Shoveler (*Anas clypeata*) [A056] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed Plover (*Charadrius hiaticula*) [A137] • Grey Plover (*Pluvialis squatarola*) [A141] • Knot (*Calidris canutus*) [A143] • Dunlin (*Calidris alpina*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Redshank (*Tringa totanus*) [A162] • Wetlands & Waterbirds [A999]
Rogerstown Estuary SAC (000208)	SAC located approx. 11.3km to north-west	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • *Salicornia* and other annuals colonizing mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410]

Designated Site	Proximity of site to nearest point of designated site	Qualifying features of conservation interest
		• Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]
Dalkey Islands SPA (004172)	SPA located approx. 12.2km to south	• Roseate Tern (*Sterna dougallii*) [A192] • Common Tern (*Sterna hirundo*) [A193] • Arctic Tern (*Sterna paradisaea*) [A194]

Figure 5.2 Proposed Development site in relation to surrounding Natura 2000 sites

Potential impacts on designated Natura 2000 sites (SAC/cSAC/SPA) are specifically addressed in a Natura Impact Statement which has been submitted as part of this application. The Natura Impact Statement notes that following a comprehensive evaluation of the potential direct, indirect and cumulative impacts on the qualifying interests and conservation objectives for Natura 2000 sites, it has been concluded that the proposed development will not have an adverse effect on the integrity of Natura 2000 sites.

5.3.2 Nationally Protected Sites

The basic designation for wildlife in Ireland is the Natural Heritage Area (NHA). Natural Heritage Areas (NHAs/pNHAs) are national designations under the Wildlife Act 1976, as amended. NHA's are areas considered important for the habitats present or which holds species of plants and animals whose

habitat needs protection. In addition to 148 NHAs, there are 630 proposed Natural Heritage Areas (pNHA). A list of pNHAs was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated. Prior to statutory designation, pNHAs are subject to limited protection including in the areas of agri-environmental farm planning schemes, certain forest service requirements pertaining to payment of afforestation grants and recognition of the ecological value of pNHAs by Planning and Licencing Authorities. There are no NHAs and 15 pNHAs within 15km of the development site; these latter are listed in **Table 5.3** below.

Table 5.3 pNHA sites located within 15km of the proposed development

Site name and code	Distance from pNHA site to development site	Features of Interest
Howth Head pNHA (000202)	pNHA located approx. 0.3km to south-east	pNHA site code, site area and features of interest correspond to those of the Howth Head SAC and is of ornithological importance as the site is encompassed within the Howth Head Coast SPA.
Ireland's Eye (000203)	pNHA located approx. 0.5km to north-east	pNHA site code, site area and habitat and species features of interest correspond to those of Ireland's Eye SAC & Ireland's Eye SPA.
Baldoyle Bay (000199)	pNHA located immediately adjacent	pNHA site code, site area and features of interest correspond to those of the Baldoyle Bay SAC and is of ornithological importance as the site is encompassed within the Baldoyle Bay SPA.
North Dublin Bay (000206)	pNHA located approx. 1.9km to south-west	pNHA site code, site area and features of interest correspond to those of the North Dublin Bay SAC and is of ornithological importance as the site is encompassed within the North Bull Island SPA.
Sluice River Marsh (001763)	pNHA located approx. 5.8km to north-west	This site is of interest because it contains several very rare plant species in addition to a number of wintering bird species of the nearby Baldoyle Bay SPA[4].
Feltrim Hill (001208)	pNHA located approx. 8.8km to north-west	The site is of geological importance and has been previously known to contain two rare species of plant, namely Spring squill and Long-stalked Cranes-bill[5].
Santry Demesne (000178)	pNHA located approx. 11.3km to west	The primary importance of the site is that it contains the legally protected species Hairy St. John's-wort. The woodland is also of general ecological interest[4].
Malahide Estuary (000205)	pNHA located approx. 5.8km to north-west	pNHA site code, site area and features of interest correspond to those of the Malahide Estuary SAC and is of ornithological importance as the site is encompassed within the Malahide Estuary SPA.

[4] http://www.fingalbiodiversity.ie/resources/fingal_countryside/2008%20Sluice%20River%20Flora.pdf

[5] pNHA Site Synopsis Portfolio

Site name and code	Distance from pNHA site to development site	Features of Interest
Rogerstown Estuary (000208)	pNHA located approx. 11.3km to north-west	pNHA site code, site area and features of interest correspond to those of the Rogerstown Estuary SAC and is of ornithological importance as the site is encompassed within the Rogerstown Estuary SPA.
Lambay Island (000204)	pNHA located approx. 10.3km to north-east	pNHA site code, site area and features of interest correspond to those of the Lambay Island SAC and is of ornithological importance as the site is encompassed within the Lambay Island SPA.
South Dublin Bay (000210)	pNHA located approx. 8.3km to south-west	pNHA site code, site area and features of interest correspond to those of the South Dublin Bay SAC and is of ornithological importance as the site is encompassed within the South Dublin Bay and River Tolka Estuary SPA.
Dalkey Coastal Zone and Killiney Hill (001206)	pNHA located approx. 11.3km to south	This site represents a fine example of a coastal system with habitats ranging from the sub-littoral to coastal heath. The flora is well developed and includes some scares species. The islands are of ornithological importance. The site also has geological importance[4].
Royal Canal (002103)	pNHA located approx. 11.8km to south-west	The ecological value of the canal lies more in the diversity of species it supports along its liner habitats than the presence of rare species i.e. Opposite-leaved Pondweed. The canal crosses through agricultural land and therefore provides a refuge for species threatened by modern farming[4].
Grand Canal (002104)	pNHA located approx. 11.7km to south-west	The ecological value of the canal lies more in the diversity of species it supports along its liner habitats than the presence of rare species i.e. Opposite-leaved Pondweed. The canal crosses through agricultural land and therefore provides a refuge for species threatened by modern farming[4].

5.3.3 Ramsar Sites

The Ramsar Convention on Wetlands of International Importance, especially as Waterfowl Habitat, is an international treaty that was established for the conservation and sustainable use of wetlands. The Ramsar Convention was ratified by Ireland in 1984 and came into force for Ireland on the 15th of March 1985. Ireland presently has 45 sites designated as Wetlands of International Importance, with a surface area of 66,994 hectares. The Convention is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. A key commitment of Ramsar Contracting Parties is to identify and place suitable wetlands onto the List of Wetlands of International Importance. Baldoyle Bay and North Bull Island are both listed as Ramsar sites. This is a non-statutory designation.

Baldoyle Bay is a tidal embayment separated from the sea by a major sand dune system. Vast mudflats are exposed at low tide and there are extensive beds of *Spartina*. The site is internationally important

for the wintering Light-bellied Brent Goose (*Branta bernicla hrota)*, and nationally important numbers of various species of waterbirds use the site[6].

North Bull Island is a small island built up over 200 years against a harbour wall and the adjoining foreshore of sandy beaches, saltmarshes and mudflats. The site is unique in Ireland because it supports well-developed saltmarsh and dune systems displaying all stages of development from the earliest phase of colonization to full maturity. The site supports five protected or threatened plant species and nationally important populations of three insect species. The area is important for nesting Little Tern (*Sterna albifrons)* (80 pairs, or about 30% of the Irish population) and for numerous species of wintering waterbirds[5].

5.3.4 Important Bird Areas

Important Bird and Biodiversity Areas (IBAs) are sites selected as important for bird conservation because they regularly hold significant populations of one or more globally or regionally threatened, endemic or congregator bird species or highly representative bird assemblages. The European IBA programme aims to identify, monitor and protect key sites for birds all over the continent. It aims to ensure that the conservation value of IBAs in Europe (now numbering more than 5,000 sites or about 40% of all IBAs identified globally to date) is maintained, and where possible enhanced. The programme aims to guide the implementation of national conservation strategies, through the promotion and development of national protected-area programmes. Through their designation they aim to form a network of sites ensuring that migratory species find suitable breeding, stop-over and wintering places along their respective flyways.

The function of the Important Bird Area (IBA) Programme is to identify, protect and manage a network of sites that are important for the long-term viability of naturally occurring bird populations, across the geographical range of those bird species for which a site-based approach is appropriate. The proposed development site lies in close proximity to the Baldoyle Bay IBA (Site Code: IE112), the Dublin Bay IBA (Site Code: IE109) and the Ireland's EYE IBA (Site Code: IE111). These sites qualify for designation under a number of IBA Criteria (2000) (**Table 5.4**)

Table 5.4: IBA Criteria met by Baldoyle Bay, Dublin Bay & Ireland's Eye

IBA Selection Criteria		Site Which IBA Criteria met
Category	Criterion	
A4i	The site is known or thought to hold, on a regular basis, ≥1% of a biogeographic population of a congregatory waterbird species.	Dublin Bay
A4iii	The site is known or thought to hold, on a regular basis, ≥20 000 waterbirds or ≥10 000 pairs of seabirds of one or more species.	Dublin Bay
B1i	The site is known or thought to hold ≥ 1% of a flyway or other distinct population of a waterbird species.	Dublin Bay, Baldoyle Bay, Ireland's Eye
B2	The site is one of the most important in the country for a species with an unfavourable conservation status in Europe and for which the site-protection approach is thought to be appropriate.	Dublin Bay, Baldoyle Bay
B3	The site is one of the most important in the country for a species with a favourable conservation status in Europe but concentrated in Europe and for which the site-protection approach is thought to be appropriate.	Ireland's Eye

[6] https://www.ramsar.org/wetland/ireland

C2	The site is known to regularly hold at least 1% of a flyway population or of the EU population of a species threatened at the EU level (listed on Annex I of The Birds Directive).	Dublin Bay
C3	The site is known to regularly hold at least 1% of a flyway population or of the EU population of a species threatened at the EU level (not listed on Annex 1 of The Birds Directive).	Dublin Bay, Baldoyle Bay, Ireland's Eye
C4	The site is known to regularly hold at least 20,000 migratory waterbirds and/or 10,000 pairs of migratory species of one or more species.	Dublin Bay
C6	The site is one of the five most important in the European region in question for a species or subspecies considered threatened in the European Union.	Dublin Bay
C7	The site has been designated as a Special Protection Area (SPA) or selected as a candidate SPA based on ornithological criteria (similar to but not equal to C1–C6) in recognized use for identifying SPAs	Dublin Bay

5.4 Marine Ecology

This section will examine all parts of the marine environment relevant to the proposed development in the form of desk-top studies and on-site assessments. The following aspects will be dealt with: water quality, marine benthos, sediment (granulometry and contaminants), hydrodynamics, cetaceans and pinnipeds.

5.4.1 Water Quality

Refer to **Chapter 7 Water** for a full description of the impact assessment on waters.

5.4.1.1 *Methodology*

A desktop study was undertaken as part of the **Chapter 7 Water** of this EIAR. Refer to **Chapter 7 Water** for full details on this desktop study. A hydrodynamic and Sediment Regime Assessment (**Appendix 4**) and a Generic Quantitative Risk Assessment (**Appendix 10**) were completed as part of this EIAR. This chapter on Biodiversity incorporated these assessments into its own assessment on the impacts to biodiversity.

5.4.1.2 *Results*

The name of the water body under the water framework directive is the Irish Sea Dublin (HA 09) and the quality status is good. The water body is currently not at risk.

The Hydrodynamic assessment found the following relevant information;

- There will be an increase in suspended solids in the area of the dredging works:
- There will be dispersion of sediments to sensitive receptor areas outside the harbour. The main impact will be an annual deposition at Claremont Beach in the order of 0.4mm. This deposition will be removed from the beach on a daily basis through tidal and wave action:
- There will be a minor decrease in the wave action on Claremont beach due to the reclamation area. This would have the effect of potentially slowing the natural erosion of embryo dunes on Claremont beach.

The Generic Quantitative Risk Assessment is also used to assess the risk to biodiversity in relation to the water quality. It found the following;

- Certain heavy metals, tributyl tin and to a lesser degree PCBs and PAHs have been identified in the shallow sediments at sample locations within the dredge area. Modelling of the potential mobilisation of these potential pollutants during the dredge phase indicates that the EQS will be exceeded for two parameters at receptors outside of the harbour. Mitigations are outlined in order to address the exceedances. Once the mitigations are in place the risk to water quality and marine life from dredging will be low to negligible in the short term.
- The long term leaching from the stabilised and solidified sediments in the land reclamation area will meet the EQS as the leachate leaves the revetment wall.
- The impact of the dredging works is considered to be a low to negligible short term risk to water quality and marine life. The impact of the S/S sediment is considered to be a negligible permanent risk to water quality and marine life.

5.4.2 Marine Benthic Fauna

Aquatic Services Unit (ASU) undertook a survey of the benthos in the area. The aim of this survey was to map the faunal communities in the vicinity of the proposed development, to determine the faunal composition that will be removed due to dredging and lost due to land reclamation. This assessment involved the completion of field assessments of both the intertidal and subtidal habitats within the immediate vicinity of the proposed development. See **Appendix 6** of the EIAR for full report details.

In terms of biologically defined protected areas, the survey area is not located within any protected areas. However, the Baldoyle Bay SAC (See **Figure 5.2** above) is located immediately adjacent to the proposed reclamation area.

The report concluded that *'all species and habitats identified in the survey area are common in Irish coastal waters. In soft sediment areas within the basin, dominated by fine muds, abundances and diversities are low. Samples taken from within the areas to be dredged are similar to those taken at dredge site controls. Areas located outside the basin consist of sands and muddy sands, with no differences in habitat noted between the proposed disposal areas and the disposal control areas. Diversity is higher in samples collected outside the Howth basin'* (ASU, 2019).

5.4.2.1 *Methodology*

Fieldwork was carried out on the 4th June 2019. Benthic samples were taken by means of a 0.1m^2, stainless steel, weighted Van-Veen grab. In addition, a shoreline survey was carried out in the immediate vicinity of the existing pier during low spring tide on June 7th 2019. Intertidal rocky shore transects were carried out where appropriate, and a single intertidal core was taken by means of a 0.028m^2 stove pipe core to a depth of 15cm. Habitats were identified using the JNCC Marine Habitat Classification System (Connor *et al.*, 2004).

5.4.2.2 *Results*

Benthic Samples

A total of 19 sub-tidal stations (see **Figure 5.3**) were sampled for benthic faunal analysis, granulometric analysis and organic carbon analysis. Samples were taken exclusively where there was sufficient penetration of the Van-Veen grab. Sample locations were chosen from within the areas to be dredged and areas where dredge spoil is to be deposited. In addition, control locations were selected in areas adjacent to the dredge and disposal zones where no dredging or disposal is to be undertaken. Granulometric analysis was carried out on oven dried sediment samples from each station using the protocols described by Holme & McIntyre (1984). Further analysis of the sediment data was undertaken using the Gradistat package (Blott & Pye, 2001).

On returning to the laboratory all faunal samples were sieved on a 1.0mm mesh sieve, preserved in buffered formalin and subsequently sorted by eye. All fauna was identified to the lowest taxonomic level possible using standard keys to north-west European fauna.

A number of biotic indices were calculated from the species / abundance matrix from the grab samples. These indices included Simpson's Dominance Index (where values range from low dominance [0] to high dominance [1]), Shannon-Wiener Diversity Index (Values ranging from low diversity [0] to high diversity [4]) and Pielou's Evenness Index (values ranging from low i.e. dominated by a few species [0] to high evenness i.e. a more even spread of species [1]).

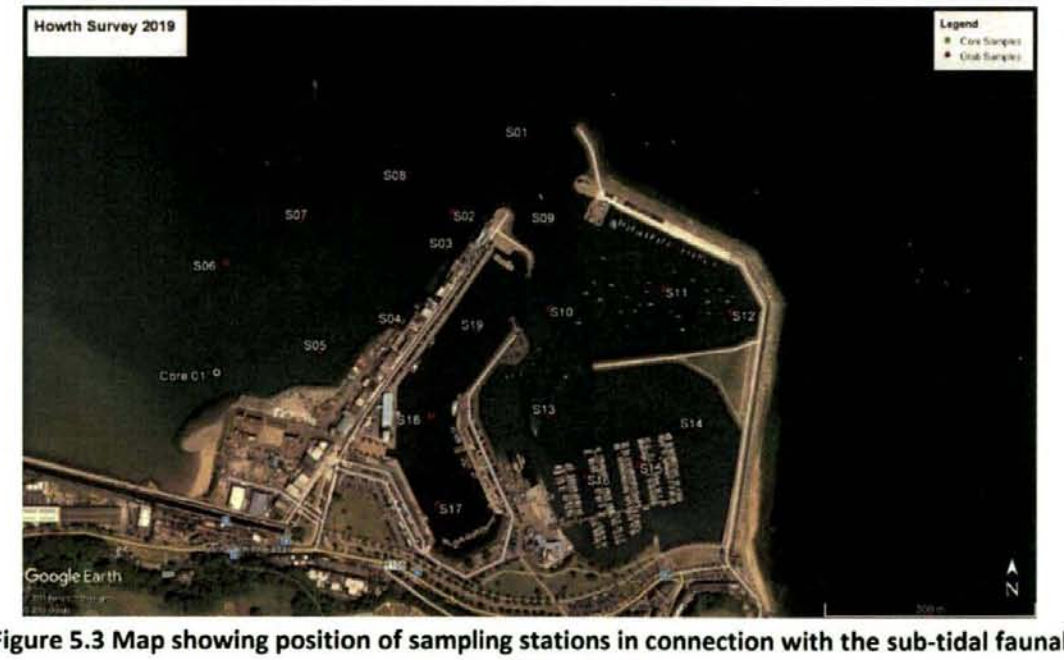

Figure 5.3 Map showing position of sampling stations in connection with the sub-tidal faunal sampling (ASU, 2019).

In total 55 taxa were encountered in the soft sediment samples. A full list of the species and their densities are shown in **Appendix 6** of the EIAR. Derived indices for each station are presented in **Table 5.5** below.

Stations S01 and S02 contained the highest number of taxa per site compared to all other sites, with numbers of 23 and 17 respectively (**Table 5.5**). Three stations had only 2 taxa (Stations S16, S17 & S18). All sites located outside of the Howth Harbour basin had more diversity compared to all sites within the basin, with the exception of S09, which is located at the Harbour entrance.

The bivalve mollusc *Abra alba* is the most common taxa within the survey area, being present at 13 sites with 384 individuals identified (See **Appendix 6** of the EIAR). Other common taxa present across the survey area include the polychaete worms *Nephtys hombergii* (70 individuals across 12 sites), *Lanice conchilega* (51 individuals across 8 sites), *Owenia borealis* (36 individuals across 9 sites), the gastropod mollusc *Peringia ulvae* (269 individuals across 6 sites) and the bivalve molluscs *Fabulina fabula* (80 individuals across 8 sites) and *Corbula gibba* (13 individuals across 7 sites).

Table 5.5. Derived indices calculated for all stations in the survey area (ASU, 2019).

	Number of Species (S)	Number of Individuals (N)	Shannon-Wiener Diversity (H')	Pielou's Evenness (E)	Simpson's Dominance (D)
S01	23	380	1.38	0.439	0.483
S02	17	52	2.41	0.852	0.12
S03	13	54	1.83	0.712	0.256
S04	9	29	2.05	0.933	0.141
S05	9	19	1.88	0.857	0.197
S06	8	25	1.8	0.864	0.206
S07	9	47	1.37	0.622	0.41
S08	12	57	1.79	0.721	0.288
S09	11	35	2.05	0.855	0.167
S10	7	17	1.71	0.877	0.211
S11	7	169	0.926	0.476	0.533
S12	7	57	1.48	0.761	0.288
S13	5	53	1.17	0.73	0.36
S14	5	127	0.384	0.239	0.838
S15	4	7	1.28	0.921	0.306
S16	3	7	0.796	0.725	0.551
S17	2	2	0.693	1	0.5
S18	2	5	0.673	0.971	0.52
S19	2	5	0.5	0.722	0.68
Core 1	11	28	2.04	0.851	0.173

Results from the particle size analysis (Granulometry) indicated the presence of two distinct sediment types in the area based on location in relation to the Howth Harbour Basin. Samples collected from within the Harbour basin consist of fine muds and sandy muds, while samples collected from outside the harbour basin consist of fine sands and muddy sands.

Multivariate analysis of the faunal data set identified the presence of 2 faunal groupings (**Figure 5.4 & 5.5**). The distribution of these two groups is relative to their positions within or outside the Howth Harbour basin.

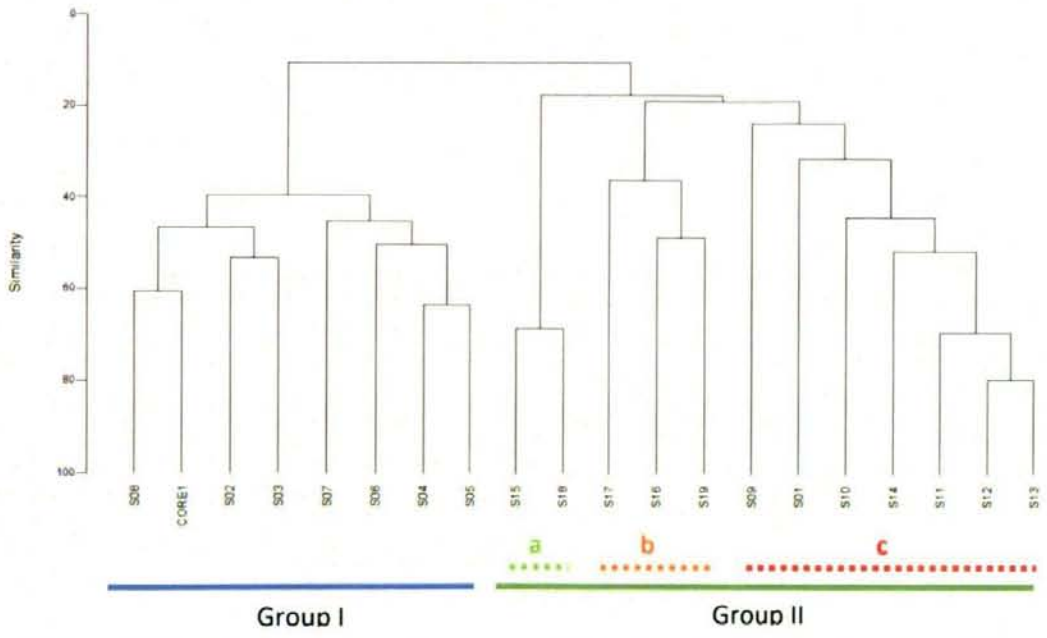

Figure 5.4 Cluster diagram identifying the presence of 2 faunal groups within the Howth Harbour study area. Group II contains three discrete faunal assemblages within the basin (marked in dashed lines) (ASU, 2019)

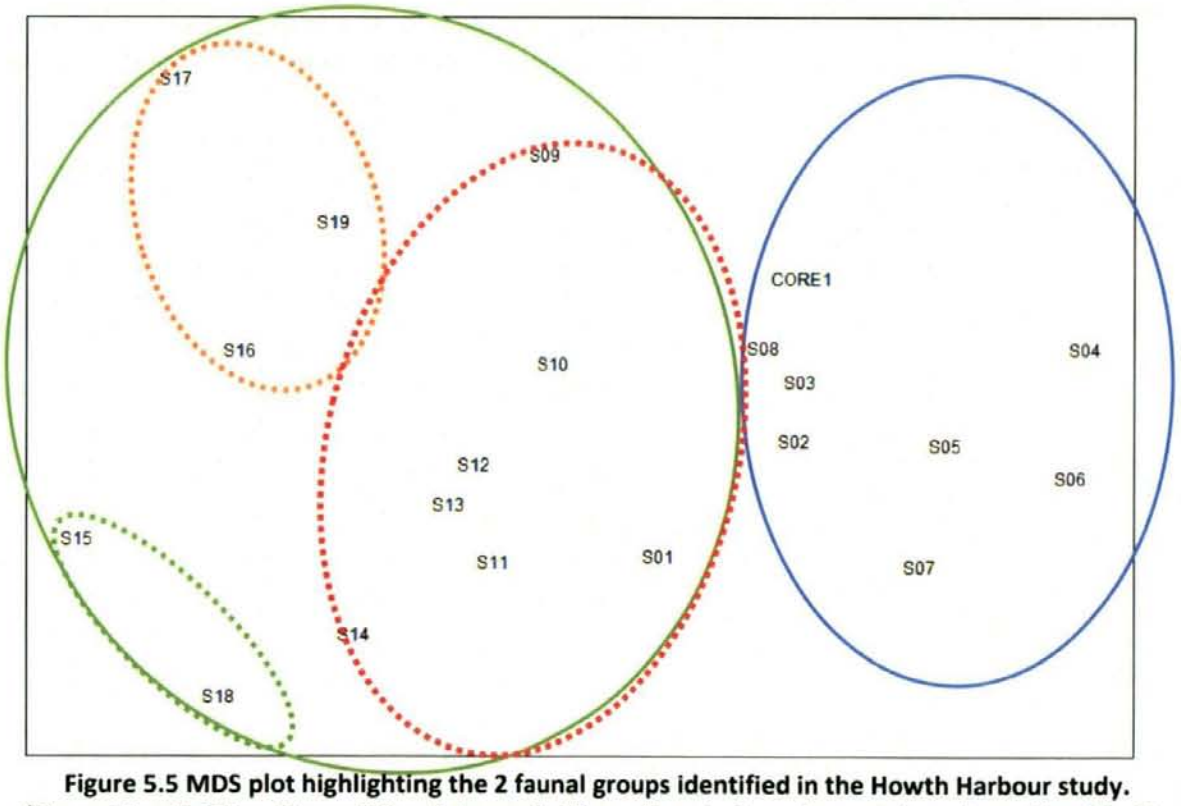

Figure 5.5 MDS plot highlighting the 2 faunal groups identified in the Howth Harbour study. (Group I is solid blue; Group II is solid green). Three discrete faunal groups have been identified in the Howth Harbour Basin, identified using the dashed lines (ASU, 2019).

Group I consist of fauna typical of fine sands and muddy sands and reflects the nature of the sediment identified at these sites. All sites in this group are outside the Howth Harbour Basin. This group is dominated by the polychaetes *Owenia borealis*, *Lanice conchilega* and *Nephtys hombergii*, *Eumida*

sanguinea and *Glycera* sp, as well as the bivalve molluscs *Fabulina fabula, Macomangulus tenuis, Abra alba* and *Chamelea striatula*. This group has been identified as the Infralittoral muddy sand (SS.SSa.IMuSa) habitat (Connor *et al.*, 2004).

Group II consists of fauna typical of muds and sandy muds. The stations within this group are located within, and at the mouth of the Howth Harbour basin. Overall, diversity and abundances are lower in this group compared to Group I. This group is dominated by the bivalve mollusc *Abra alba* and the gastropod mollusc *Peringia ulvae*. Other species present within the basin, but in lower numbers, are the bivalve molluscs *Abra nitida*, *Corbula gibba* and the polychaetes *Nephtys hombergii*, *Malococeros vulgaris* and *Capitella capitata*. Three discrete groups are present within the basin (**Figure 5.4**). One discrete group (c) is located at the mouth and in more exposed areas of the basin (Stations S01 and S09-S14). Sites in this discrete group show more diversity than the remaining sites within the basin. The other discrete groups (a & b) are located in the more sheltered areas of the basin and contain low species diversity and abundances at these sites (S15-S19). Group II has been classified as the Infralittoral Fine Mud (SS.SMu.IFiMu) habitat which is a common habitat in harbours in Ireland and the UK (Connor *et al.*, 2004).

Shore Survey

A walk-over survey of intertidal habitats and associated biological communities was undertaken by ASU along the northern side of the Howth West Pier during low spring tide on June 7th 2019. The survey was undertaken in fine weather under ideal conditions. The survey was largely confined to the hard substrate intertidal habitats with just general observations on the wider soft sediment intertidal areas, a very large expanse of which, exposed during low tide, lies immediately to the west and north-west within the Baldoyle Estuary SAC but outside the immediate development area. See **Appendix 6 Volume 3** of the EIAR for the site survey report.

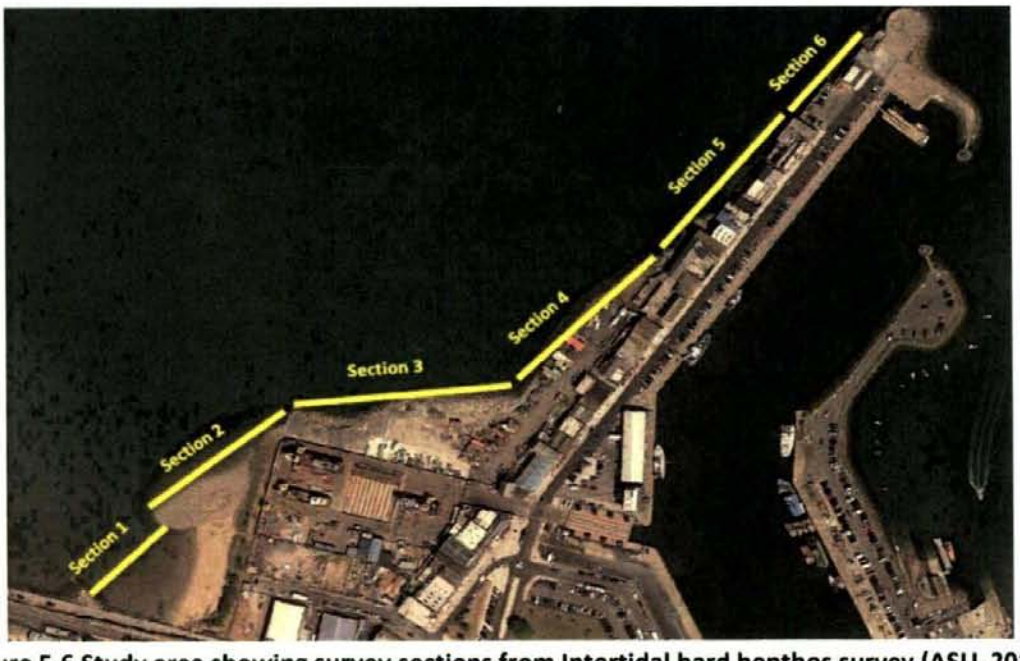

Figure 5.6 Study area showing survey sections from Intertidal hard benthos survey (ASU, 2019).

The survey area was characterised by a fairly wide range of typical rocky / boulder hard benthos intertidal habitats. Sections 1 and 2, both immediately southwest of the proposed reclamation area comprise essential moderate to low diversity habitats ranging from barren sand and barren gravel/small cobbles to low diversity fucoid seaweed covered large cobbles/small boulders. Section 2, the steep rock-armour embankment adjoining the boat repair yard is the least biologically diverse sections of the survey area and the first within the section earmarked for dredge spoil deposition.

Sections 4 to 6 are essentially very similar in shore zonation and species diversity, with Section 4 still dominated by large rock armour elements throughout the shore, whereas the remaining two sections, differing in only fairly subtle respects, can be conveniently denoted by having a upper and mid-shore dominated by a more or less uniform smooth sloping section of laid stone and concrete substrate, abruptly succeeded in the mid to mid-lower section of the shore by larger or smaller barnacle covered boulders. In terms of species diversity, the lower shore *Fucus serratus* fringe which subtended all sections from 4 to 6 inclusive was by far the most diverse habitat particularly in terms of red algae but also encrusting fauna such as barnacles, sponges, bryozoans etc. A feature of this lowest shore habitat was the apparent absence of calcareous red algal crusts which may relate in some way to the nature of the rock type present. The *Fucus serratus* fringe merged into an upper subtidal band of kelp dominated mainly by *Laminaria digitata* but with much *Saccharina latissima* also present and very occasional *Chorda filum*. This latter habitat began in Section 4 as an extremely narrow fringe and gradually widened out toward the end of Section 6 toward the head of the pier.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Plate 1 A
Section 1 – Claremount strand</td><td>Plate 1B
Section 1 – intertidal soft sediment with Arenicola bed</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Plate 1 C
Section 1 – Claremount strand – rock armour</td><td>Plate 2A
Section 2 – Fucus vesiculosus on mid-shore cobble and boulders</td></tr>
</table>

Plate 2B
Section 3- clean rippled sand shore (view north)

Plate 3A
Section 3 – species poor rock armour

Plate 4A
Section 4 – *Verrucaria* with *Caloplaca*

Plate 4B
Section 4 – Barnacles on rock armour

Plate 4C
Section 4 – *F. vesiculosus* on lower rock armour mid-lower shore

Plate 4D
Section 4 – *F. serratus* & Laminaria – Extreme lower shore

Plate 5A
Section 5/6 – Upper shore fucoid – dominated

Plate 5B
Section 5 – mid-lower barnacle dominated boulders

Plate 5C
Section 5 – closeup of barnacle and mollusc mid-lower shore

Plate 5D
Section 5 – Lower shore: *F. serratus*, with reds and *Ulva*

Plate 6A
Section 6 – Upper to Mid shore fucoid zones

Plate 6B
Section 6 – Large barnacle-covered boulders

Plate 6C
Section 6 – Lower shore (*F.serratus & L.digitata*)

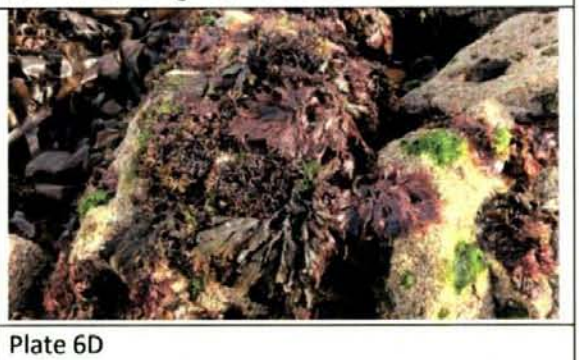

Plate 6D
Section 6 - Lower shore Red algal turfs

5.4.3 Marine Mammals

Irish Whale and Dolphin Group (IWDG) Consulting were commissioned by Malachy Walsh and Partners to carry out a Marine Mammal Risk Assessment (MMRA) in relation to the proposed works at Howth Harbour. This risk assessment was based on a review of available literature and data sources, including the IWDG's cetacean sightings database. See **Appendix 5** of the EIAR for the MMRA report.

5.4.3.1 *Legislation pertaining to Marine Mammals in Irish Water*

Irish cetaceans and pinnipeds are protected by national legislation and by a number of international regulations which the Republic of Ireland is signatory to. 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.

All cetaceans and pinnipeds are protected under the EC Habitats Directive. All cetaceans are included in Annex IV of the Directive as species 'in need of strict protection'. Under this Directive, the harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) are designated Annex II species which are of community interest and whose conservation requires the designation of special areas of conservation. Ireland is also signatory to conservation agreements such as the Bonn Convention on Migratory Species (1983), the OSPAR Convention for the Protection of the Marine Environment of the northeast Atlantic (1992) and the Berne Convention on Conservation of European Wildlife and Natural Habitats (1979).

In light of the legislation and conservation status of marine mammals, careful consideration must be given during all anthropogenic activity with potential effect on the species and their habitat. The National Parks & Wildlife Service of the Department of Arts, Heritage and the Gaeltacht have developed a '*Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters* (NPWS, 2007). These were subsequently reviewed and amended to produce '*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters*' (NPWS, 2014) which include mitigation measures specific to dredging. Issues of disturbance to marine mammals in general are dealt with via the Wildlife Act licences and Derogations under the Natural Habitats regulations but in some cases where consent is given for an activity by a Regulatory Authority (e.g. coastal dredging or pile driving) the Department as a consultee may recommend MMO monitoring of works and a set of monitoring guidelines.

5.4.3.2 *Marine Mammals recorded in the proximity to the proposed development site.*

It is necessary to determine what marine mammals use the waters in the vicinity of the proposed works, and likely extended zone of influence in order to estimate the likely significance of any impacts resulting from the proposed development.

Cetaceans

A review of cetacean (whale, dolphin and porpoise records) submitted to the IWDG during the period 1st of January 2000 to 13th of June 2017 was viewed and mapped. To date, 433 validated records were available (See **Table 5.6**). Most records were of harbour porpoise (372 or 86% of all records), bottlenose (17 records) and minke whale (8 records). There were also sightings of common dolphin (3 records) and a humpback whale (Berrow & Wall, 2020).

Table 5.6: Number of Cetacean sightings

Species	No. of Sightings	No. of Individuals	Comments
Harbour porpoise	372	1318	Mean group size 3.5
Bottlenose dolphin	17	142	
Common dolphin	3	16	
Dolphin sp. Possibly harbour porpoise	19	57	Most likely to be harbour porpoise
Dolphin sp.	8	48	
Minke whale	8	8	
Humpback whale	1	1	
Medium whale	2	2	
Whale sp.	3	3	
Cetacean sp.	1	1	
Total	433	1596	

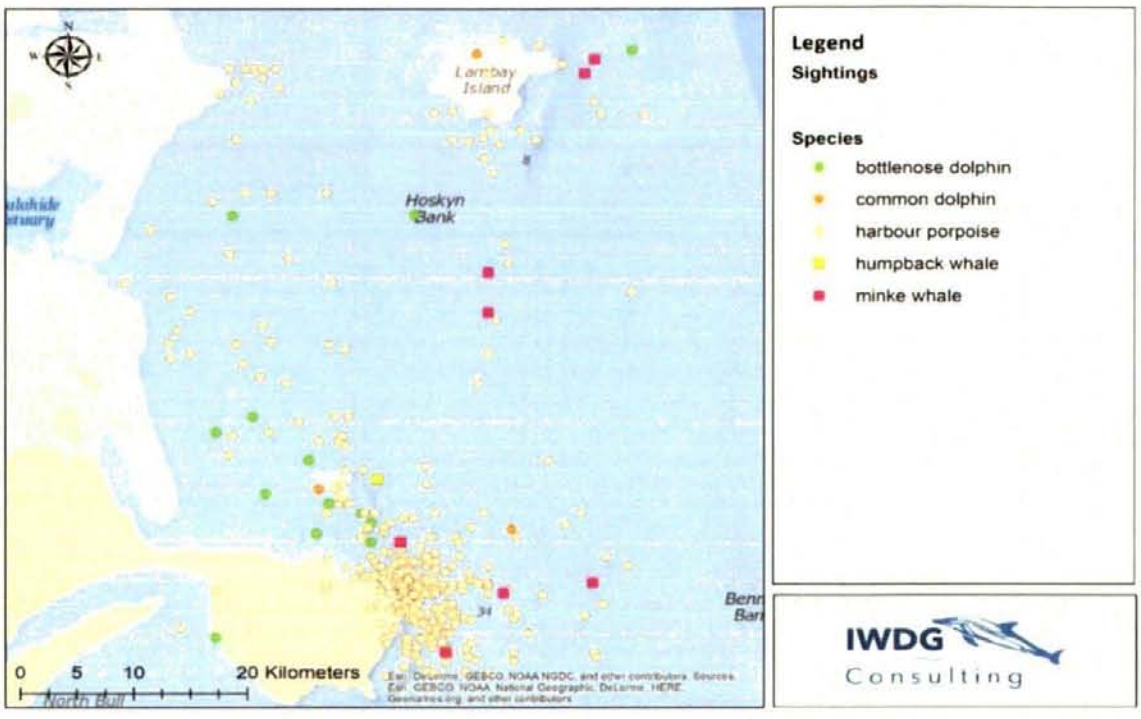

Figure 5.7 Map of all identified cetacean sightings submitted to the IWDG between 2000 to present (Berrow & Wall, 2020).

Most records were from Howth Head, which reflects observer effort as the distribution of cetacean's spreads over a wider area including off Portmarknock and north to Lambay Island. A more detailed assessment of the most frequently recorded species is presented below:

Harbour porpoise (Phocoena phocoena)

Harbour porpoise, Europe's smallest cetacean species, are the most widespread and abundant cetacean in inshore Irish waters, with highest abundance in the Irish Sea (Berrow et al. 2010). North County Dublin, including off Howth, support some of the highest densities of this species recorded in Ireland (Berrow et al. 2014) and an area of 273 km² was recently designated as a Special Area of Conservation to protect harbour porpoise and their habitats. The Rockabill to Dalkey Island SAC (Site Code 003000) extends from Dalkey to Rockabill with the boundary only 1km from the entrance to Howth Harbour at its closest point.

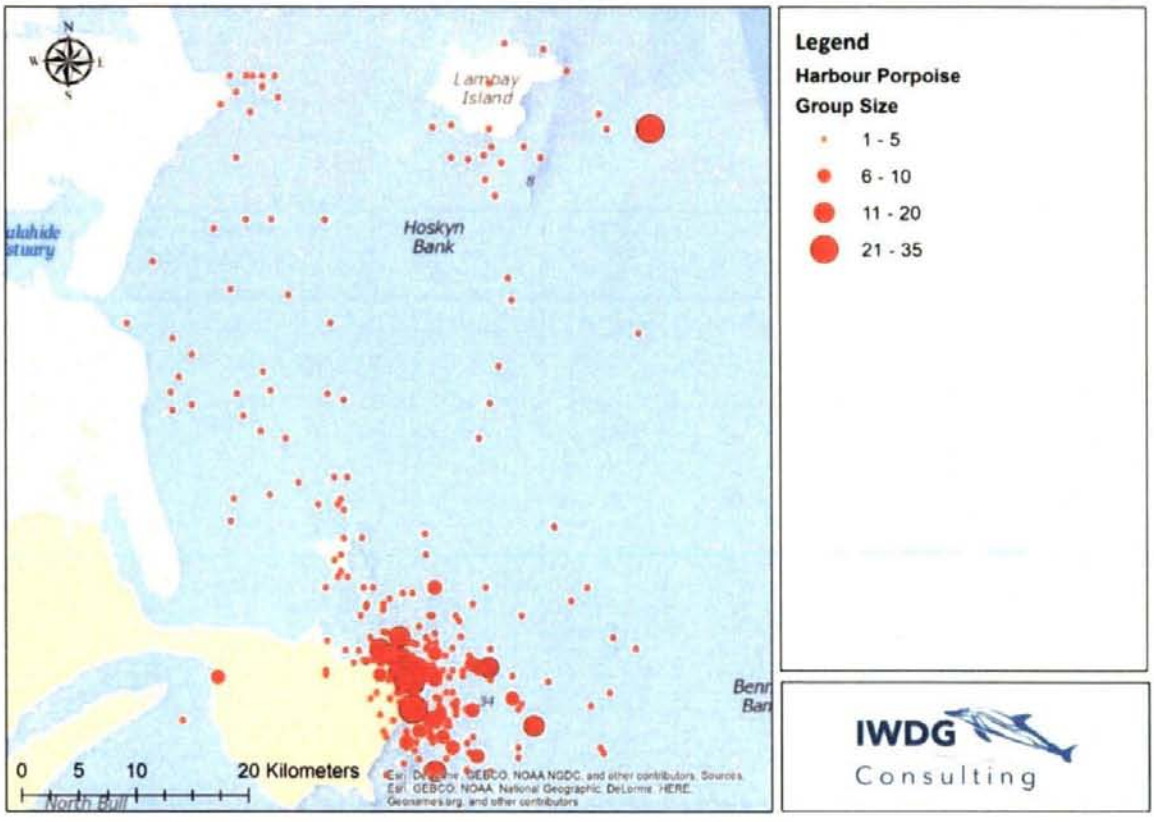

Figure 5.8 Sighting records of harbour porpoise (from IWDG accessed June 2019) (Berrow & Wall, 2020).

Harbour porpoise are known to particularly associate with areas of strong tidal currents and can be regularly seen foraging off Howth Head. The diet of harbour porpoise is poorly known but thought to consist of small benthic or demersal fish such as gobies, sandeels, whiting and other gadoids and pelagic species such as herring and sprat when available (Rogan 2008). Sighting rates of harbour porpoise off Howth Head is around 60% with the lowest rate recorded in May and June which is consistent with the calving period (Berrow et al. 2010). There is one record of a single harbour porpoise within Howth Harbour (**Figure 5.8**) and O'Brien and Berrow (2016) recorded a small group of harbour porpoise at the entrance to Howth Harbour during dedicated porpoise surveys on behalf of the NPWS.

Harbour porpoise are very sensitive to vessel noise and activity and are unlikely to approach areas of high activity and are therefore considered not likely to be impacted by the proposed works. Mitigation measures outlined in **Section 5.8** will minimize potential impacts of the proposed works if there is occasional use of the harbour by this species.

Bottlenose dolphin (Tursiops truncatus)

Bottlenose dolphins are a coastal species of cetacean regularly recorded north County Dublin and close to the coast off Howth Harbour, with 16 records to date. This probably under records their presence as Bottlenose dolphins off Dublin are part of the highly mobile coastal population which has been recorded all around the Irish coast and some individuals reported off Scotland (O'Brien et al. 2009; Robinson et al. 2012). Bottlenose dolphins are a wide-ranging species and individuals commonly

travel between coastal regions especially during the summer months (Ingram et al., 2003). They are relatively abundant off the Irish coast with most sightings along the western seaboard (Berrow et al. 2010). Recent genetic evidence (Mirimin et al. 2011) suggests the existence of three discrete populations of bottlenose dolphins in Ireland: the Shannon Estuary, an inshore population and an offshore population that ranges from the Bay of Biscay and the Azores (Louis et al. 2014). Photo-identification has shown individuals recorded Co Dublin to be part of the inshore population (O'Brien et al. 2009).

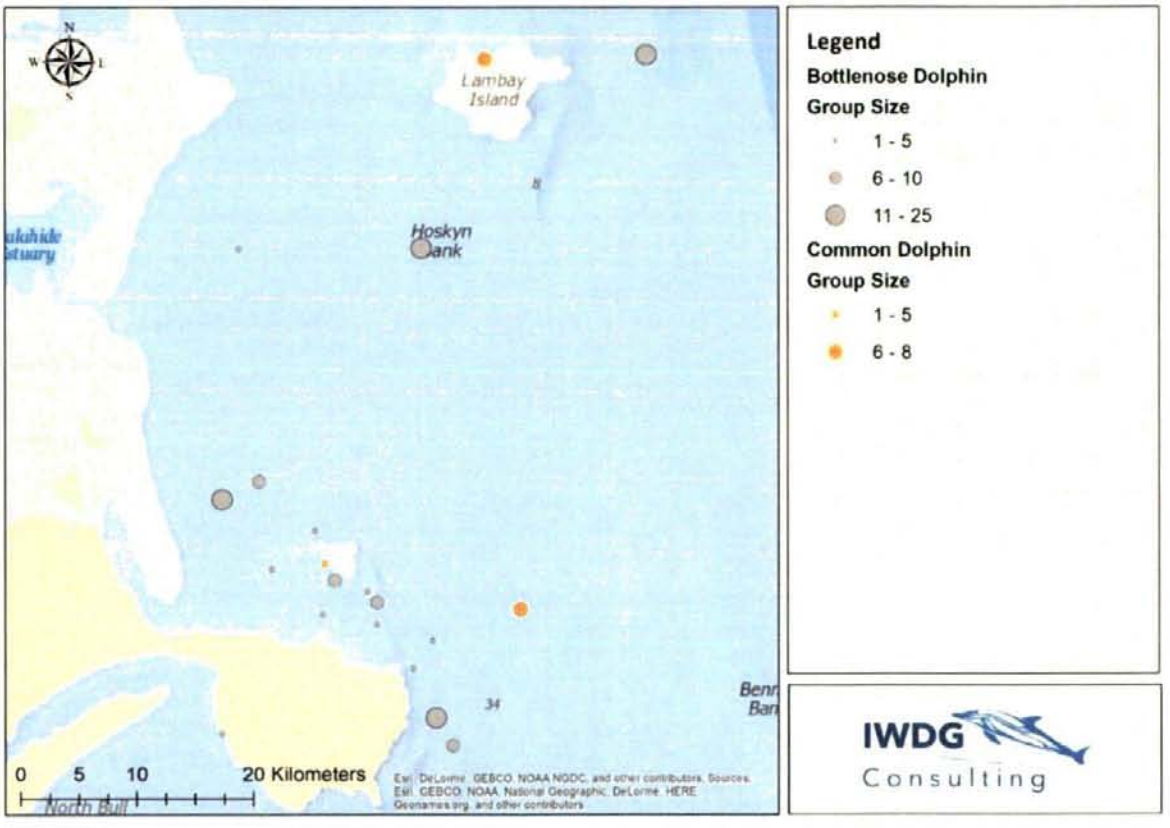

Figure 5.9 Sighting records of bottlenose and common dolphin (from IWDG accessed June 2019) (Berrow & Wall, 2020).

Bottlenose dolphins may be attracted to vessel activity, making them potentially vulnerable to physical harm from industrial activities (RPS, 2012). It is considered unlikely that the proposed works will impact upon bottlenose dolphins in the area as they do not frequent the waters of the harbour; however, mitigation measures outlined in **Section 5.8** will minimize potential impacts of the proposed works if there is occasional use of the harbour by this species.

Minke (Balaenoptera acutorostrata) and Humpback whale (Megaptera novaeangliae)

Minke whales are most common species of baleen whale found around Irish coasts and are widespread and abundant in inshore Irish waters from May to October (Berrow et al. 2000). The summer distribution tends to be concentrated around southwest Ireland. Minke whales were widespread in the area from Howth Head to Lambay Island. The Minke whale of all whale species that use Irish waters is the species with the most nearshore distribution, and therefore potentially the most vulnerable to anthropogenic noise resulting from coastal developments (RPS, 2012). It is unlikely

however that there is a direct threat to individuals from the proposed harbour works as there are no records of this species within Howth harbour.

There are two records of humpback whales off Howth both in July 2010, presumably of the same animal. Humpback whales have been seen off all Irish coasts, though less frequently in the Irish Sea. Although they have been recorded throughout the year in Ireland, sightings mainly occur in late summer, autumn and winter. Sighting records are much lower in the late spring possibly suggesting that a small number of non-breeding whales may remain here for the winter while the rest migrate to their low-latitude breeding grounds[7].

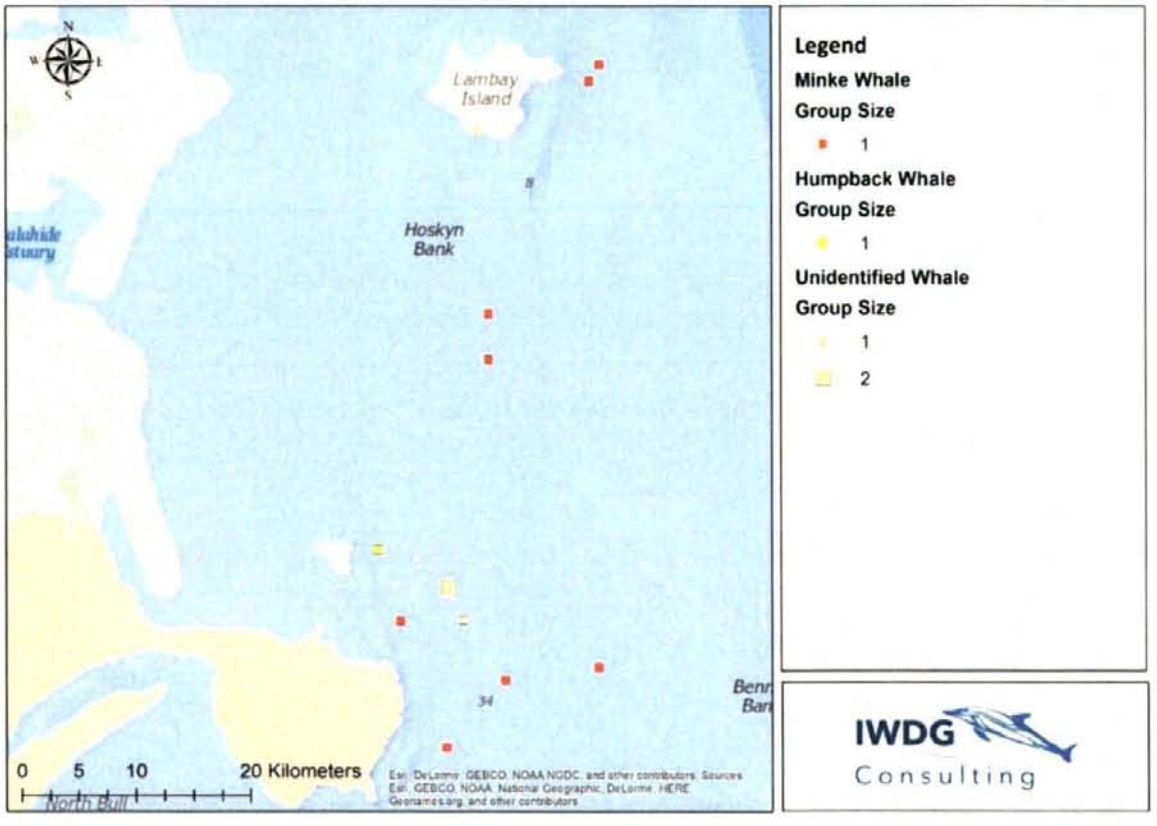

Figure 5.10. Sighting records of minke and humpback whale (from IWDG accessed June 2019) (Berrow & Wall, 2020).

Pinnipeds

Grey and harbour seals are strictly protected in the Republic of Ireland under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000. They are also listed under Annex II of the European Union's EC Habitats Directive (92/43/EEC) as species of Community Interest, whose conservation requires the designation of Special Areas of Conservation (SACs). In the latter part of the 1990s, the National Parks & Wildlife Service (NPWS) proposed all of the major known breeding sites as candidate SACs, ten sites for the grey seal and seven for the harbour seal.

Both grey and harbour, or common, seals have been reported from north County Dublin and Howth Harbour, but the most abundant are grey seals (Lyons (2004). Lambay Island 10km to the north of Howth is a well-known pupping and haul out site for grey seals and is designated as a SAC (site code

[7] https://iwdg.ie/cms_files/wp-content/uploads/2019/04/Humpback-whale-profile.pdf

000204) with both grey and harbour seals, as qualifying interests. The ecology and foraging behaviour of common and grey seals off Dublin is not known though it is known seals on the east coast range widely. The conservation status of grey and harbour seals in Ireland has been assessed as favourable (NPWS 2014), although excessive disturbance at key breeding and haul-out sites can have a significant negative impact (NPWS 2008).

Grey Seal (Halichoerus grypus)

Grey seals generally select more remote haul-out locations on rocky skerries, uninhabited islands, isolated mainland beaches and in sea-caves (O Cadhla et al., 2005). Pups are born with a white coat that they shed before they can take to the water, usually after about six weeks. The mother stays with the pups whilst they remain on the shore. The seals shed their fur during the spring months and remain ashore for the majority of this time.

During 2005, grey seal breeding sites were identified at Lambay Island and Irelands Eye, during a national census of the grey seal population (Ó Cadhla et al. 2007). The numbers of pup's present were small (less than 3) apart from Lambay Island where 49 pups were counted. Further surveys conducted in 2009 recorded 77 pups on Lambay Island and Ireland's Eye (Ó Cadhla et al. 2013). Grey seals are present in Howth Harbour nearly all the time. They forage and scavenge around fishing boats returning to port and have accommodated to human presence including boat traffic.

Harbour (Common) Seal (Phoca vitulina)

The harbour seal tends to inhabit inshore bays, coves and estuaries (O Cadhla et al., 2005). Harbour seals are generalist feeders that take a wide variety of fish, cephalopods, and crustaceans obtained from surface, mid-water, and benthic habitats.

Harbour seals come to shore during June to give birth and mate again around this time but usually in the water. Pups are capable of swimming within a few hours of being born but stay with their mother until weaned. Harbour seals also come to shore to moult (shed their fur) during July and August, often forming large groups on sheltered shores that have ready access to the sea. They are usually extremely wary and shy on land and therefore it is almost impossible to approach them when they are hauled out without stampeding them into the water. However, habituation to human activities in their vicinity can occur. Most haul-out sites are used daily, based on tidal cycles and other environmental variables, although foraging trips can last for several days (Grellier et al. 1996, Lowry et al. 2001).

Approximately 30 harbour seals were recorded on Lambay Island during a national census in 2003 (Cronin et al. 2004) and 2012 (Duck and Morris, 2013).

Previous MMO Monitoring in Howth Harbour

IWDG have carried out two recent MMO contracts in Howth Harbour which proceeded despite the regular occurrence of seals. Extracts from the MMO reports provide an insight into the occurrence of seals in Howth Harbour.

Western Trawler Basin - October 2015 (Meade 2015)

Meade (2015) recorded marine mammal sightings in Howth Harbour during drilling of a pontoon and gangway development in the trawler basin at Howth Harbour on 12 days in October 2015. Grey seals

were the only species recorded with a total of 67 sightings comprising of 90 individuals (85 adults and 5 juveniles). They were regularly sighted swimming, socialising and feeding within the inner harbour. The drilling process did not seem to cause the seals to change their behaviour and some of the individuals would swim in close proximity to the active works.

Trawler Basin Pontoon – November 2016 (Levesque (2016)

Marine mammals were recorded during dedicated watches on all five days in November 2016 during construction of a trawler basin pontoon. Grey seals were the only species recorded during monitoring and were regularly sighted swimming and foraging within the basin. A total of 26 sightings were recorded, the majority of which comprised a group of the same five reoccurring individuals: one juvenile, two males and two females. 15 sightings were recorded while drilling activities were underway. Feeding behaviours were observed on seven different occasions occurring as close as 100m from drilling activity. The drilling appeared to have little effect on them as they came right up to the barge on which the drilling rig was located checking out the site on many occasions. Marine mammals occurred within the mitigation zone during the 30-minute pre-watch on five occasions, although all were seen exiting the zone before drilling activities commenced.

Grey seals in Howth Harbour (from Levesque 2016) (Berrow & Wall, 2020).

5.4.4 Marine Reptiles

According to records held by the National Biodiversity Data Centre, two species of reptile typically associated with marine waters have been recorded within hectad O23. They are as follows;

Loggerhead Turtle (Caretta caretta)

Loggerhead Turtles are protected under EC Habitats Directive Annex II & IV and also under the Wildlife Acts. The species prefer to feed in coastal bays and estuaries, as well as in the shallow water along the continental shelves of the Atlantic, Pacific and Indian Oceans[8] where they feed mostly on animals that live on the sea bed like molluscs, crabs, sponges and sea urchins; they will also take jellyfish[9]. They are the most common turtle in the Mediterranean, nesting on beaches from Greece and Turkey to Israel and Libya. Many of their nesting beaches are under threat from tourism development[10]. A single deceased individual was found washed up on the shoreline in 2004 near Cush Point.

Kemp's Ridley Turtle (Lepidochelys kempii)

Kemp's Ridley turtle is a critically endangered species that is mostly limited to the Gulf of Mexico where the prefer areas with sand and muddy bottoms. Juveniles range between tropical and temperate coastal areas of the northwest Atlantic Ocean and can be found up and down the east coast of the United States[11]. Numerous individuals have been recorded as stranding along the Irish coastline since the 1960's with one being found in 1968 at Whitewaterbrook beach, approximately 2.5km south of Howth Harbour.

5.5 Terrestrial Ecology

This section will examine all parts of the terrestrial environment, along with sea bird colonies, relevant to the proposed development in the form of desk-top studies and on-site assessments. The following aspects will be dealt with: Habitats, Breeding and Wintering Birds and Mammals (Volant and Non-volant).

5.5.1 Field Surveys Overview

Multidisciplinary terrestrial ecological surveys were conducted by Woodrow during 2019. The surveys were designed to provide comprehensive information on all ecological resources at the site. Refer to **Appendix 7** Sea bird 2019/2020 report and **Appendix 12** Terrestrial Habitat, Otter and bat survey 2019 in Volume 3 of this EIAR for full details of the surveys completed.
The following surveys were carried out at the site:

- A Phase 1 Terrestrial Habitat Survey (Fossitt, 2000) was conducted at the site on 20.05.2019 and 22.06.2019 by Róisín NigFhloinn.

[8] https://conserveturtles.org/information-sea-turtles-loggerhead-sea-turtle/
[9] http://www.habitas.org.uk/priority/species.asp?item=5186
[10] https://www.worldwildlife.org/species/loggerhead-turtle
[11] https://conserveturtles.org/information-about-sea-turtles-kemps-ridley-sea-turtle/

- An otter survey was conducted on 20.05.2019 and 22.06.2019. Survey data was updated during the additional site visits on 29.07.2019 and 02.09.2019 by Róisín NigFhloinn.
- Areas which were considered to support habitats which had affinity to EU Annex I habitats were re-surveyed on 29.07.2019 by Róisín NigFhloinn and Kristi Leyden.
- As a precautionary measure, a pre-dusk emergence and bat activity survey was conducted on 02.09.2019, led by Róisín NigFhloinn. This survey included the deployment of 2 no. static bat detectors which were collected on 03.09.2019.
- Breeding bird surveys were conducted over three sites visits (6th May, 27th May and 17th June in 2019) to record breeding birds in the environs of Howth Harbour, with the survey area being extended up to 500 m from the proposed works. Breeding bird surveys followed the common bird census (CBS) methodology, as described in Gilbert *et al.* (1998) - summarising Marchant (1983) and Marchant *et al.* (1990).
- High Tide / Low Tide Bird Usage Mapping were carried out in order to map bird usage of Howth Harbour and environs by employing 'snap-shot' counts conducted at low tide and at high tide. Monthly surveys were conducted during the summer of 2019 (May to August). This was repeated during the winter bird season with bi-monthly visits. Methodology was based on the approach outlined in Lewis & Tierney (2014). Summary counts were undertaken over a three-hour period, with low tide (LT) or high tide (HT) in the middle. See **figure 5.11** below for Howth Harbour bird usage count sections.
- Breeding Seabird Surveys were carried out targeting two specific Special Protection Areas (SPAs), Howth Head SPA and Ireland's Eye SPA. The coastline was divided into count sections and the sections employed in Seabird 2000 (Mitchell *et al.* 2004) were utilised to allow for comparison with counts conducted in previous years. All breeding seabirds were counted within the selected count sections where appropriate and a range of censusing techniques were employed, including land and boat-based counts, as described in Walsh *et al.* (1995).
- Black Guillemot Surveys were carried out in 2019 within Howth Harbour and a section of Howth Head peninsula (to the Nose of Howth). These consisted of pre-breeding counts of individuals. For potential breeding sites in the environs of Howth Harbour, ongoing monitoring of nesting activity continued over the 2019 breeding season surveys. This was done to identify nesting locations in relation to the proposed works. Additional checks for breeding activity were made in March 2020.

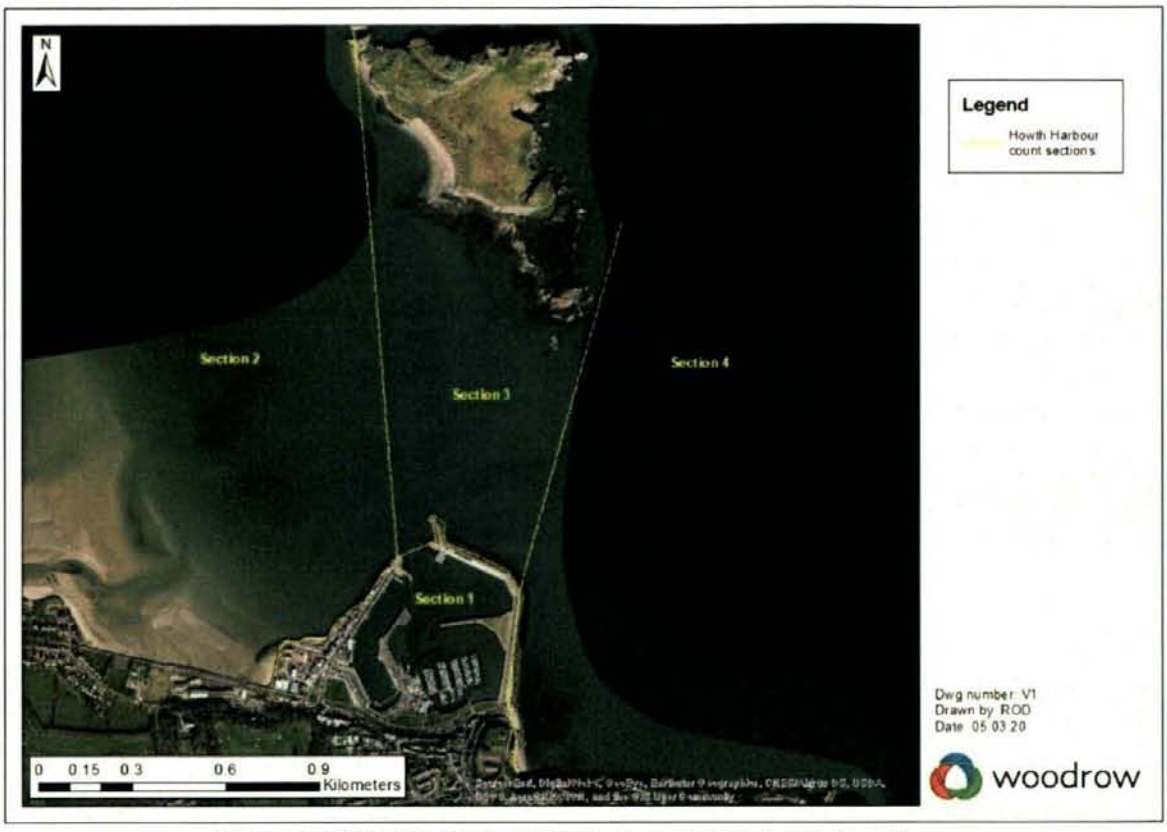

Figure 5.11 Howth Harbour bird usage mapping count sections

5.5.2 Data Retrieved from Database Searches

The following sections give an overview of the desk study sources consulted and results obtained during the desk study assessment.

5.5.2.1 *Flora*

The site of the proposed development lies within Ordnance Survey National Grid 10km hectad O23. The desk review included a review of relevant literature (Doogue, date unknown), a review of data held by the National Biodiversity Data Centre and a review of the National Parks and Wildlife Service (NPWS) rare plant database.

National Parks and Wildlife Service (NPWS) rare plant database

The National Parks and Wildlife Service (NPWS) rare plant database[12] notes the presence of the following protected plant species within hectad O23 for the Howth area (**Table 5.7**)

[12] http://webgis.npws.ie/npwsviewer/

Table 5.7: Protected species listed by the NPWS as occurring within the Howth area.

Flowering plant Species	Latin Name	Recorded Date	Designations	Habitat[13]
Hairy Violet	*Viola hirta*	1833, 1900	Flora (Protection) Order, 2015. Threatened Species: Vulnerable	A perennial herb, occurring mainly on calcareous soils, and found in short grassland or open scrub on downland rocky slopes, limestone pavement, woodland borders and rides, and sometimes on base-flushed but more acidic riverside substrates; also, on roadsides and railway banks.
Lesser Snapdragon	*Misopates orontium*	Date unknown	Flora (Protection) Order, 2015. Threatened Species: Endangered	A spring-germinating annual of light soils, found in arable and other cultivated ground including among horticultural crops, and in gardens and waste places. It reproduces by seed, but cold, wet summers inhibit its germination and growth.
Betony	*Stachys officinalis*	1887	Flora (Protection) Order, 2015. Threatened Species: Near threatened	A perennial herb of hedge banks, grassland, heaths, open woods and woodland rides and margins. It is occasionally found in cliff-top grassland, sometimes as the genetically dwarf var. nana. It favours mildly acidic soils, but is also found on those that are neutral or somewhat calcareous. 0-460 m
Sea Pea	*Lathyrus japonicus*	1833	Flora (Protection) Order, 2015. Threatened Species: Vulnerable	A long-lived perennial herb, forming large and conspicuous patches on shingle beaches, or rarely, in smaller quantities on blown sand.
Red Hemp Nettle	*Galeopsis angustifolia*	1884	Flora (Protection) Order, 2015. Threatened Species: Vulnerable	An annual of arable land, waste places and open ground on calcareous substrates, including limestone pavements and scree; also found on eskers and on coastal sand and shingle. This late-flowering species often fails to set seed within winter-sown crops. 0-320 m
Round Prickly-headed Poppy	*Papaver hybridum*	1887	Flora (Protection) Order, 2015. Threatened Species: Regionally extinct	This annual occurs in arable crops, and sometimes in other disturbed habitats. It is most frequent on chalky soils, but also grows on other limestones and on calcareous sands. The seed, which can be long-lived, germinates in both autumn and spring. 0-320 m

These species were not recorded within study area during site survey conducted by Woodrow in 2019.

[13] All habitat descriptions taken directly from the online Atlas of the British and Irish flora

Protecting Howth's Habitats (Doogue, date unknown)

The flora of Howth has changed over the last century primarily due to the variety of historical land use changes, most of which were not undertaken in the best interests of the flora (Doogue, date unknown).

Of the habitats potentially impacted by the proposed development due to their close proximity, Doogue notes the following in relation to flora;

Spray Zone Habitats

Most of the plants occurring in and above the spray zone have been largely unaffected by changes in land use. Species recorded and familiar in this zone include Thrift (*Armeria maritime*), Sea Samphire (*Crithmum maritimum*), Rock Sea-spurrey (*Spergularia rupicola*) and Rock Sea-lavender (*Limonium binervosum*) as well as the much rarer Sea Wormwood (*Seriphidium maritimum*). Many of these species occur in cracks in the jointed rocks and are equipped with strong perennial rooting systems that help the plants to withstand wave and wind action. Sea Spleenwort (*Asplenium m*arinum) has been recorded on the sea side of the wall running west from Howth Railway Station towards Claremont Beach.

The main threat to these habitats close to the sea is invasion by alien species, most particularly by Hottentot Fig (*Carpobrotus edulis*).

Saltmarsh habitats

Saltmarsh vegetation occurs in three main types in the peninsula. One form of saltmarsh vegetation has developed on shingle, like that which has formed on the ridge of gravel on the west side of the west pier of Howth Harbour. These saltmarsh formations are typically dominated by quantities of Sea-purslane (*Atriplex portulacoides*) which holds the shingle / pebble matrix together and which, over time, allows other species to become established.

It is noted that during the habitat surveys conducted in 2019, Woodrow classified the ridge of shingle along the west side of the west pier as Shingle and Gravel Banks CB1 which they corresponded to the Annex I habitat 'Annual Vegetation of Drift Lines (1210)', see **Section 5.5.3.2** below, with no mention of saltmarsh formation. This may indicate that this area is unstable and is subject to change due to both natural and man-made processes.

Sandy Shores

A sandy shore species that has undergone a contraction of range in the east of Ireland is Ray's Knotweed (*Polygonum oxyspermum* subsp. *Raii*). However, this species still occurs on coarse sand in a few coves around the coast and may re-appear at Claremont Beach where it was last seen 25 years ago.

Sand Dunes

The small sand spit known as the Cush was the site for a number of rare species of sand dunes and dune grassland. These included the now legally-protected Hairy Violet (*Viola hirta*), as well as rarities such Harebell (*Campanula rotundifolia*) and Hound's-tongue (*Cynoglossum officinale*).

Sand now accumulates on the foreshore at the western end of Claremont Beach, resulting in the development of an interesting dune system with many plants typical of more mature dunes also present. The main species involved in this colonisation and consolidation are Wall Pepper (Sedum acre), Sand Timothy (*Phleum arenarium*) and a moss *Tortula ruraliformis*. The most interesting species is *Vulpia fasciculata*, a rare grass hitherto known only in the Howth area, from Ireland's Eye.

A number of alien species have taken hold all along the Claremont Beach area. Most of these are herbaceous perennial garden escapees.

Fragments of the grassland may still be encountered on the railway banks at Claremount where rarer species such as Upright Brome (*Bromopsis erecta*) and Hoary Ragwort (*Senecio erucifolius*) persist. Blue Fleabane (*Erigeron ace*), a red-data book species, has been recorded on the limestone walls nearby on occasions.

National Biodiversity Data Centre (NBDC) online database

The National Biodiversity Data Centre (NBDC) online database provides data on the distribution of mammals, birds, and invertebrates within the 10km grid squares. Some 509 flowering plants are listed by the NBDC as present in the hectad O23. **Table 5.8** lists threatened species and designations.

Table 5.8: NBDC flowering and threatened flowering plants.

Flowering plant Species	Latin Name	Date of last record	Designations	Habitat[13]
Meadow Barley	*Hordeum secalinum*	1905	Flora (Protection) Order, 2015. Threatened Species: Vulnerable	A perennial herb of meadows, pastures and roadsides, often in river valley floodplains and showing a strong preference for sticky clay soils. In coastal areas it is frequently abundant in grazing marsh grasslands and on earthen sea walls.
Sea Pea	*Lathyrus japonicus*	1833	Flora (Protection) Order, 2015. Threatened Species: Vulnerable	A long-lived perennial herb, forming large and conspicuous patches on shingle beaches, or rarely, in smaller quantities on blown sand.
Lesser Centaury	*Centaurium pulchellum*	2010	Flora (Protection) Order, 2015. Threatened Species: Near threatened	An erect annual of mildly acidic to calcareous soils. Inland it is found in dry, open grasslands and heaths, in woodland rides, marl pits and other open, disturbed ground. On the coast it is a plant of open sandy and muddy grassy places, often by estuaries, sand dunes and in upper saltmarsh.

Little-robin	*Geranium purpureum*	2014	Threatened Species: Near threatened	An upright annual in stony or rocky places near the sea, on sheltered cliffs, disused railway lines, and particularly by roads and fields.

As can be seen from **Tables 5.7 & 5.8** a number of species are protected under the Flora (Protection) Order (FPO). The Flora (Protection) Order, 2015[14], which supersedes orders made in 1980, 1987 and 1999, is a list of plant species protected by Section 21 of the Wildlife Act, 1976. It is illegal to cut, uproot or damage the listed species in any way, or to offer them for sale. This prohibition extends to the taking or sale of seed. In addition, it is illegal to alter, damage or interfere in any way with their habitats. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation.

5.5.2.2 *Invasive species*

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality. The NBDC lists a number of both aquatic and terrestrial high impact invasive species which have been recorded within hectad O23 (**Table 5.9**).

Table 5.9: NBDC list of high impact invasive species recorded within hectad O23.

Common Name	Latin Name
Flora	
Japanese Knotweed	*Fallopia japonica*
Rhododendron	*Rhododendron ponticum*
Giant Hogweed	*Heracleum mantegazzianum*
Common Cord-grass	*Spartina anglica*
Cherry Laurel	*Prunus laurocerasus*
Hottentot-fig	*Carpobrotus edulis*
Canadian Waterweed	*Elodea canadensis*
Flatworm	
New Zealand Flatworm	*Arthurdendyus triangulatus*
Terrestrial Mammal	
Eastern Grey Squirrel	*Sciurus carolinensis*
Brown Rat	*Rattus norvegicus*
Feral Ferret	*Mustela furo*
House Mouse	*Mus musculus*

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 make it an offence to plant, disperse, allow dispersal or cause the spread of certain species e.g.

[14] S.I. No. 356/2015 - Flora (Protection) Order, 2015.

Japanese knotweed, keep the plant in possession for purpose of sale, breeding, reproduction, propagation, distribution, introduction or release, keep anything from which the plant can be reproduced or propagated from, without a granted licence and keep any vector material for the purposes of breeding, distribution, introduction or release. There is a statutory obligation under S.I. 477 of 2011 of the European Communities (Birds and Natural Habitats) Regulations 2011 to address invasive species in Ireland.

The Wildlife (Amendment) Act 2000 states that anyone who plants or otherwise causes to grow in a wild state in any place in the State any species of (exotic) flora, or the flowers, roots, seeds or spores of (exotic) flora shall be guilty of an offence.

5.5.2.3 *Fauna – Species listed under National and European Legislation*

Otter (Lutra lutra)

Otters, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Direct which is transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I 94 of 1997), as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered species (CITES).

Although rare in parts of Europe they are widespread in Ireland and found in a variety of aquatic habitats, both freshwater and marine, but always requiring access to fresh water. The national population is estimated at 16,000 – 20,000 individuals (Lysaght & Marnell, 2016). Otters are solitary and territorial animals which are rarely seen. They are primarily nocturnal animals, although coastal otters in particular are often active diurnally, and they feed on a variety of prey, primarily fish and crustaceans, but occasionally also taking birds and small mammals.

Surveys for otters primarily rely on detecting signs of their presence. These include spraints (droppings), anal gland secretions, paths, slides, footprints and remains of prey items. Spraints are of particular value as they are used as territorial markers and are often found on prominent conspicuous locations such as grass tussocks, stream junctions and under bridges. In addition, they are relatively straightforward to identify.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting places or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reed beds where depressions in the vegetation called "couches" are formed. Generally, holts or resting areas can be located by detecting signs such as spraints or tracks. Coastal holts are mostly within 100 m of the shore and may also be very frequent, with densities up to three or four per km in some areas (Conroy & Kruuk 1995).

In contrast, natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season.

Watson (1986) and Watt (1995) state that young otter engage in hunting for less profitable prey such as crabs which form a significant proportion of diet as they are learning to hunt when compared to adults that hunt more fish. While the presence of areas with large amount of spraint with crab remains may not necessarily indicate young otter, it may nonetheless point to the potential presence of juveniles where good stocks of intertidal fish also exist.

It is noted that otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of otters in the centre of Cork and Limerick City. Thus, otters are able to adapt to increased noise and activity levels; however, breeding holts are generally located in areas where disturbance is lower.

A review of existing records within a 10km radius of the study site (hectad O23) showed that otter or signs of otter have been recorded on 3 occasions, the most recent being in May 1980. As part of the site surveys Woodrow Environmental Consultants conducted a mammal walkover survey of the site. The aim of the survey was to determine if a species e.g. otter, was present and the general pattern of usage of the development site and adjacent habitats. See **Section 5.5.3.3** for further details.

Bats

In Ireland, nine species of bat are currently known to be resident, with another species yet to be confirmed. These are classified into two Families: the *Rhinolophidae* (Horseshoe bats) and the *Vespertilionidae* (Common bats). The lesser horseshoe bat (*Rhinolophus hipposideros*) is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family;

- Common pipistrelle (*Pipistrellus pipistrellus*),
- Soprano pipistrelle (*Pipistrellus pygmaeus*),
- Nathusius' pipistrelle (*Pipistrellus nathusii*),
- Natterer's bat (*Myotis nattereri*),
- Daubenton's bat (*Myotis daubentonii*),
- Whiskered bat (*Myotis mystacinus*),
- Brandt's bat (*Myotis brandtii*),
- Brown long-eared bat (*Plecotus auritus*) and
- Leisler's bat (*Nyctalus leisleri*).

A review of existing bat records within hectad O23 showed that the following Irish bat species have been recorded locally, see **Table 5.10**. It is noted that other species which have not been included within this database are also likely to occur. Lesser horseshoe bat (*Rhinolophus hipposideros*) is the only species of bat listed on Annex II of the Habitats Directive (Directive 92/43/EEC) and that can be a qualifying interest of cSACs in Ireland. Lesser horseshoe bat does not occur within the wider Dublin area.

Table 5.10: Presence of Irish bat species recorded within hectad O23 (NBDC records).

Common name	Scientific name	Legislative Protection
Lesser Noctule	*Nyctalus leisleri*	Annex IV[15], WA 1976-2012[16]
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	Annex IV, WA 1976-2012
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Annex IV, WA 1976-2012
Brown Long-eared Bat	*Plecotus auritus*	Annex IV, WA 1976-2012

While the remaining Irish bat species have not been recorded in the local area to date, whiskered bat may potentially occur as this species is widespread in the Irish countryside. Nathusius' pipistrelle, Natterer's bat, Lesser horseshoe bat and Brandt's bat, are rarer Irish species and are less likely to occur.

The NBDC's online mapper[17] also includes a Bat Habitat Suitability Index (BHSI) layer derived from an analysis of the habitat and landscape associations of Irish bats compiled in Lundy *et al.* (2011). The index evaluation ratings range from 0 to 100 with 0 being the least favourable for bats and 100 the most favourable. Index evaluations are available for each individual species and an overall rating is also available for all species in combination. The reference area to which the indices listed in **Table 5.11** below, relates to the land south of the development site footprint i.e. Howth and the geographical area extending away from it. The different ratings for individual bat species are listed at **Table 5.11** below.

Table 5.11 Bat Habitat Suitability Index Rating by Species

Species	Suitability Index Rating
Lesser horseshoe bat (*Rhinolophus. hipposideros*)	0/100
Daubenton's bat (*M. daubentonii*);	21/100
Whiskered bat (*Myotis mystacinus)*	21/100
Natterer's bat (*M. nattereri)*	25/100
Nathusius' pipistrelle (*Pipistrellus nathusii)*	12/100
Common pipistrelle (*P. pipistrellus*);	45/100
Soprano pipistrelle (*P. pygmaeus*)	55/100
Leisler's bat (*N. leisleri*)	47/100
Brown long-eared bat (*P. auritus)*	39/100
All bats	29/100

All bat species are protected under the Wildlife Acts (1976 & 2000) which make it an offence to wilfully interfere with or destroy the breeding or resting place of all species; however, the Acts permit limited exemptions for certain kinds of development. All species of bats in Ireland are listed in Schedule 5 of the 1976 Act and are therefore subject to the provisions of Section 23 which make it an offence to:

- Intentionally kill, injure or take a bat
- Possess or control any live or dead specimen or anything derived from a bat
- Wilfully interfere with any structure or place used for breeding or resting by a bat

[15] Annexed species are those listed under the EU Habitats Directive (92/43/EEC)

[16] WA 1976-2012 refers to species protected under the Wildlife Acts

[17] http://maps.biodiversityireland.ie/#/Map

- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.

All bats are listed on Annex IV of the EU Habitats Directive. The domestic legislation that implements this Directive gives strict protection to individual bats and their breeding and resting places. It should also be noted that any works interfering with bats and especially their roosts, including for instance, the installation of lighting in the vicinity of the latter, may only be carried out under a licence to derogate from Regulation 23 of the Habitats Regulations 1997, (which transposed the EC Habitats Directive into Irish law) issued by NPWS. The details with regards to appropriate assessments, the strict parameters within which derogation licences may be issued and the procedures by which and the order in relation to the planning and development regulations such licences should be obtained, are set out in Circular Letter NPWS 2/07 "Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 - strict protection of certain species/applications for derogation licences" issued on behalf of the Minister of the Environment, Heritage and Local Government on the 16th of May 2007.

Furthermore, on 21st September 2011, the Irish Government published the European Communities (Birds and Natural Habitats) Regulations 2011 which include the protection of the Irish bat fauna and further outline derogation licensing requirements. **Table 5.12** summarises the protection given to bats by national and international legislation and conventions.

Table 5.12. Legislative protection for bats in Ireland

Legislation/Convention	Relevance to Irish bats
Irish Wildlife Act (1976) & Irish Wildlife (Amendment) Act 2000.	It is an offence to wilfully interfere with or destroy the breeding or resting place of bats, (with some exemptions for certain kinds of construction development). Provides for the creation of NHAs.
EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Directive 92/43/EEC), commonly known as the 'Habitats Directive	Lists all the vesper bats in Annex IV as in need of strict protection and also encourages Member States to conserve landscape features such as river corridors, field boundaries, ponds and woodlands. It also requests that Member States establish a system to monitor the incidental capture and killing of the animals listed in Annex IV. The lesser horseshoe bat is further listed in Annex II of the EC Habitats Directive. The level of protection offered to lesser horseshoe bats effectively means that areas important for this species are designated as Special Areas of Conservation.
The Convention on the Conservation of European Wildlife and Natural Habitats, commonly known as the 'Berne Convention'.	It obliges states to protect and conserve animals and their habitats, especially those listed as endangered or vulnerable. Also obliges parties to promote national policies for the conservation of wild fauna and natural habitats

The Convention on the Conservation of Migratory Species of Wild Animals, commonly known as the 'Bonn Convention'.	This led to the European Bats Agreement (EUROBATS), which lists a wide range of objectives, including promoting research programmes relating to the conservation and management of bats, promoting bat conservation and public awareness of bats, and identifying and protecting important feeding areas of bats from damage and disturbance.

Woodrow Environmental Consultants were commissioned by MWP to survey the site for the presence of bats. See **Section 5.5.3.3** for further details.

Pine Marten (Martes martes)

Pine marten are a protected species in Ireland and have recently undergone a natural range expansion after centuries of decline. Pine Marten are listed under Annex V of the EC Habitats Directive [92/43/EEC], Wildlife (Amendment) Act, 2000 and Appendix III of the Bern Convention 1979.

In terms of general ecology, individual pine marten are solitary (except for mating purposes) and have an intra-sexual system of territorial organisation, which at the population level can be very well structured (Powell 1979). Males typically have bigger territories than females and there can be partial overlap between adjacent territories. The species is primarily active at night and individuals live in territories that can vary in size from 50 hectares to 400 hectares.

Pine marten can occupy a variety of habitat types including rock crevices, cavities in trees, buildings and old squirrel dreys or bird nests during the breeding season. Refuge sites (outside breeding season) are usually associated with height in forested areas. They are adept at climbing trees as they have powerful non-retractable claws.

Pine marten are omnivorous taking both plant and animal material. In Ireland, pine marten exploits a variety of resources including berries, fruits, small mammals, invertebrates, birds and amphibians. In some areas where pine marten occurs close to towns and villages the species will exploit rubbish bins for food.

A review of existing records from the NBDC's online mapper showed that Pine marten has been recorded approximately 2.7km west of Howth Harbour, near Cush Point. Woodrow Environmental Consultants conducted a site walkover during the summer of 2019 and noted any signs of terrestrial mammals in the area. See **Section 5.5.3.3** for further details.

Irish Hare (Lepus timidus hibernicus)

The Irish hare is one of three lagomorphs found on the Island of Ireland and the only native lagomorph. It is listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC) and as an internationally important species in the Irish Red Data Book due to 100% of the population occurring in Ireland.

The Irish hare is adaptable and lives in a wide variety of habitats from heaths, upland grasslands to coastal sand dune systems. It typically reaches its highest densities on farmland, particularly where there is a mix of grassland and arable fields along with hedgerows and other cover.

Irish hare is known to occur within the wider landscape, with numerous sightings west of Howth (NBDC's online mapper[15]). Woodrow Environmental Consultants conducted a site walkover during summer of 2019 and noted any signs of terrestrial mammals in the area. See **Section 5.5.3.3** for further details.

Common Frog (Rana temporaria)

Common Frog is listed in Annex V of the EC Habitats Directive and is protected under the Wildlife Acts. Common Frog is the only species of frog found in Ireland[18] and is listed as an internationally important species.

Common frogs spend most of their lives on land and can be found in a wide range of habitats, although the species is less tolerant of dry conditions in the terrestrial habitat. Common frogs primarily live and hunt in damp pastures, open woodlands or other habitats with suitable cover and generally not far from a pond or stream. They hibernate at the bottom of ponds (mostly males) or in frost-free refugia, such as under logs or in dense piles of vegetation (Reid et. al., 2013).

Common frogs are among the earliest amphibians to breed as winter gives way to spring. The species has been recorded breeding late in winter, but this is related to temperature and hence varies geographically. Adults migrate to breeding ponds (unless they hibernated there) usually in February or early March, depending on latitude, altitude and local weather conditions. Spawning occurs in shallow water usually 15 - 30 cm deep and exposed to the sun. Tadpoles hatch within a fortnight or so and grow in the natal pond over the following two or three months, metamorphosing into froglets in May or June (Reid et. al., 2013).

Common Frog has been recorded in close proximity to Howth Harbour, southeast of the eastern pier (NBDC's online mapper[15]).

5.5.2.4 *Fauna – Species listed under National Legislation*

Twelve other species of terrestrial mammal have been recorded within hectad O23. Five of which are protected under the Irish Wildlife Act; namely Badger, Hedgehog, Irish Stoat, Red Squirrel & Pygmy Shrew.

According to records held by the NBDC, Smooth Newt and Common Lizard have also been recorded within hectad O23.

Woodrow Environmental Consultants conducted a site walkover during summer of 2019 and noted any signs of terrestrial mammals in the area. See **Section 5.5.3.3** for further details on the presence/absence of the species listed below.

[18] http://www.ipcc.ie/a-to-z-peatlands/frogs/ [accessed 17/07/2019]

Badger (Meles meles)

Badger and their setts are protected under the provisions of the Wildlife Act 1976, as amended, and it is an offence to intentionally, knowingly or unknowingly kill or injure a protected species, or to willfully interfere with or destroy the breeding site or resting place of a protected wild animal. Badger setts are formed by a complex group of interlinked tunnels, and therefore works in proximity to setts can potentially cause damage to this protected species.

The density of badgers in Ireland is approximately one social group per km^2 in lowland areas with a high component of pasture. In upland areas where feeding is scarce badgers are generally found at lower densities. Overall, the average density in Ireland is approximately one social group per $2km^2$.

Field signs are characteristic and sometimes quite obvious and include tufts of hair caught on barbed wire fences, conspicuous badger paths, footprints, small excavated pits or latrines in which droppings are deposited, scratch marks on trees, and snuffle holes, which are small scrapes where badgers have searched for insects and plant tubers. Due to seasonal factors including the cover of vegetation it is most effective to survey for badgers in the period from November to April. Within this period badger activity is high from mid-January to March and surveys at this time are most efficient at identifying badger populations.

Badgers are known to occur within the wider landscape, with numerous sightings near Kilbarrack and Raheny (NBDC's online mapper[15]).

Hedgehog (Erinaceus europaeus)

Hedgehog are also listed on Appendix III of the Berne Convention can be found throughout Ireland, with male hedgehogs having an annual range of around 56 hectares. A number of factors are thought to influence the distribution of hedgehogs in a habitat, with nest sites, food availability and the presence of predators believed to be major contributory factors. Generally, hedgehogs prefer edge habitat and pasture but in recent years have begun to colonize urban areas.

Hedgehog has been recorded within Howth Head peninsula (NBDC's online mapper[15]).

Irish Stoat (Mustela erminea hibernica)

Irish Stoat is one of the species protected under regulations (Protection of Wild Animals) in 1980 which enabled Ireland to comply with the provisions of the Bern Convention of European Wildlife and Natural Habitats, which was ratified by Ireland in April 1982. Irish stoats occur in most habitats with sufficient cover, including urban areas.

Irish Stoats are good swimmers, surefooted climbers and perfectly adapted for squeezing into small holes and burrows. It is capable of killing prey several times its own size and its varied diet includes rabbits, rats, pygmy shrews, mice, bank voles, fish, invertebrates, birds and birds' eggs. It avoids open areas due to a risk of predation by larger predatory mammals and raptors.

Irish Stoat has been recorded within Howth Head peninsula (NBDC's online mapper[15]) and is a recent coloniser of the nearby North Bull Island (Cooney, 2018). A single Irish Stoat was noted on West Pier hunting starling chicks from a nest in a building on 27th of May 2019 (Woodrow, 2020a).

Red Squirrel (Sciurus vulgaris)

Red Squirrel is the only squirrel species native to Ireland. It was once widespread but has declined significantly since the mid-20th Century following the first introduction of Grey Squirrel to Ireland in 1913 (ROD, 2017). Red Squirrel are also listed on Appendix III of the Berne Convention can be found throughout Ireland. They are found in all types of habitat but typically are in higher densities in mature mixed broadleaved forests. They can also survive in monoculture coniferous woodland. Red Squirrel primarily feed on seeds and exhibits scatter-hoarding behaviour, where food is cached in the ground to be consumed when the natural supply of food is low in late winter and early spring, at which time they will supplement their diet with fungi, flowers, buds and insects.

The red squirrel population on the Howth peninsula is the last strong hold in Dublin city. The Dublin red squirrels are living on the edge. They have been pushed to the brink of extinction by the threat invasion by grey squirrels. The last remaining red squirrel population on Howth head is at risk from both invading grey squirrels and small population effects due to isolation (Carr, 2011).

Pygmy Shrew (Sorex minutus)

The Pygmy shrew is Ireland's smallest mammal, with an average lifespan of one year. Pygmy shrew is common throughout mainland Ireland and has a preference for habitats such as hedgerows and grasslands; they have also been found utilizing stone walls. Pygmy shrews are solitary creatures and are very aggressive to other shrews. Each one has a separate territory which it defends against all others.

Pygmy shrew has been recorded in close proximity to Howth Harbour, with a potential sighting at Claremont Beach (NBDC's online mapper[15]).

Smooth Newt (Lissotriton vulgaris)

Smooth Newts have a biphasic life-cycle, with aquatic and terrestrial stages. The species is highly adaptable and can be found in a variety of habitats outside the breeding season, inhabiting deciduous woodland, wet heathland, bogs, marshes, gardens, parks and farmland. During the breeding season Smooth newts are known to use a variety of waterbody types such as garden ponds, natural pools, drainage ditches and quarry ponds. Rocks and fallen timber surrounding the wetland provide ideal terrestrial refuges (Griffiths 1984).

During the breeding season (typically spring and summer), newts occupy aquatic habitats, while outside of the breeding season, newts inhabit the surrounding terrestrial environment. Smooth Newts are generally nocturnal, but may be active by day and night during the breeding season. In terrestrial habitats, Smooth newts are relatively inactive, spending most of the time in moist, terrestrial refuges (Griffiths 1984).

In late winter adults wake from their winter torpor and make their way to the water to breed. This occurs mostly in February and March. Eggs are laid in water and develop into tadpoles with external gills which then metamorphose into semi aquatic juveniles known as efts, capable of breathing on land. The egg then develops into a tadpole within about 10 – 20 days, depending on temperature. Following metamorphosis, efts disperse onto land, this usually occurs around September. The juveniles will then spend the next two to three years on land until they become sexually mature and return once more to the water to breed. Adults will leave the pond and move to the adjoining terrestrial habitats post breeding i.e. during dry summer period of July/August.

A review of the NBDC's online mapper[15], showed that Smooth Newt has been recorded near Portmarnock Point, circa. 2.5km west of Howth Harbour, on a number of occasions.

Common Lizard (Zootoca vivipara)

Common Lizard is Ireland's only native terrestrial reptile and is so protected under the Wildlife Act. Ideal habitats for the species are south-facing, damp tussocky grassland, scrub covered hillsides, dunes or banks, and woodland tracks, and it also resides in peat bogs, dry grasslands and heathlands.

Common lizards typically hunt any small invertebrates they can catch and overpower, such as insects, spiders, snails and earthworms.

The common lizard is heliothermic i.e. it relies on the heat of the sun in order to stay active. The common lizard can also absorb heat from a suitable surface such as a rock to increase its body temperature (thigmothermy). Due to their reliance on plentiful sunshine, the common lizard hibernates during the winter months, though may emerge in mild winter weather (IWT, 2007).

A review of the NBDC's online mapper[15], showed that Common lizards have been recorded on Howth peninsula in the past.

5.5.2.5 *Avian Fauna*

The National Biodiversity Centre online data base lists 220 species of bird recorded within hectad O23. Of these species, a number are listed under Annex I of the Birds Directive and are Red Listed Birds of Conservation Concern in Ireland (Colhoun & Cummins, 2013) (**Table 5.13**).

Birds species listed in Annex I of the Birds Directive are considered a conservation priority. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern whose population/range has declined significantly over time and who need urgent action to reduce threats faced and to maintain and support these vulnerable populations. Amber List species are species of medium conservation whose population or range has been in decline over recent years, which makes them vulnerable/threatened species. Green listed species are regularly occurring bird species whose conservation status is currently considered favourable. Birds species listed in Annex I of the Birds Directive (2009/147/EC) are considered a conservation priority.

Table 5.13: Bird species listed under Annex I of the Birds Directive and/or classified as Red Listed Birds of Conservation Concern in Ireland recorded within grid square O23 (NBDC records).

Species	Scientific Name	Birds Directive Annex	BOCCI
		I	Red List
Arctic Tern	*Sterna paradisaea*	X	
Barn Owl	*Tyto alba*		X
Bar-tailed Godwit	*Limosa lapponica*	X	
Black Tern	*Chlidonias niger*	X	
Black-headed Gull	*Larus ridibundus*		X
Black-throated Diver	*Gavia arctica*	X	
Common Goldeneye	*Bucephala clangula*		X
Kingfisher	*Alcedo atthis*	X	
Pochard	*Aythya ferina*		X
Redshank	*Tringa totanus*		X
Common Scoter	*Melanitta nigra*		X
Common Tern	*Sterna hirundo*	X	
Corn Crake	*Crex crex*	X	X
Dunlin	*Calidris alpina*	X	X
Eurasian Curlew	*Numenius arquata*		X
Eurasian Wigeon	*Mareca penelope*		X
Eurasian Woodcock	*Scolopax rusticola*		X
European Golden Plover	*Pluvialis apricaria*	X	X
Great Northern Diver	*Gavia immer*	X	
Grey Wagtail	*Motacilla cinerea*		X
Hen Harrier	*Circus cyaneus*	X	
Herring Gull	*Larus argentatus*		X
Kentish Plover	*Charadrius alexandrinus*	X	
Little Egret	*Egretta garzetta*	X	
Little Tern	*Sternula albifrons*	X	
Little Gull	*Larus minutus*	X	
Long-tailed Duck	*Clangula hyemalis*		X
Meadow pipit	*Anthus pratensis*		X
Mediterranean Gull	*Larus melanocephalus*	X	
Montagu's Harrier	*Circus pygargus*	X	
Northern Lapwing	*Vanellus vanellus*		X
Northern Pintail	*Anas acuta*		X
Northern Shoveler	*Anas clypeata*		X
Peregrine Falcon	*Falco peregrinus*	X	
Red-necked Phalarope	*Phalaropus lobatus*	X	X
Red-throated Diver	*Gavia stellata*	X	
Roseate Tern	*Sterna dougallii*	X	
Sandwich Tern	*Sterna sandvicensis*	X	
Short-eared Owl	*Asio flammeus*	X	
Snowy Owl	*Nyctea scandiaca*	X	
Tufted Duck	*Aythya fuligula*		X
Bewick's Swan	*Cygnus columbianus bewickii*	X	X

Twite	*Linaria flavirostris*		X
Whooper Swan	*Cygnus cygnus*	X	
Yellowhammer	*Emberiza citrinella*		X

5.5.3 Field Survey Results

5.5.3.1 *Marine Habitats*

As detailed in **Section 5.4.2** all habitats recorded are common in Irish coastal waters. Description of these habitats can be found in the Benthic Habitat Survey Study (University College Cork, Aquatic Services Unit [ASU], 2019) in **Appendix 6 Volume 3**.

During the terrestrial survey carried out by Woodrow, while utilising information obtained by ASU during their site surveys, Woodrow classified the shoreline habitats according to the standard habitat classification system described in 'A Guide to Habitats in Ireland' (Fossitt, 2000). The habitats noted (see **Figure 5.11** below) are as follows;

- Exposed Rocky Shores LR1
- Shingle and Gravel Shores LS1
- Sand Shores LS2

Further information regarding these habitats can be found in the Benthic Habitat Survey Study (University College Cork, Aquatic Services Unit [ASU], 2019) in **Appendix 6 Volume 3**.

5.5.3.2 *Terrestrial Habitats*

An initial Phase 1 habitat survey was undertaken on the 20.05.2019 and 22.06.2019 by Woodrow. Following the initial Phase 1 habitat assessment, a further site visit was conducted on 29.07.2019.

The entire site was walked, plant species composition noted, and broad habitat types were assigned to the species assemblages as appropriate. Correspondence of these habitats to EU Annex I habitats was also noted. The habitats encountered could then be cross-referenced to EC Habitats Directive Annex I habitat types, as described in the Interpretation Manual of European Union Habitats (European Commission, 2013) and the Article 17 Habitats Conservation Assessment Report (NPWS, 2019).

The vast majority of the application site is comprised of built structures, hardstanding, and amenity grassland and parkland habitats which have low species diversity in general. On the outskirts of the survey area there are areas of coastal habitat which support a more diverse flora. The different Fossitt 2000 (Level 3) habitats that were encountered on site are described in further detail in **Appendix 12 Volume 3** of this EIAR and shown in **Figure 5.11** below;

- Buildings and artificial surfaces BL3
- Sea walls, piers and jetties CC1
- Shingle and Gravel Banks CB1
- Embryonic Dune CD1

- Marram Dune CD2
- Fixed Dune CD3
- Dune Scrub and Woodland CD4
- Amenity Grassland (Improved) GA2
- Ornamental/non-native shrub WS3
- Treelines WL2
- Scattered Trees and Parkland WD5
- Scrub WS1
- Scrub WS1 on Coastal Cliff CS1

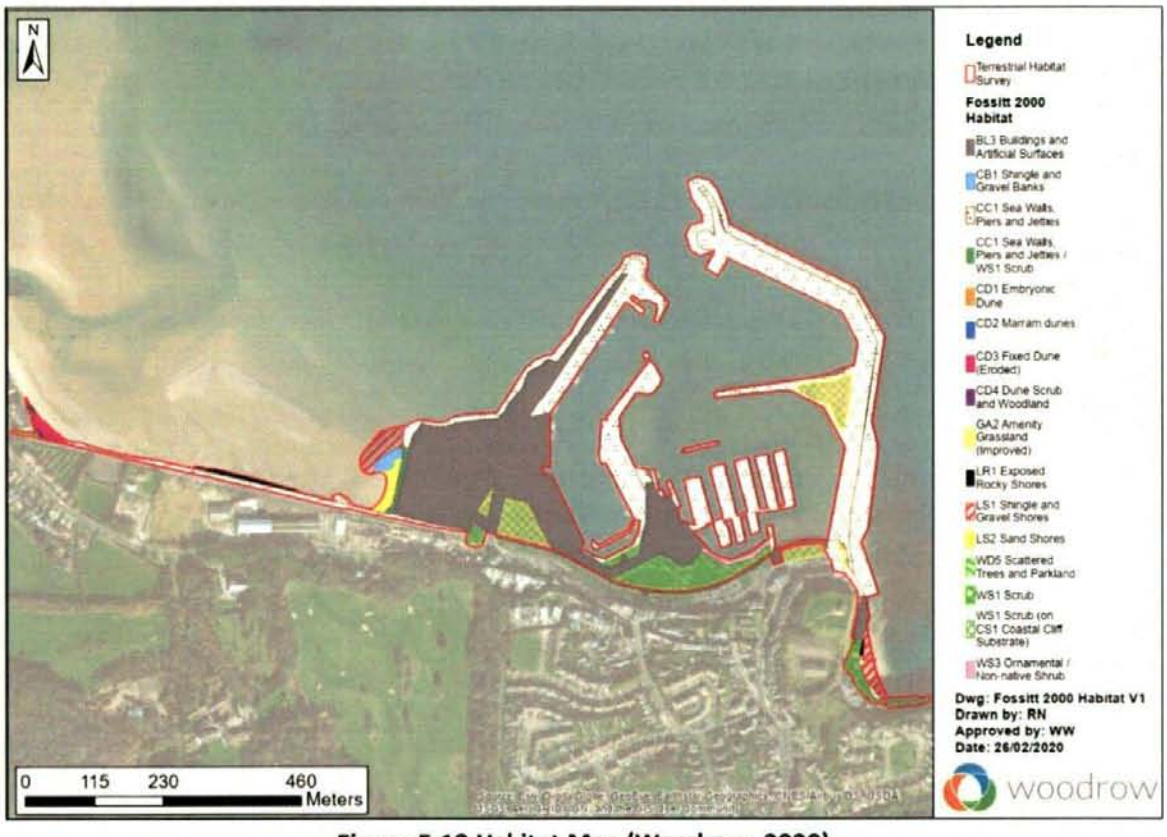

Figure 5.12 Habitat Map (Woodrow, 2020)

Of the habitats recorded five corresponded to or have links to Annex I Habitats of the EU Habitats Directive, three of which occur adjacent to the western pier (Woodrow, 2020). See **Table 5.14** below. It is noted none of these habitats occur within the proposed development site.

Table 5.14 Habitats recorded during the site survey which correspond to or have links to the Annex I habitats of the EU Habitats Directive.

Fossitt Habitat Classification	Annex I Habitat	Correspond to/Links to	
Shingle and Gravel Banks CB1	Annual Vegetation of Drift Lines (1210)	Correspond to Claremont Beach southwest of the proposed reclamation area.	
Embryonic Dune CD1	Embryonic Shifting Dunes (2110)	Correspond to – western end of Claremont Beach	Links to – eastern end of Claremont Beach, southwest of proposed reclamation area.

Marram Dune CD2	Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") (2120)	Correspond to Claremont Beach southwest of the proposed reclamation area.
Fixed Dune CD3	Fixed Coastal Dunes with Herbaceous Vegetation ("Grey Dunes") (2130)	Correspond to Claremont Beach southwest of the proposed reclamation area.
Sand Shores LS2	Mudflats and sandflats not covered by seawater at low tide (1140)	Correspond to (Sections of this habitat occur within the Baldoyle Bay SAC and are shown as the Annex 1 habitat 1140 within the conservation objective series document (NPWS 2012c))

The embryonic dune (CD1) habitat occurring south of the proposed reclamation area has links to the Annex 1 habitat 'Embryonic Shifting Dunes (2110)', however, this recorded habitat represents a poor example of embryonic dune which does not fully conform with the EU Annex I habitat classification, and is not thought to be of EU Annex I quality (Woodrow, 2020).

Doogue (date unknown) notes (see **Section 5.5.2.1** above) that the habitat type 'Annual Vegetation of Drift Lines (1210)', classified by Woodrow in 2019, as saltmarsh vegetation formation which has developed on shingle on the west side of the west pier. The difference in species abundance/composition of this habitat resulting in different habitat classifications overtime may indicate that this area is unstable and is subject to change due to both natural and man-made processes.

The intertidal Annex I habitat *Mudflats and sandflats not covered by seawater at low tide (1140)* which is listed as a qualifying interest of the Baldoyle Bay SAC also occurs outside the proposed development site. Potential impacts on the Baldoyle Bay SAC are specifically addressed in a Natura Impact Statement which has been submitted as part of this application.

5.5.3.3 *Terrestrial Fauna*

This section covers the results of the specific surveys undertaken by Woodrow to ascertain a list of fauna using the proposed development area and within 200m of the site. The results of the mammal survey, which is included in **Appendix 12** are summarised below.

Otter (Lutra lutra)

Following all site visits by Woodrow in 2019 and extensive searches of the survey area and habitats upstream and downstream, within 200m of the site, no evidence of otter was found e.g. spraints (faeces), anal gland secretions, paths, slides, footprints, remains of prey or resting sites. In addition, no ad hoc records were provided from querying local harbour users such as fishermen and tour boat operators, who attend this site on a daily basis (Woodrow, 2020).

Bats

With regard to the suitability of the buildings as roosting habitat, a daytime preliminary assessment (habitat suitability and external checks of accessible buildings) determined that the buildings within the development site, while supporting some Potential Roost Features (PRF's), was low given the lack of optimal foraging habitat.

No bats were recorded foraging or commuting within the survey area and no bats were recorded exiting any buildings on West Pier during the pre-dusk emergence survey. The majority of the survey area was noted to be well-lit by street lights at night time during the dusk bat activity survey, particularly along the promenade of West Pier (Woodrow, 2020).

Only one species of bat, Leisler's bat (*Nyctalus leisleri*), was recorded during the static bat activity survey. Only five bat passes were recorded at the southern end of the West Pier, concluding in a low bat activity level over the night. Only a single bat pass was recorded by the static detector at the northern end of the western pier, both demonstrating that the site has very low bat activity, which is likely to be due to the habitats present which provide sub-optimal foraging habitat.

The time that Leiser's bats were recorded on both static bat detectors does not indicate that a Leisler's bat roost exists in close proximity to Howth Harbour.

The harbour consists of a series of exposed buildings with little or no vegetation and as such foraging and commuting habitats were deemed to be of negligible to low suitability, and the application site is not predicted to be used by high numbers of foraging bats.

5.5.3.4 *Other Fauna*

A single Irish Stoat (*Mustela erminea Hibernica*) was noted on West Pier hunting starling chicks from a nest in a building on 27th May 2020. No signs of other terrestrial mammals, amphibians or lizard were recorded by Woodrow during their site visits in 2019. It is noted that the proposed development site is largely marine in nature and thus generally lacks the ecological requirements for the species listed in **Sections 5.5.2.3** and **5.5.2.4** above.

5.5.3.5 *Avian Fauna*

Summary of Breeding Bird Surveys

A total of three species were confirmed as breeding within Howth Harbour i.e. Black Guillemot (3 to 4 pairs within the harbour walls and 1 to 2 pairs in buildings facing onto the proposed reclamation area), pied wagtail (1 pair) and rock pipit (1 pair) (see **Figures 5.13 & 5.14** below).

A count of Black Guillemot (*Cepphus grille*) was conducted at Howth harbour in early May 2019. Further observations suggested that 2019 was a late breeding season for the Howth Harbour Black Guillemot colony. The 2019 pre-breeding season surveys generated a count of 10 individuals. Foraging and loafing birds were recorded during all of the breeding season counts, except for August.

Numerous seabird species were recorded breeding in the environs of Howth Harbour and were largely confined to both Ireland's Eye (SPA) and Howth Head Cliffs. The breeding seabird surveys covered the following Seabird 2000 counts sections:

Howth Head.

- HH A1 – north coast beyond SPA

- HH 1 – north coast west of Howth Head to end of SPA
- HH 2 – Howth Head and section of east coast

Ireland's Eye.

- IE 1 – north coast
- IE 2 – east coast
- IE 3 – Thulla (island was not accessed by foot)
- IE 4 – interior

The following are a list of species recorded breeding or during the breeding season by Woodrow in the environs of Howth Harbour (Ireland's Eye & Howth Head cliffs) during the 2019 breeding sea bird survey. **Tables 5.15 & 5.16** below provide comparative count data for the census conducted in 1999 (Seabird 2000) at seabird colonies on Ireland's Eye and Howth Head, respectively. Note that for Howth Head, only count data for counts sections HH1a, HH1 and HH2 are provided.

Of these species Cormorant, Herring Gull, Guillemot, Razorbill and Kittiwake are listed as species of conservation intertest (SCI) for the Ireland's Eye SPA. Kittiwake is the only qualifying species for Howth Head Coast SPA.

Fulmar (*Fulmarus glacialis*)

Only a small number of Fulmar's nest on the Howth Head cliffs. Ireland's Eye holds sections where breeding densities are slightly higher, and these are closer to the site where dredging works are proposed. During the 2019 count 49 to 56 AOS[19] were noted.

Cormorant (*Phalacrocorax carbo*)

There is a well-documented colony on Thulla (the islet off the south coast of Ireland's Eye) and more recently (over the 2000s) colonies have become established on the northern coastal slope of the island. During the 2019 count approximately 127 AONs[18] were recorded on Thulla. Additionally, 255 AONs[18] were recorded on the northern slopes and 44 AONs on the eastern side of Ireland's Eye. Therefore, this equates to an overall population of 426 AONs on Ireland's Eye in 2019.

Cormorant were recorded foraging around the harbour in small numbers during the breeding season, with very small numbers recorded within the harbour and these were usually birds roosting on the harbour walls (Woodrow, 2020a).

Shag (*Phalacrocorax aristotelis*)

Shag breed in small colonies or isolated nests around the coast of the Ireland's Eye and Howth Head. There are far fewer birds nesting on the Howth Head cliffs than on Ireland's Eye, and surveys from Seabird 2000 through to 2019 have not recorded any breeding pairs on Howth Head cliffs in close proximity to the harbour. Approximately 106 to 133 AONs (plus 20 hidden nests) recorded on Ireland's Eye in 2019. It is noted that this species is difficult to census, especially on Ireland's Eye, as breeding sites are obscured under boulder fields just south of the stack on the northeast side of the island and sub-colonies on the north coast are situated low on the cliffs.

[19] AOS = apparently occupied site. AON = apparently occupied nest. AOT = apparently occupied territory

Shag were recorded foraging around the harbour in small numbers during the breeding season, with very small numbers recorded within the harbour and these were usually birds roosting on the harbour walls (Woodrow, 2020a).

Gannet (*Morus bassanus*)

Ireland's Eye supported the east coast's only gannetry until 2007, when breeding was confirmed on Lambay, and is now one of only six gannet colonies in Ireland. The gannetry has an increase in numbers over the last two decades and as such it is hypothesised that birds must be recruiting to Ireland's Eye from other colonies (Mitchell *et al.* 2004). The counts for this project conducted in 2019 continued to demonstrate significant growth at this colony with 809 AONs and 849 AONs recorded on dates on 28-May-19 and 05-Jul-19 respectively. There were a large number of birds recorded on the mainland cliff and a proportion of these could possibly have been holding trace nests (possibly young birds) rather than AONs.

Most Gannets recorded were noted in association with the breeding colony on Ireland's Eye with only small numbers (< 50 birds) occasionally recorded foraging around the harbour, which would be considered as exceptionally low usage considering that *c.* 800 AONs were recorded on the island (Woodrow, 2020a).

Herring Gull (*Larus argentatus*)

Relatively few Herring Gulls nest on the Howth Head cliffs, with significantly higher numbers recorded on Ireland's Eye. The closest breeding site to Howth Harbour is on Thulla. The Ireland's Eye population has seen a dramatic decrease in numbers since the 1970's (c. 1,250 pairs) but this has seen a slight increase in 2007 (217 AOTs[18]). The 2019 counts showed a continued population growth with 484 AOTs recorded.

During the breeding season Herring Gulls foraged around the harbour with up to c. 300 birds recorded. While many of these birds were sub-adult, some would be linked to breeding sites on Ireland's Eye (Woodrow, 2020a).

Lesser black-backed gull (*Larus fuscus*)

There have never been any breeding attempts by lesser black-backed gulls documented for Howth Head. Ireland's Eye holds a small population of breeding Lesser black-backed gull, 7 AOT's noted in 2019, but this is limited due to the preference of the species to nest in areas adjacent to dense cover or areas with longer swards. The thick stands of bracken on Ireland's Eye do not offer any open spaces and this may be limiting the availability of nesting areas for this species.

Great black-backed gull (*Larus marinus*)

Breeding Great black-backed Gulls on Ireland's Eye are distributed over the northern third of the island from The Steer to the eastern cliffs. The species tends to show a preference for the rocky outcrops and areas with short vegetation, with single territories being held on the Martello Tower and the ruined church. Particularly high breeding density was noted on the most north-easterly rocky outcrop. No breeding was recorded from south of Samper Hole to the narrow inlet on the northern side of the promontory leading to the Thulla Rock. A few pairs nest around Thulla Rock with good numbers recorded on Thulla. A total of 134 AOTs were recorded in 2019 which is a slight decrease in numbers than that noted during a 2007 census (189 pairs).

During the breeding season high tide/low tide surveys, Great black-backed Gulls were consistently recorded utilising the harbour for foraging and loafing, with some these birds probably linked to nest sites on Ireland's Eye (Woodrow, 2020a).

Kittiwake (*Rissa tridactyla*)

Kittiwake is the only species listed as a Qualifying Interest (QI) of the Howth Head SPA and are also a QI for Ireland's Eye SPA. During the 2019 survey, a whole colony count was not conducted for all the count sections covering the Howth Head peninsula, as it was considered appropriate to only survey the count sections closest to the proposed development, including Count Sections HH1a, HH1 and HH2. A total of 1,209 AONs were recorded for the Howth Head survey sites during the 2019 survey, in addition to 475 AONs, plus 39 trace (bird/ pair holding territory but nest poorly built) recorded on Ireland's Eye.

Kittiwakes were recorded on occasions foraging off the harbour during the breeding season. However, the majority of the records were dominated by birds returning to breeding colonies or actually counted on colonies, including the stack of Ireland's Eye or the cliffs of sub-section HH1a on Howth Head (Woodrow, 2020a).

Common Guillemot (*Uria aalge*)

Common guillemot is listed as a Qualifying Interest of the Ireland's Eye SPA and sub-colonies are distributed from the cliffs west of Seal's Cave on the north coast to the inlet north of Rowan Rocks on the east coast of the island. The population on the island has seen numerous fluctuations since the 1990's, with the 2019 survey recording 1,194 to 2,116 individuals, which is similar in range to those previously recorded.

Guillemot numbers noted within the count sections (HH1a, HH1 and HH2) on Howth Head surveyed in 2019, recorded 1,216 individuals with some birds recorded in Section HH1a, where previously no birds had been recorded.

During the breeding season surveys Common Guillemot were largely recorded in association with both the breeding colonies removed from the harbour on Ireland's Eye and Howth Head (Woodrow, 2020a).

Razorbill (*Alca torda*)

The razorbills on Ireland's Eye have a similar distribution to common guillemots and interestingly both species appeared to show parallel trends in population growth and decline. The 2019 count recorded 686 to 774 individuals which represented a fall in numbers compared to those recorded during a survey in 2015 (1,600 ind.).

Numbers of razorbills noted within the count sections (HH1a, HH1 and HH2) on Howth Head surveyed in 2019, recorded 240 and 277 individuals and just like Common Guillemot, saw birds recorded in Section HH1a, where previously no birds had been recorded.

During the breeding season surveys Razorbill were largely recorded in association with both the breeding colonies removed from the harbour on Ireland's Eye and Howth Head (Woodrow, 2020a).

Puffin (*Fratercula arctica*)

The puffin colony on Ireland's Eye, although small, is one of a very few breeding locations for this species on the east coast. The population has seen a dramatic decline since 1939 (c. 1,000 pairs) with less 100 pairs potentially remaining (131 individuals noted in 2015). Merne & Madden (2000) suggest that puffin numbers on Ireland's Eye are probably affected by brown rats and great black-backed gull predation. No dusk counts were undertaken in 2019 and only 3 individuals were recorded.

Terns

No tern species were recorded breeding in the vicinity of the harbour and usage was correspondingly low. There was a small peak in usage detected in August when Sandwich Terns (*Sterna sandvicensis*) were recorded roosting and foraging offshore. A distant flock, thought to be Sandwich Terns was recorded as unidentified tern species (Woodrow, 2020a).

Waders

No wader species were recorded nesting in the vicinity of Howth Harbour during the 2019 breeding season. The closest breeding wader sites are for Oystercatcher (*Haematopus ostralegus*) and Ringed Plover (*Charadrius hiaticula*) which attempted to breed on Ireland's Eye. Oystercatchers were the only wader species recorded in the vicinity of harbour throughout the breeding season and these were recorded in very small numbers, with counts of only 8 birds, until August when 16 birds were recorded. Small numbers of other wading species were recorded including: Curlew (8 birds in August), Greenshank (1 bird in May), Purple Sandpiper (2 birds in August), Redshank (2 birds in August), Turnstone (2 birds in August). All were recorded early in the breeding season (06-May) or later in the season post-breeding (19-Aug) (Woodrow, 2020a).

Other waterbirds

Grey Herons (*Ardea cinerea*) were recorded (1 to 4 birds) within and adjacent to the harbour throughout the breeding season and it is likely that there was a small heronry in the general area, probably at the nearby Deerpark woodlands. Shelduck (*Tadorna tadorna*) and Mallard (*Anas platyrhynchos*) were also recoded in small numbers, with Shelduck thought to breeding on Ireland's Eye (Woodrow, 2020a).

Table 5.15 Breeding seabird numbers for Island's Eye

Species	Count unit[18]	Seabird 2000 1999	2004	2005	2007	Seabird 4 2015	2019 (Woodrow)
Northern fulmar	AOS	70			55	91	49 to 56
Northern gannet	AON	188		313	375	350	809 to 845
Great cormorant	AON	306		571	651	424	426
European shag	AON	32	65		64	81	106 to 133 (+20 hidden)
Lesser back-backed gull	AOT	1			4	2	7
Herring gull	AOT	*c. 250*	*c. 135 to 150*		217	318	484
Great black-backed gull	AOT	*c.* 100	*c.* 151		185	154	134
Black-legged kittiwake	AON	941	1,016		633	459	475 (+39 trace)
Common guillemot	Ind.	2,191	3,568		2,341	4,410	1,994 to 2,116

Razorbill	Ind.	522	818		546	1,600	628 to 774
Black guillemot	Ind.	15			10	2	3
Atlantic puffin	Ind.	4			25 to 35	131	3
Note	Black guillemot counts reported in Seabird 2000 were undertaken for Ireland's Eye in April 1998 and these represent the only count conducted within the prescribed pre-breeding season survey window, until the national Black Guillemot Census was repeated in 2017/18 (final report pending). The 2007, 2015 and 2019 black guillemot counts reported were not generated by pre-breeding season surveys.						

Table 5.15 Breeding seabird number for selected count sections covering Howth Head

Species	Count unit[18]	Count section	Seabird 2000 1999	2007	Seabird 4 2015	2019 (Woodrow)
Northern fulmar	AOS	HH1a			1	
		HH1	3		2	4
		HH2	2	10	4	10
European shag	AON	HH1a				
		HH1				1
		HH2		1	5	9
Herring Gull	AOT	HH1a				
		HH1	4	2		
		HH2	1	3		
Great black-backed gull	AOT	HH1a				
		HH1	1			
		HH2	1	1		
Black-legged kittiwake	AON	HH1a		*	168	412
		HH1	176	279. Tr.27, oov.10	301	330
		HH2	1,113 oov.20	1,347. Tr.101, oov.35	823 to 870 Tr.35	467
Common guillemot	Individual	HH1a		*		33 to 88
		HH1	8	14		261
		HH2	402	376 oov.50	284 to 371	867
Razorbill	Individual	HH1a		*		53 to 90
		HH1	20	28	28	103
		HH2	178	106 oov.50	63 to 117	84
Notes	Hidden = oov (out of view) = estimate of the number of birds/ territories/ sites/ nests hidden from view. *combined count for Section HH1a and Section HH1 Note counts in for Section HH1a and Section HH1a in Seabird 2000, 2007 and Seabird 4 were land-based counts; therefore, numbers of would be considered underestimates. Counts for this section in 2019 were boat-based and therefore would have covered area not visible for land. For Black Guillemot counts see species account					

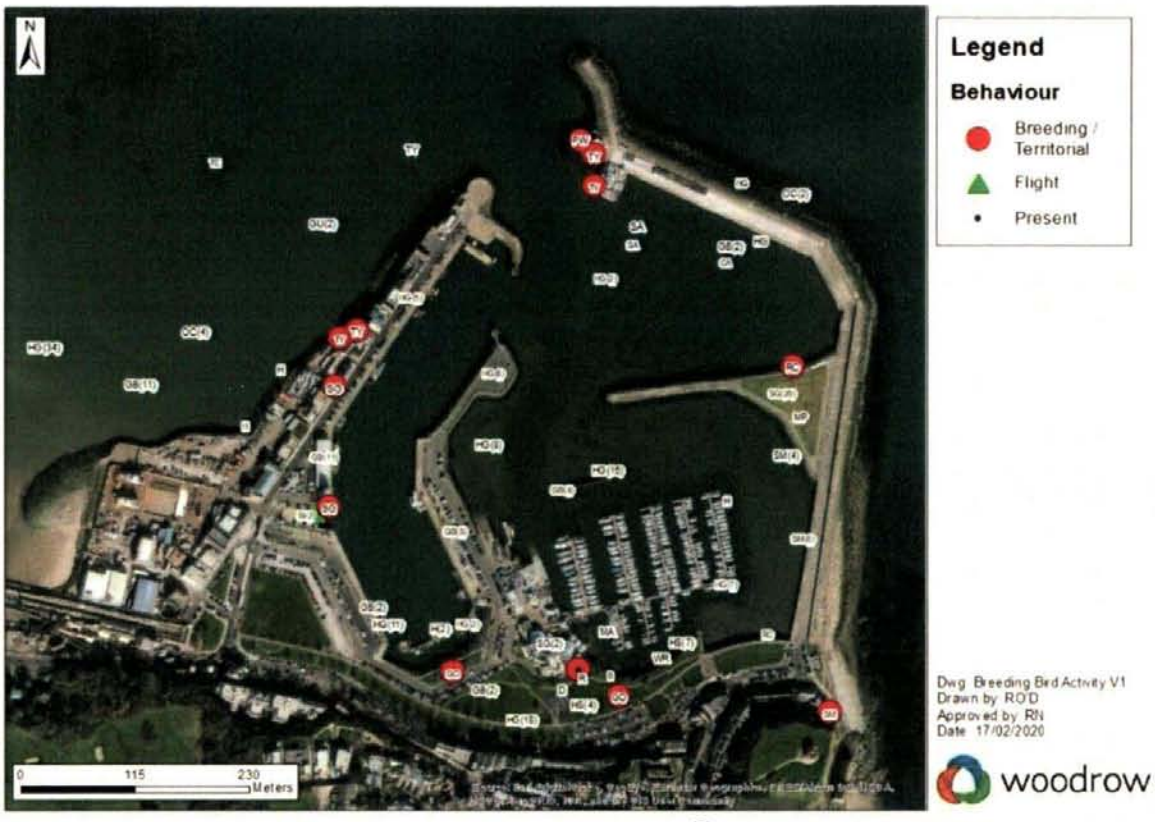

Figure 5.13 Breeding Bird Survey results[20] (Woodrow 2020)

[20] Species represented using the BTO species codes
https://www.bto.org/sites/default/files/u10/downloads/taking-part/species_codes.pdf

Figure 5.14 Breeding Black Guillemot locations (Woodrow, 2020)

Numbers of birds foraging and roosting within the study area were not considered to be significant over the breeding season (i.e. no nationally / internationally important numbers of birds were recorded within the study area during the breeding season). Typically, species of breeding seabirds noted as QIs of the nearby SPAs – Howth Head SPA (kittiwake) and Ireland's Eye (cormorant, herring gull, kittiwake, common guillemot and razorbill) were recorded in association with breeding colonies removed from the harbour (Woodrow, 2020a).

Summary of Non-Breeding Bird Season Surveys (Winter Period)

Numerous species were recorded foraging and roosting within Howth Harbour and / or in proximity to the harbour and proposed reclamation area during high and low tide cycles. See **Figure 5.11** above for survey count sections and **Appendix 7** of this EIAR for survey results. **Figure 5.16** below shows notable winter roost locations recorded during the 2019/2020 survey period at Howth Harbour.

The following species were recorded during the high and low tide counts by Woodrow. Information provided is largely in relation to the proposed works areas.

Two species of diver (loon) were recorded. Great Northern Diver (*Gavia immer*) was recorded twice during the high tide counts with one bird recorded foraging over the proposed reclamation area (section 2). Red-throated Diver (*Gavia stellate*) was noted to be slightly more abundant (1 to 4 birds) during the high tide counts. Two birds were recorded within the harbour in early January with a single

bird recorded near the mouth of the harbour in February. Foraging birds were also recorded in the proposed reclamation area. Both species are listed as Annex I under the Birds Directive 2009/147/EC.

Two species of grebe were recorded within the survey site. Great Crested Grebe (*Podiceps cristatus*) was recorded in section 2 during both the low and high tide counts, with birds foraging over the proposed reclamation area during two counts. Little Grebe (*Tachybaptus ruficollis*) was recorded within on the western side of the inner harbour on five high tide counts over the full season, with numbers ranging from 1 to 5 birds.

Gannet was not commonly recorded during the surveys, however most records where noted in association with the colony at Ireland's Eye.

Recordings of Cormorant and Shag within the harbour were sparse, with low numbers of birds noted i.e. up to 5, which were typically associated with loafing. Low numbers of each species were also noted in section 2, with birds occasionally foraging over the proposed reclamation area. Most observations of Cormorant and Shag were around Ireland's Eye.

Two species of heron were recorded during the survey period. The Annex I species Little Egret (*Egretta garzetta*) was only recorded once in November 2019, during a low tide count, with a single bird foraging along the eastern harbour wall in the Moorings. Grey Heron was regularly recorded throughout winter with a maximum number of 11 birds recorded. Birds were often loafing around the fish processing plant in Section 1, on the roofs of buildings and were also recorded foraging or roosting within the harbour. In Section 2 herons were occasionally recorded loafing at the southwest tip of the proposed reclamation area.

Numerous species of wildfowl were noted during the high and low tide survey period. Mute Swan (*Cygnus olor*) was recorded once during the winter, with 5 birds recorded foraging within the harbour, just off the Marina. Pale-bellied Brent Goose (*Branta bernicla hrota*) was frequently recorded (5 to 50 birds) within section 1, with birds regularly foraging on the small triangle of amenity grassland adjacent to the eastern seawall. Birds were also recorded within the Moorings, Marina and along the harbour wall of the Marina approach channel. In Section 2, small numbers of Brent Geese were occasionally recorded forging at the southwestern tip of the proposed reclamation area. All the records attributed to Section 3 were birds foraging on Ireland's Eye or the islet of Thulla. Two Mallard were only recorded once during the survey counts. Shelduck records were all attributed to Ireland's Eye with a max count of 13 to 14 birds noted. Red-breasted Merganser (*Mergus serrator*) was recorded twice during the high and low tide counts, with birds (2 to 8) foraging directly adjacent to the proposed reclamation area in section 2.

Five species of gull were noted during the high and low tide counts, with Herring Gulls being the most numerous bird species recorded in the environs of Howth Harbour. During high tide counts, the highest numbers were consistently recorded in section 1 (92 to 245 birds) and this was associated with birds flying around the harbour, roosting on the roofs of buildings within the harbour, and utilising the amenity grasslands adjacent to the harbour. Birds are attracted to the fish landing and processing activities in the area, with the roofs providing a convenient roosting spot with commanding views over the harbour and surrounding waters. Herring Gulls are a red listed species and it is listed as a QI for Ireland's Eye SPA. Great black-backed Gull was recorded in lower numbers (max 82 high tide & 142

low tide counts) but showed a similar distribution to Herring Gulls, with the main attraction being the activities associated with the commercial fishery at Howth Harbour. Small numbers of both Black-headed Gull (*Larus ridibundus*) and Common Gull (*Larus canus*) were recorded during the high and low tide counts over winter 2019-20. Kittiwakes were recorded during both low and high tide counts in March, with up to 90 birds associating with nesting cliffs on Howth Head.

Three species of auk i.e. Black Guillemot, Common Guillemot and Razorbill, were recorded both offshore and within the harbour in small numbers. Over winter 2019-20 (October to March) only a single black guillemot was recorded during the low tide counts, February 2020 in Section 1. While birds were recorded over the high tide counts in late October, there were no black guillemots recorded over subsequent counts until late January. These counts indicate that black guillemots are dispersing away from Howth Harbour for extended periods during the winter and there is a period between early November and mid-January when no birds were recorded. Black guillemots are reported to remain close to breeding colonies over the winter and it is possible that Howth birds maintain a contact with the harbour throughout the winter, possibly returning to these more sheltered, intertidal waters during rougher sea conditions.

Ten species of wader were recorded during the high and low tide counts over winter 2019-20, namely; Bar-tailed godwit (*Limosa lapponica*), Curlew (*Numenius arquata*), Dunlin (*Calidris alpina*), Greenshank (*Tringa nebularia*), Oystercatcher, Purple Sandpiper (*Calidris maritima*), Redshank (*Tringa totanus*), Ringed Plover (*Charadrius hiaticula*), Sanderling (*Calidris alba*) and Turnstone (*Arenaria interpres*).

Both Dunlin and Bar-tailed Godwit are listed as Annex I species under the Birds Directive. A single Bar-tailed Godwit was recorded once within section 2, while small numbers of Dunlin were recorded during four high tide counts, twice roosting with Ringed Plover on western harbour wall (x 2 birds on both occasions) and twice roosting in section 3 on the outer part of the seawall. The roost on the western seawall is located on the northern tip of the proposed reclamation area. There was only one record of Sanderling during the surveys, with a single bird picked up roosting with ringed plover on the western seawall in section 2.

Small flocks (1 to 26 birds) of Curlew were recorded during low tide counts foraging on intertidal sands in section 2, west of the harbour wall, with records ranging from 30m to 700m from the proposed reclamation area. A single bird was recorded roosting on southwestern corner of the proposed reclamation area during high tide counts. Single Greenshanks were also recorded on four occasions, during high tide counts, roosting at the southwestern tip of the proposed reclamation area.

At Howth Harbour Purple Sandpiper are a species that utilise the outer seawalls of the harbour, foraging along the intertidal zone. Section 3 generated the most consistent numbers with 1 to 11 birds recorded. Purple sandpipers were only recorded in Section 2 once and twice in Section 4 (foraging on the outer harbour wall) during the count period.

Oystercatchers were one of the more commonly recorded and widely distributed wading bird species observed during the 2019-20 high and low tide counts. They were recorded in all count sections, including section 1 (inner harbour) although infrequently and only in small numbers (< 3 birds). The most consistently utilised area was section 2 with Oystercatchers recorded during both high tide (5 to

22 birds) and low tide counts (3 to 18 birds) utilising the proposed reclamation area to forage. The species was also recorded roosting at the southwestern tip of the proposed reclamation area. Based on cumulative counts for all four count sections (although subject to the risk of birds being double counted) it is estimated that that Howth Harbour and environs support a maximum of 40 oystercatcher over the winter (including birds recorded on Ireland's Eye).

Redshank was a commonly observed wader during the surveys. Utilisation of the inner harbour included small numbers of birds (2 to 6 birds) over low tide foraging on exposed mud in the southeast corner of the harbour and the area backing the Marina. During high tide there were several small redshank roosts noted within Howth Harbour, including the inner harbour wall between the Marina and the approach channel, which supported up to 22 birds, and the mid-harbour wall, which supported up to 17 birds distributed along the wall. Usage of Section 2 was limited to single observation of 3 birds foraging adjacent to the harbour wall within the proposed reclamation area. There were also two observations of small numbers of birds (2 birds) foraging on the intertidal sands, relatively far removed from the proposed reclamation area. Similar results were seen for sections 3 & 4 with low numbers of birds foraging along the outer seawall of the harbour.

Turnstone is a species that specialises in foraging over rocky shores in the intertidal zone, including rock armouring on harbours like those available at Howth. As would be expected with high tides pushing birds up on the tideline, more turnstones were recorded during high tide counts than during low tide counts. Elevated numbers during high tide was mainly as a result of birds being detected at several small roosts, including: the southwest and northern tip of the proposed reclamation area (section 2), the mid-harbour wall, and the low inner harbour wall between the marina and the approach channel (section 1). The outer harbour walls/ rock armour (sections 3 and 4) recorded less usage. Overall, it is estimated that Howth Harbour supports up to 70 turnstones over the winter period.

Ringed plover was the most numerous species of wader recorded, with combined counts ranging from 20 to 157 birds. Ringed plovers were only recorded during the high tide period and this was related to birds utilising the outer walls of the harbour as high tide roost locations. One of the roosts was located on the eastern seawall and is therefore removed from proposed works. The other roost location is on the western seawall near the mouth of the harbour and at the northern tip of the proposed reclamation area.

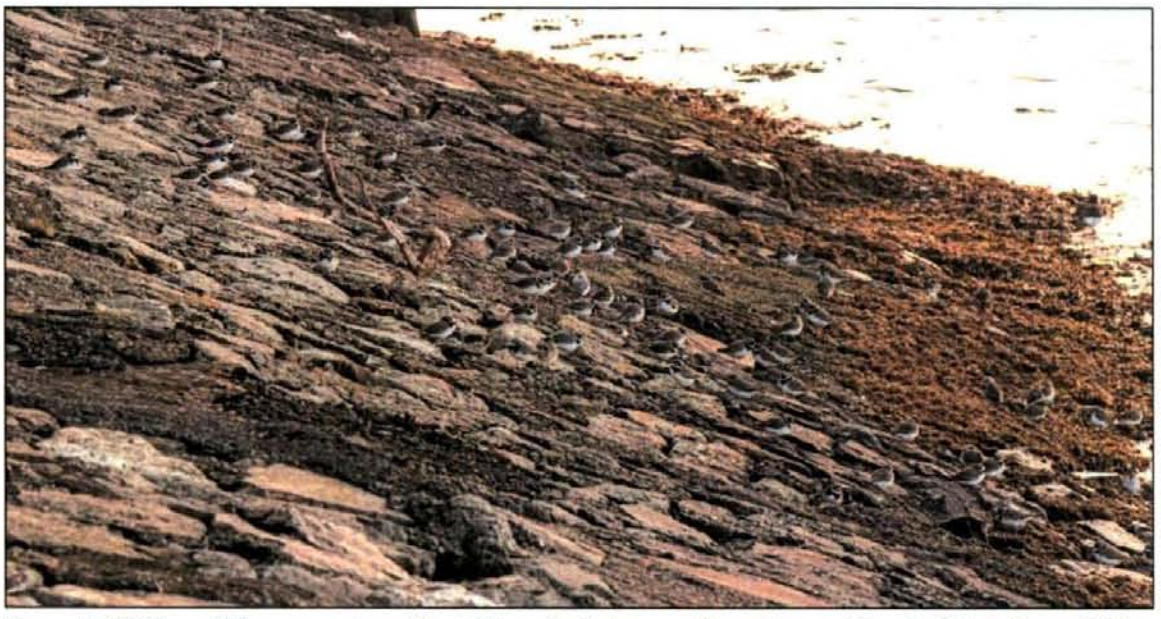

Figure 5.15 Ringed Plover roost on West Pier – includes small numbers of Dunlin (Woodrow, 2020 - Photo courtesy of John Fox).

Figure 5.16 Notable Winter Roosts at Howth Harbour in 2019 / 2020 (Woodrow, 2020).

5.6 Evaluation of Existing Environment within the development Site

The habitats, flora, fauna and other ecological features or resources identified in **Sections 5.3** to **5.5** are now evaluated on the basis of their local, national and international conservation value using the

evaluation criteria described in **Section 5.1.5** above. On the basis of these evaluations an assessment will then be made as to which of these habitats or species are considered sensitive ecological receptors which may be impacted upon during the proposed construction phase, or the operation phase of the project. In summary, these evaluations determine whether the ecological features within the site are at, or above, a defined threshold level of value. In order to ensure that a systematic, transparent and comprehensive assessment of the impacts is completed the selection of sensitive ecological receptors does not include, at this point, consideration of any mitigation measures that will be incorporated into the final project design.

5.6.1 Selection of Key Habitat Ecological Receptors

Overall, the habitats recorded within the proposed development site are heavily impacted by human influence. The habitat types within the development site are evaluated in **Table 5.15** below, for their conservation importance, and those which were not considered as KERs or effects are not anticipated is based on the following reasons:

- Distance from the proposed development and dilution provided in the marine environment;
- Lack of hydrological connectivity;
- Nature of the sites e.g. terrestrial nature of habitats; and
- Lack of any identifiable source-pathway-receptor chain for effects.

Table 5.15 Selection of Key Habitat Ecological Receptors within the proposed development site

Fossitt Habitat Type	Evaluation[21]	Key Ecological Receptor	Rationale
Sea walls, piers and jetties CC1	Local importance (Lower Value)	No	This is a highly modified and disturbed habitat, with low species diversity and of no intrinsic ecological value.
Buildings and artificial surfaces BL3	Local importance (Lower Value)	No	This is a highly modified and disturbed habitat of low intrinsic ecological value.
Amenity Grassland (Improved) GA2	Local importance (Lower Value)	No	This is a highly modified habitat of low intrinsic ecological value.
Treelines WL2	Local importance (Lower Value)	No	Treelines can provide important sites for foraging, roosting and breeding birds whilst also providing ecological corridors facilitating bird and other animal movement. However, the treeline alongside the Howth Yacht Club boundary fence-line is a small species-poor planted treeline of low intrinsic ecological value in local and broader context.
Ornamental/non-native shrub WS3	Local importance (Lower Value)	No	This habitat is primarily dominated by ornamental and non-native shrubs including the non-scheduled, Medium

[21] As per criteria outlined in Section 5.1.4.

Fossitt Habitat Type	Evaluation[21]	Key Ecological Receptor	Rationale
			Impact invasive species[22] butterfly-bush (*Buddleja davidii*) and Japanese rose (*Rosa rugosa*). This habitat is of a low ecological value at local level.
Shingle and Gravel Banks CB1	County Importance (Areas of habitat located within the Baldoyle Bay SAC boundary considered of International Importance)	Yes	This habitat was found to occur immediately south of the proposed reclamation area, on the northern end of the sandy beach, where a shingle bank has formed adjacent to the West Pier. This is an EU Annex I habitat '*Annual Vegetation of Drift Lines (1210)*'. (Woodrow, 2020). It is noted that the bank was not very well developed and that parts of the substrate appeared to be broken down cement and brick fragments (Woodrow, 2020).
Embryonic Dune CD1	County Importance (Areas of habitat located within the Baldoyle Bay SAC boundary considered of International Importance)	Yes	This habitat occurred in two locations within the survey area, one of which is located approximately 60m south of the proposed reclamation area. Both locations had undergone recent and significant erosion and disturbance (which could be seen within the adjacent habitats); however, the initial stages of dune formation were occurring here during the site visits in 2019. (Woodrow, 2020) This is an EU Annex I habitat '*Embryonic Shifting Dunes (2110)*', to the western end of Claremont Beach. However, it is a poor example of embryonic dune along the eastern end of Claremont Beach, south of the proposed reclamation area, which does not fully conform with the EU Annex I habitat classification, and is not thought to be of EU Annex I quality due to the high level of disturbance from sea defences, trampling and erosion in this area (Woodrow, 2020).
Marram Dune CD2	County Importance (Areas of habitat located within the Baldoyle Bay SAC boundary considered	No	This habitat occurs approximately 0.5km west of the proposed reclamation area. This small marram dune was noted to be heavily eroded at this location as a result of wave action and trampling by walkers. Where this habitat occurs in good condition, it is an EU Annex I

[22] https://invasivespeciesireland.com/wp-content/uploads/wp-post-to-pdf-enhanced-cache/1/amber-list-recorded-species.pdf

Fossitt Habitat Type	Evaluation[21]	Key Ecological Receptor	Rationale
	of International Importance)		habitat *'Shifting dunes along the shoreline with Ammophila arenaria ("white dunes") (2120)'*. (Woodrow, 2020) This habitat is located outside the proposed development site and no impact on this habitat as a result of the development is predicted to occur.
Fixed Dune CD3	County Importance (Areas of habitat located within the Baldoyle Bay SAC boundary considered of International Importance)	No	This habitat is located 0.6km west of the proposed reclamation area. This area of fixed dune habitat represents a good (albeit small) example of its type, which corresponds to the Priority Annex I habitat type *'Fixed Coastal Dunes with Herbaceous Vegetation ("Grey Dunes") (2130)'*, although it was observed to be eroded along the edge. This habitat is located outside the proposed development site and no impact on this habitat as a result of the development is predicted to occur. Patches of non-scheduled, invasive species hottentot-fig (*Carpobrotus edulis*) and wall-spray (*Cotoneaster horizontalis*) were also recorded growing within the habitat (Woodrow, 2020).
Dune Scrub and Woodland CD4	local importance (higher value) (Areas of habitat located within the Baldoyle Bay SAC boundary considered of International Importance)	No	Good examples of this habitat are rare in Ireland as a result of disturbance to dune habitats (and dune woodland occurring in Ireland is generally planted). The CD4 habitat within the survey area does not represent a good example of this habitat, and was mainly dominated by invasive species (Woodrow, 2020). This habitat does not represent an EU Annex I habitat classification (Woodrow, 2020).
Exposed Rocky Shores LR1	Local importance (Lower Value) (Areas of habitat located within the Baldoyle Bay SAC boundary considered of International Importance)	No	This habitat is located outside the proposed development site and no impact on this habitat as a result of the development is predicted to occur.
Shingle and Gravel Shores LS1	local importance (higher value)	Yes	Situated just south of the proposed reclamation area, this habitat category includes exposed or moderately exposed shores with accumulations of

Fossitt Habitat Type	Evaluation[21]	Key Ecological Receptor	Rationale
	(Areas of habitat located within the Baldoyle Bay SAC boundary considered of International Importance)		loose, coarse but usually rounded and mobile rocky material. While this habitat has links to the Annex I habitat *''annual vegetation of drift lines (1210)'*, it does not represent an EU Annex I habitat classification
Sand Shores LS2	County Importance (Areas of habitat located within the Baldoyle Bay SAC boundary considered of International Importance)	Yes	Found on the western side of West Pier, at Claremont Beach, this particular habitat was comprised of fine sands, and did not support any associated herbaceous flora during the surveys in 2019 (Woodrow, 2020). This has links to the EU Annex I habitat *'Mudflats and sandflats not covered by seawater at low tide (1140)'*. (ASU, per. Comms.)
Scattered Trees and Parkland WD5	Local importance (Lower Value)	No	Parkland areas surrounding the harbour consisted of small clusters of planted trees on amenity grassland, including species such as ash (*Fraxinus excelsior*) and the non-native species sycamore (*Acer pseudoplatanus*). These areas were regularly maintained, and species poor (Woodrow, 2020).
Scrub WS1	local importance (higher value) (Areas of habitat located within the Howth Head SAC boundary considered of International Importance)	No	Native scrub can be ecologically important, providing foraging for small mammals including bats. Scrub also provides feeding and nesting sites for small birds and for invertebrates. However, the scrub habitat noted is primarily dominated by non-native species. This habitat is located outside the proposed development site and no impact on this habitat as a result of the development is predicted to occur.

Fossitt Habitat Type	Evaluation[21]	Key Ecological Receptor	Rationale
Scrub WS1 on Coastal Cliff CS1	local importance (higher value) (Areas of habitat located within the Howth Head SAC boundary considered of International Importance)	No	Situated approximately 150m south of the Eastern Pier, scrub habitat was recorded growing on the sea cliff at Balscadden Bay. Within the Survey Area, this habitat, was more akin to WS1 Scrub and did not correspond to EU Annex I habitat *'Vegetated sea cliffs of the Atlantic and Baltic Coasts (1230)'* (Woodrow, 2020). This habitat is located outside the proposed development site and no impact on this habitat as a result of the development is predicted to occur.

5.6.2 Selection of Key Faunal Ecological Receptors (Non-avian)

All fauna identified during desktop or field surveys are evaluated below for their conservation importance. Those selected as key ecological receptors are:

- of at least local importance (Higher Value)
- which were recorded during the site surveys or
- for which records are retained by NPWS, BCI or at the NBDC and;
- for which suitable habitat is available;
- require protection under national or international legislation.

In summary, Key Ecological Receptor species are selected on the basis of their legal status, the types of habitat within and around the site and on the basis of current or previously recorded evidence of a species' presence within the site.

Table 5.16 below, illustrates the evaluation rating given to each species. The rationale behind these evaluations is also provided.

Table 5.16 Selection of Key Faunal Ecological Receptors (non-avian)

Species	Legislative Protection	Evaluation[23]	Key Ecological Receptor	Rationale
Benthic Fauna	• Those occurring within the qualifying habitat *'Mudflats and sandflats not covered by sea water at low tide (1140)'* of the adjacent Baldoyle Bay SAC are protected under the EC Habitats Directive [92/43/EEC].	Local Importance (lower value) to International Importance when occurring within the Annex I Habitat *'Mudflats and sandflats not covered by seawater at low tide'*.	Yes	Precautionary principle. The biological survey of the intertidal and sub-tidal benthos both within and outside Howth Harbour identified a limited number of species that correspond to the community complexes of those associated with the Annex I habitat *'Mudflats and sandflats not covered by sea water at low tide (1140)'* of the adjacent Baldoyle Bay SAC. Due to the legal status of the adjacent Baldoyle Bay SAC and its qualifying habitat *'Mudflats and sandflats not covered by sea water at low tide (1140)'*, the precautionary principle merits their evaluation as Key Ecological Receptor.
Harbour porpoise (*Phocoena phocoena*)	• Wildlife Acts • EC Habitats Directive [92/43/EEC] Annexes II and IV • Bern Convention Appendix II	Local Importance (Higher Value)	Yes	Precautionary principle. Regularity of sightings. North County Dublin including off Howth support some of the highest densities of this species recorded in Ireland (Berrow et al. 2014).
Bottlenose dolphin (*Tursiops truncatus*)	• Wildlife Acts • EC Habitats Directive [92/43/EEC] Annexes II and IV • Bern Convention Appendix II	Local Importance (Higher Value)	Yes	Precautionary principle. Regularity of sightings. Recorded in north County Dublin and close to the coast off Howth Harbour.

[23] As per criteria outlined in Section 5.1.5.

Species	Legislative Protection	Evaluation[23]	Key Ecological Receptor	Rationale
Minke Whale (*Balaenoptera acutorostrata*)	• Wildlife Acts • EC Habitats Directive [92/43/EEC] Annexes II and IV • Bern Convention Appendix II	Local Importance (Higher Value)	Yes	Precautionary principle. Regularity of sightings. Minke whales are widespread in the area from Howth Head to Lambay Island. The Minke whale of all whale species that use Irish waters is the species with the most nearshore distribution, and therefore potentially the most vulnerable to anthropogenic noise resulting from coastal developments (RPS, 2012).
Humpback whale (*Megaptera novaeangliae)*	• Wildlife Acts • EC Habitats Directive [92/43/EEC] Annexes II and IV • Bern Convention) Appendix III	Local Importance (Higher Value)	Yes	Precautionary principle, due to locations of sightings and ecology of species i.e. inhabits marine waters.
Grey seal (*Halichoerus grypus*)	• Wildlife Acts • EC Habitats Directive [92/43/EEC] Annexes II and IV • Bern Convention) Appendix III	Local Importance (Higher Value)	Yes	Precautionary principle. Regularity of sightings. They were regularly sighted swimming, socialising and feeding within the inner harbour.
Harbour seal (*P. vitulina*)	• Wildlife Acts • EC Habitats Directive [92/43/EEC] Annexes II and IV • Bern Convention) Appendix III	Local Importance (Higher Value)	Yes	Precautionary principle. Regularity of sightings.
Loggerhead Turtle (*Caretta caretta*)	• Wildlife Acts • EC Habitats Directive [92/43/EEC] Annexes II and IV • Bern Convention) Appendix II	Local Importance (Higher Value)	No	Data base record rather than any direct evidence. Concentrations of sightings primarily along the west coast of Ireland (NBDC's online mapper[15]).