October 2023

Assessment of Impact on the Maritime Usage Report

Geotechnical Investigation at proposed 250m Offshore Renewable Energy capable Quay Extension at the Port of Waterford, Belview, Co. Kilkenny

On behalf of

Port of Waterford

MALONE O'REGAN ENVIRONMENTAL

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Assessment of Impact on the Maritime Usage Report

Geotechnical Investigation at proposed 250m ORE capable Quay Extension on 250m at the Port of Waterford, Belview, Co. Kilkenny

Port of Waterford

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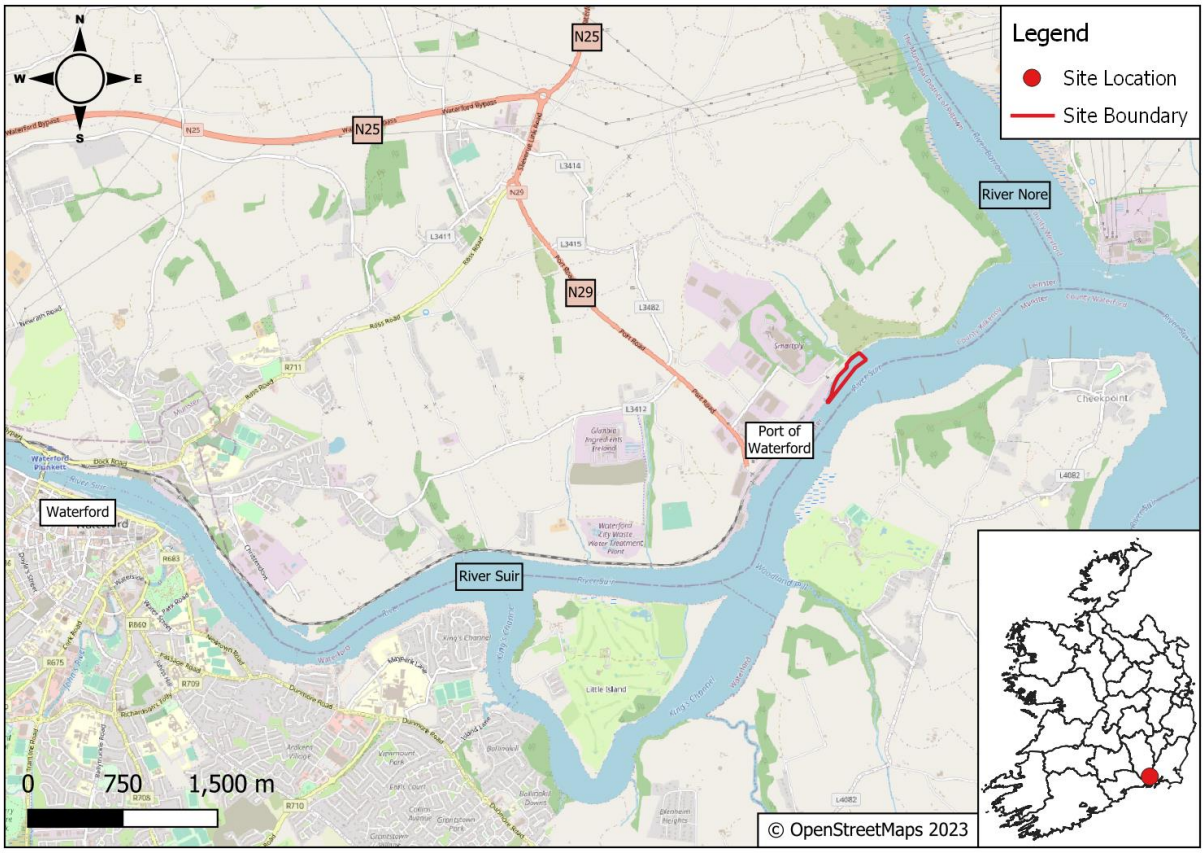
1 INTRODUCTION

Malone O'Regan Environmental (MOR) have been commissioned by the Port of Waterford ('the Applicant') to undertake an Assessment of the Impact on the Maritime Usage Report (AIMU) in respect of a proposed geotechnical investigation required to support the design of a proposed 250m Offshore Renewable Energy (ORE) capable quay extension ('the proposed works) in the River Suir at the Port of Waterford, Belview, Co. Kilkenny (OSI Reference ITM 666422; 613637).

The proposed works will be located on a site in the River Suir that is ca. 2.48 hectares (ha) in size and borders the townland of Gorteens, Co. Kilkenny, ca. 5.3km east of Waterford City and is shown in Figure 1-1 ('the Site').

Figure 1-1: Site Location



1.1 Scope of Report

This report has been prepared in support of a Licence application submitted to the Maritime Area Regulatory Authority (MARA) for a licence to carry out specified maritime usages in the maritime area the Maritime Area Planning Act (2021).

This application is seeking consent to undertake geotechnical investigation works within the proposed licence boundary to support a proposed 250m Offshore Renewable Energy (ORE) capable quay extension.

This AIMU includes the following:

- EIA Screening exercise to determine whether the proposed SI activities require an Environmental Impact Assessment Report;

- Environmental appraisal of the proposed activities including identification and description of the likely effects of the proposed SI activities on the environment and to proposed mitigation measures to deal with any negative effects (if required).

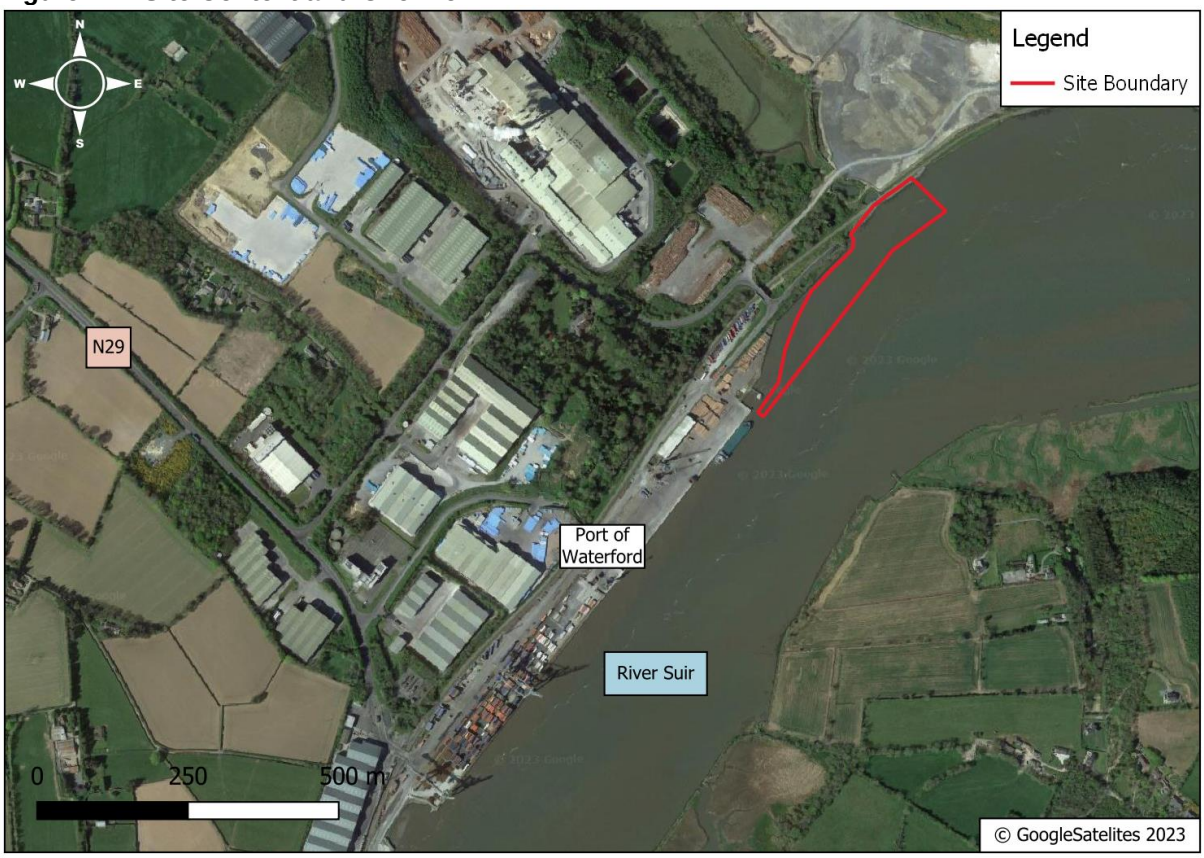
This application is also supported by the following documentation:

- Licence Application Form with mapping;
- Supporting Information: Screening for Appropriate Assessment (SISAA);
- Natura Impact Statement (NIS);
- Risk Assessment for Annex IV Species; and,
- Site Investigation Schedule of Works.

1.2 Site Context

The Site is located in an area adjacent to the shoreline within the River Suir in an area ca. 2.48 ha in size. This area is located within the area adjacent to the active Port of Waterford. The Site is access via Belview Port of Waterford, which is off the N29 national road.

Figure 1-2: Site Context and Overview



1.3 The Applicant

The Port of Waterford is a long established, busy commercial port. The Port of Waterford has been located within the Belview Port since the 1990's and offers facilities for bulk and breakbulk, liquid bulk and container cargoes.

The current commercial port comprises some 960m of marginal quays at Belview and 280m of layby quay at Waterford City centre, known as the Frank Cassin Wharf. The Frank Cassin Wharf is currently used for cruise vessels on an occasional basis. This wharf in conjunction

with the open and covered storage areas and warehouses within a 265ha area located at Belview have been designated as the Belview Port Zone.

Port of Waterford is a State-owned commercial company responsible for the management and development of the Port. The Port of Waterford is the fifth largest of the State commercial ports in terms of total tonnage handled and the facilities are considered an infrastructure asset of national importance. The Port provides significant employment to the local population.

The Port of Waterford is designated as a Port of National Significance (Tier 2) within the terms of the National Ports Policy [1].

Tier 2 ports:

a) are responsible for at least 2.5% of overall tonnage through Irish ports;

b) have the clear demonstrable potential to handle higher volumes of unitised traffic; and,

c) have the existing transport links to serve a wider, national marketplace beyond their immediate region.

The Port of Waterford is Ireland's closest multi-modal port to mainland Europe and enjoys excellent transport links with Ireland's major cities. The Southern Assembly Regional Spatial and Economic Strategy (RSES) supports the development of the Port of Waterford as a major international gateway and its achievement of Tier 1 status.

2 PROPOSED DEVELOPMENT DETAILS

2.1 Description of the Proposed Development

The Applicant intends to apply for a licence to carry out specified maritime usages in the maritime area for a geotechnical site investigation at the proposed ORE berth location at the Port of Waterford. The site investigation will consist of:

- Drilling ca. ten (10No.) boreholes ca. 200mm in diameter;
- Drilling ca. ten (10No.) coreholes ca. 200m in diameter; and,
- Associated sampling and testing.

The proposed borehole and corehole locations are illustrated Appendix A.

The equipment for excavating boreholes will be a cable percussive drilling rig such as a Dando 2000/3000. The borehole is advanced through a casing, 200mm in diameter, by using a cutting tool.

Coreholes will result in the recovery of a length of rock between two and four metres in length and 150mm to 200mm in diameter. The rock will undergo a suite of laboratory tests to determine strength, fractures and other geological information. The equipment used for extracting coreholes will include a GEO 205 drill rig or similar using triple tube core drilling techniques and air-mist coolant. The corehole is advanced using a diamond drill.

All equipment that will be used for the drilling work will be placed on a barge. All drilling works will be through the river into underlying soils and rock. Access to the Site will be from Belview Port.

Further details are provided in the preliminary method statement in Appendix B.

2.2 Drilling Noise Level

The noise generated from the proposed drilling is difficult to predict as it will be influenced by a variety of factors such as the nature of the riverbed, i.e., whether drilling will be sediment or bedrock.

Drilling is defined as a non-pulse sound type [2]. Drilling is generally acknowledged to produce moderate levels of continuous omnidirectional sound at low frequency (several tens of Hz to several thousand Hz and up to ca. 10 kHz) [2]. Drilling can produce underwater pressure levels generally within the 145-190 dB re 1µPa @ 1m [2].

2.3 Construction Procedures

During the proposed works potential environmental impacts will be short-term and localised. Nonetheless, all works will comply with the relevant legislation, construction industry guidelines and best practice in order to reduce potential environmental impacts associated with the works. Where remaining potential impacts have been identified, additional mitigation measures will be employed to reduce, as far as practicable potential impacts.

The following guidance will be referred to and will be followed during the proposed to prevent environmental pollution that may occur within the area:

- C532 – Control of Water Pollution from Construction, Guidance for Consultants and Contractors [3];
- C584 – Coastal and Marine Environmental Site Guide for Protection of Water Quality and in turn Aquatic Life, During the Construction Phase of the Works [4];
- C741 - Environmental Good Practice on Site (4th edition) [5];

- C774 – Coastal and Marine Environmental Site Guide (Second Edition) [6];
- Guidance for the Treatment of Otters Prior to the Construction of National Road Schemes [7]; and,
- All works will be undertaken in accordance with the Inland Fisheries Ireland (IFI) 'Requirements for the Protection of Fisheries Habitat during Construction and Development' [8].

It is anticipated that the works will take approximately three (3No.) weeks to complete. Works will take place from 08:00 to 17:00 Monday to Friday and 08:00 to 13:00 on Saturday. No works will take place on Sundays or at night-time.

2.4 Monitoring

An Ecological Clerk of Works (ECoW) / suitably qualified Marine Mammal Observer (MMO) will inspect the Site in advance of works commencing and will undertake Site inspections as required during the works to ensure that they are completed in accordance with the mitigation measures detailed within this AIMU, the Stage 2: Appropriate Assessment – Natura Impact Statement (NIS), the Annex IV Species Risk Assessment

The ECoW / MMO will also either deliver or provide the resident engineer with sufficient environmental information to deliver a Site induction to all personnel working onsite.

2.5 Need for the Development

The proposed geotechnical investigation is required to support the design of a proposed 250m Offshore Renewable Energy (ORE) capable quay extension.

The boreholes will provide the required information about the overburden soils essential to the design of the structural piling system, the fendering system and the construction of the revetment.

The coreholes will result in the recovery of a length of rock that will undergo a suite of laboratory tests to determine strength, fractures and other geological information which will allow the wharf substructure (i.e., the piles) to be designed.

2.6 Alternatives

In order to design the proposed 250 ORE capable quay extension, information on the soils and geological information is necessary. As per the requirements of the AIMU, an assessment of alternatives has been undertaken. The only alternative to these works would be a 'Do Nothing' scenario; however, this alternative is not viable due to the fact that this information is essential to designing a safe and functioning quay extension.

3 EUROPEAN DIRECTIVES

3.1 National Marine Planning Framework

Under the Maritime Spatial Planning Directive (2014/89/EU), all coastal EU Member States must prepare a maritime spatial plan, and in Ireland this plan is referred to as the National Marine Planning Framework (NMPF). The NMPF applies to the maritime area around Ireland and provides objectives, policies and visions for all marine-based activities and how these activities interact with one another.

Following a review of the NMPF, it can be confirmed that the proposed Site Investigations at are in compliance with the objectives set out in the NMPF, as the Site Investigations are a necessary element of the proposed ORE capable berth extension, which is aligned with the Objectives and Planning Polices as set out in Chapter 13; Energy- Offshore Renewable of the NMPF.

ORE Policy 7 and ORE Policy 10 are of particular relevance to the proposed Site Investigations and state the following:

ORE Policy 7

> *Where potential for ports to contribute to ORE is identified, plans and policies related to this port must encourage development in such a way as to facilitate ORE and related supply chain activity.*

ORE Policy 10

> *Opportunities for land-based, coastal infrastructure that is critical to and supports development of ORE should be prioritised in plans and policies, where possible.*

Referencing '*Interactions with Other Sectors'* the National Marine Planning Framework also states:

> …*Our ports will also play a crucial role in facilitating the necessary development of both offshore renewable generation and grid infrastructure, requiring investment to handle plant, equipment and cabling, and the associated shipping during the construction, operation and maintenance phases of future projects*.

3.2 Water Framework Directive

The Water Framework Directive (WFD) (2000/60/EC) establishes a framework for the protection, improvement and sustainable use of all water environments. According to the WFD, the purpose of the WFD is to:

> *'establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which;*
>
> *(a) prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems;*
>
> *(b) promotes sustainable water use based on a long-term protection of available water resources;*
>
> *(c) aims at enhanced protection and improvement of the aquatic environment, inter alia, through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and the cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances;*
>
> *(d) ensures the progressive reduction of pollution of groundwater and prevents its further pollution, and*

(e) contributes to mitigating the effects of floods and droughts.'

The WFD requires all EU Member States to achieve '*good*' water quality status in all surface and ground waterbodies by 2027.

To establish the current and future objectives of a waterbodies WFD status, each water body is incorporated into a river basin management plan (RBMP). The Draft River Basin Management Plan (DRBMP) 2022-2027 was published for Public Consultation on the 27th of September 2021 [9]. The DRBMP outline the status of the waterbodies and measures required for the waterbodies to achieve and maintain good status. The RBMP's are implemented and reviewed in six-year cycles, the DRBMP is the third cycle currently undergoing consultation.

According to the WFD, any new development should cause 'no deterioration' to the WFD status of a waterbody. The Site is located within the River Suir, which is located adjacent to the Suir Catchment [9, 10]. An assessment on water quality has been undertaken as part of this AIMU (see Section 6.2), and it can be concluded that the proposed works is not likely to cause a significant impact on the receiving waterbody or cause a deterioration in the WFD status of the receiving waterbody or jeopardise the waterbody from attaining '*Good'* status.

3.3 Marine Strategy Framework Directive

The Marine Strategy Framework Directive (MSFD) (2008/56/EC) was established to protect the marine ecosystem and biodiversity. The aims of the MSFD are to achieve 'good environmental status' (GES) for all marine waters in Europe and to provide an ecosystem-based approach to human activities that enables a sustainable use of marine resources.

The MSFD is implemented in 6-year cycles and Ireland is currently on the final stage of the second cycle and the public consultation of Ireland's MSFD – Marine Strategy Part 3: Programme of Measures was published on the 7th of March 2022 [11]. The MSFD outlines the status of the marine environment, including a description of GES, develops environmental targets and associated indications (Marine Strategy Part 1), develops monitoring programmes (Marine Strategy Part 2) and put in place a programme of measures (Marine Strategy Part 3).

The proposed works take into account the MSFD, as such all works will be undertaken in accordance with relevant legislation and best practice measures and mitigation measures will be implemented in order to ensure no adverse effects occur to the marine environment and that there is no deterioration of the environmental status of the marine environment.

3.4 Environmental Impact Assessment (EIA) Directive

An EIA screening assessment has been undertaken in accordance with Schedule 5 and Schedule 7 of the Planning and Development Regulations 2001 (as amended) and takes cognisance of Directive 2014/52/EU, as it is currently interpreted, utilising the following guidance:

- Environmental Protection Agency (EPA), Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EIAR) 2022 [12].

3.4.1 Methodology

3.4.1.1 Desk Based Studies

In undertaking this EIA Screening Assessment, a detailed desk-based study was completed that included a review of the following information:

- Relevant legislation and guidance; and,
- Relevant published information pertaining to the Site and surrounding area regarding all of the stipulated EIAR topics.

The first step in the assessment process was to examine whether the proposal is a project as understood by the Directive. Projects requiring environmental impact assessment are defined in Article 4, and set out in Annexes I and II, Schedule 5 of the Planning and Development Regulations, 2001 as amended. Section 5 of the Planning and Development Regulations 2001 (as amended) sets out the criteria for assessing whether a mandatory EIA is required for a development. It transposes Annex I and Annex II of the EU EIA directive (85/337/ECC as amended) into Irish law under Parts 1 and 2 of the Schedule.

3.4.1.2 Legislative and Regulatory Context

EIA screening requirements derive from the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU). The amended EIA Directive came into force on 16th May 2017 and regulations transposing it into national legislation were signed into law on 19th July 2018 as the Planning and Development (Amendment) Act 2018 [13]. There are no changes to the prescribed project types or EIA thresholds under the amended EIA Directive 2014/52/EU. The project types and thresholds set out in the 2001-2010 Regulations remain in effect.

In order to determine whether it is required to undertake an EIA for the proposed works, the following legislation was consulted:

- The Planning and Development Regulations, 2001 (as amended) [14];
- EU Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment ('2014 EIA Directive') [15]; and,
- The Foreshore Act 1993 (as amended) [16].

In addition, the following guidance documents were reviewed:

- Interpretation of Definitions of project Categories of Annex I and II of the EIA Directive [17];
- European Commission (June 2017), Environmental Impact Assessment of Projects. Guidance on Screening [18];
- Department of the Environment, Heritage and Local Government (DEHLG), Environmental Impact Assessment (EIA) Guidelines for Consent Authorities regarding Sub-threshold Development [19];
- Environmental Protection Agency (EPA), Guidelines on the Information to be contained in Environmental Impact Assessment Reports Draft [20];
- Department of Housing, Planning, Community and Local Government (DHPCLG), Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive) - Circular 1/2017', 15th May 2017 [21]; and,
- Department of Housing, Planning and Local Government (DHPLG) Transposing Regulations (S.I. No. 296 of 2018) Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment [22].

3.4.2 EIA Screening

The requirement for EIA Screening under the EIA Directive 2011/92/EC, as amended, the Foreshore Acts and the Planning and Development Regulations 2001, as amended, is discussed below.

Article 2(a)(1) of the EIA Directive provides as follows:

> *'Member States shall adopt all measures necessary to ensure that, before development consent is given, projects likely to have significant effects on the*

environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment regarding their effects on the environment. Those projects are defined in Article 4.'

Article 4 provides as follows:

'1. Subject to Article 2(4), projects listed in Annex I shall be made subject to an assessment in accordance with Articles 5 to 10.

2. Subject to Article 2(4), for projects listed in Annex II, Member States shall determine whether the project shall be made subject to an assessment in accordance with Articles 5 to 10. Member States shall make that determination through:

(a) a case-by-case examination; or

(b) thresholds or criteria set by the Member State.

Member States may decide to apply both procedures referred to in points (a) and (b).'

In summary, statutory EIA, and screening for EIA, are required only in relation to:

- Project types defined in Article 4 and listed in Annex I or Annex II of Council Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as revised by Directive 2014/52/EU (EIA Directive); and / or
- The corresponding classes of project which are transposed by the Foreshore Acts 1933, as amended, and listed in Schedule 5, Parts 1 and 2 of the Planning and Development Regulations 2001, as amended (Planning Regulations).

3.4.2.1 Assessment under Schedule 5 (Mandatory EIA)

Part 1 of Schedule 5 of the Planning and Development Regulations 2001, as amended (Planning Regulations) lists the project types for which EIA is mandatory, transposing Annex I of the EIA Directive. Part 2 lists project types for which EIA is mandatory if a specified threshold is exceeded. For all other project types listed in Part 2, corresponding to Annex II, which do not exceed a threshold or for which no threshold is set, a screening analysis and determination are required.

The proposed works do not fall under the project types listed under Part 1 of Schedule 5. Accordingly, mandatory EIA, as classified under Annex I, is not required.

The proposed site investigation activities considered in this document, comprising a geotechnical investigation, do not constitute a project or development as listed in Part 1 or Part 2 of Schedule 5 of the Planning Regulations.

Furthermore, a separate Annex IV species Risk Assessment report, which addresses the Article 12 obligations of the European Community Habitats Directive 92/43/EEC, transposed into Irish law in Regulation 29 (1)(e)(i) of the European Communities (Birds and Natural Habitats) Regulations 2011.

Information is submitted to assist MARA in determining whether the proposed works (the subject of this licence application), either individually or in combination with other activities, plans or projects, will have an adverse effect on the conservation status of animal species listed in Annex IV(a) to the Habitats Directive in their natural range.

3.4.2.2 Assessment under Section 7 (Significance)

Section 7 of the Planning and Development Regulations 2001 (as amended, 2015) sets out the criteria for assessing whether a project will have 'likely' and 'significant' effects on the environment. These criteria include the following:

1) 'Characteristics of Proposed Development;'

2) 'Location of Proposed Development;' and,
3) 'Characteristics of potential impacts.'

These criteria were considered for the proposed works under the topics recommended in EIA guidance documents. A summary of this assessment is set out in Table 3-1.

Although Section 7 is not directly applicable to this proposed works, it has been utilised in order to comprehensively perform this assessment.

Table 3-1: EIA Screening Assessment

Topic	Likely & Significant Effects	Comment
Population and Human Health	None	The proposed works do not have the potential to lead to any significant disturbance or impact to the general population given the short-term and localised natures of the works. Furthermore, no environmental pathways have been identified by which the proposed works could lead to impacts on human health. All relevant Health and Safety regulations will be adhered to, ensuring the health and safety of staff working on the project and the general public are not adversely affected.
Biodiversity / Flora & Fauna	None	An ecological assessment has been undertaken, as presented in Section 5.1. The assessment concluded that the will not result in any significant impact on any protected or notable species and that it is considered that an overall positive impact will occur. A Natura Impact Statement (NIS) and Annex IV Species Risk Assessment have been completed for the proposed works and should be read in conjunction with this report.
Soils & Geology	None	The proposed works will occur within the River Suir. Therefore, there will be no significant effects on soils and geology at, or in the general area of, the Site.
Water	None	An assessment on this topic has been undertaken, as presented in Section 5.2. The proposed works will involve ca. ten (10No.) corehole and ca. ten (10No.) boreholes being drilled within the River Suir. The assessment concluded that the proposed works are not expected to result in any adverse impacts to the hydrological or hydrogeological regime of the receiving environment following the implementation of appropriate mitigation measures.
Noise and Vibration	None	An assessment on this topic has been undertaken, as presented in Section 5.2. The proposed works will not result in any significant ambient noise impacts. The works will not be significantly above background levels. Furthermore, the works will be short-term and localised. Therefore, no ambient noise impacts are anticipated. Underwater noise has been assessed relative to impacts on marine mammals and fish. No significant vibration as a result of the proposed works are anticipated.
Air Quality	None	An assessment on this topic has been undertaken, as presented in Section 5.3. No significant emissions to air will occur due to the proposed works.

Topic	Likely & Significant Effects	Comment
Climate	None	An assessment on this topic has been undertaken, as presented in Section 5.3. The proposed works will require the use of a vessel. It is considered that the fuel used for a single vessel during the proposed works will not have the potential to impact climate change trends.
Cultural Heritage (Underwater Archaeology)	None	An archaeological assessment has been undertaken, as presented in Section 5.5 This assessment concluded that the proposed works will not result in any significant impact on any protected monuments or features in the wider area.
Navigation	None	An assessment on this topic has been undertaken, as presented in Section 5.5. The Site is not located within the navigational channel, therefore, there will be no impacts to navigation. However, the Harbour Master for the Port of Waterford will be informed of the works, and risk assessments and method statements for the works will be approved by the Harbour Master prior to the commencement of works.
Material Assets – Waste	None	The proposed works will involve ca. ten (10No.) corehole and ca. ten (10No.) boreholes. It is not anticipated that there will be any significant waste generated as a result of the proposed works. Should any waste be produced, it is expected that this will be minimal. Any waste generated will be collected, accommodated and segregated at the Port before being removed off-site and recycled or disposed of at a suitably licensed waste or treatment facility.
Landscape & Visual	None	The proposed works will be short-term and localised. The works will involve underwater drilling, sampling and testing within the River Suir from a survey vessel. Therefore, there will be no impacts on landscape and visual amenity.

3.4.3 EIA Screening Conclusions

Based on the findings of this EIA screening assessment it was concluded that the proposed works will not result in any likely and significant effects on the environment, therefore, an EIAR is not warranted.

3.5 Scope of this Report

Based on the above assessment, the following topics have been screened in for further consideration in this ER:

- Biodiversity (Flora and Fauna);
- Water Quality;
- Air, Climate, Noise and Vibration;
- Cultural Heritage; and,
- Navigation.

4 PLANNING AND DEVELOPMENT

4.1 National Policy Context

4.1.1 The National Planning Framework - Project Ireland 2040 (Ireland 2018)

The National Planning Framework (NPF) is a high-level strategic plan to shape the future growth and development of the country to 2040. It is focused on delivering 10 National Strategic Outcomes (NSOs).

NSO 6 focuses on the *'High-Quality International Connectivity'* and recognises the long-term international trend in ports and shipping towards increased consolidation of resources in order to achieve optimum efficiencies of scale, which has knock-on effects in terms of vessel size, the depths of water required at ports and the type and scale of port hinterland transport connections.

In addition, NSO 8 focuses on the '*Transition to a Low Carbon and Climate Resilient Society'* and recognises the need to harness both on-shore and off-shore potential from energy sources including solar and deliver 40% of our electricity needs from renewable sources.

Furthermore, National Policy Objectives 40 and 42 state:

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.*

National Policy Objective 42

> *To support, within the context of the Offshore Renewable Energy Development Plan (OREDP) and its successors, the progressive development of Ireland's offshore renewable energy potential, including domestic and international grid connectivity enhancements.*

The Proposed Development is necessary to support the future development of the Port of Waterford and to design a 250m ORE capable berth.

4.1.2 Draft Planning and Development Bill 2022

The Draft Planning Bill was published in January 2023 [23]. The Bill places increased emphasis on a plan-led system based on an integrated hierarchy of plan-making consisting of a National Planning Framework, regional spatial and economic strategies and council development plans, thereby providing a decision-making framework fit for purpose to deliver on key infrastructure, including port installations and renewable energy projects.

4.1.3 Climate Action Plan 2023

In 2023, the Government of Ireland released the Climate Action Plan 2023- Changing Ireland for the Better, a plan which sets out a major programme of change. It outlines the current state of play across key sectors including Electricity, Industry, Built Environment, Transport, Agriculture, Forestry and the Marine Environment, and charts a course to achieve an ambitious net zero emissions target by 2050 [24]. The plan commits to evaluate in detail the changes required to adopt such a goal in Ireland.

Decarbonising electricity is at the centre of the Climate Action Plan strategy as this will also aid in the decarbonisation of other sectors such as transport, heating and industry. The share of electricity from renewable energy increased from 7.2% to 36.4% between 2005 and 2021 [24]. Demand for electricity is forecast to increase by between 19% and 50% above existing

capacity in the next decade in line with economic forecasts. Ensuring we build renewable, rather than fossil fuel generation capacity to help meet this demand is essential. It makes economic sense and also facilitates decarbonising our heating and transport through electrification. It is planned to increase the proportion of renewable electricity to up to 80% by 2030, and a target of 5 GW from offshore wind by 2030 [24].

The renewables sector is very dynamic in nature, with technologies still rapidly evolving. Ensuring increased levels of renewable generation will require substantial new infrastructure, including wind and solar farms, grid reinforcement, storage developments, and interconnection:

> *'Increasing the share of electricity demand generated from renewable sources to up to 80% where achievable and cost effective, without compromising security of electricity supply'*

In order to reach the goals, set out by the Government of Ireland for offshore wind, supporting infrastructure will be required during the construction, operational and maintenance phases for offshore windfarms. Therefore, given the fact Proposed Development is necessary to support the future development of the Port of Waterford and to design a 250m ORE capable berth, the Proposed Development will be in line with the Climate Action Plan.

4.2 Regional Policy Context

4.2.1 Regional Spatial and Economic Strategy for the Southern Region (2020)

The Regional Spatial and Economic Strategy for the Southern Region (RSES) [25] recognises the need to transition to a low carbon economy and society through decarbonisation, resource efficiency and climate resilience. The RSES also highlights the need for co-ordinated spatial planning between the counties within the southern region of Ireland. This strategy came into effect on 31st January 2020.

Objective RPO 87

> *Low Carbon Energy Future*
>
> *The RSES is committed to the implementation of the Government's policy under Ireland's Transition to a Low Carbon Energy Future 2015-30 and Climate Action Plan 2019. It is an objective to increase the use of renewable energy sources across the key sectors of electricity supply, heating, transport and agriculture.*

Objective RPO 95

> *Sustainable Renewable Energy Generation*
>
> *It is an objective to support implementation of the National Renewable Energy Action Plan (NREAP), and the Offshore Renewable Energy Plan and the implementation of mitigation measures outlined in their respective SEA and AA and leverage the Region as a leader and innovator in sustainable renewable energy generation.*

4.3 Local Context

4.3.1 Kilkenny City and County Development Plan 2021-2027

The Kilkenny City and County Development Plan (KCCDP) 2021-2027 [26] discusses Belview Port and its role as one of 5 ports of national significance within the terms of National Ports Policy 2013 and its classification as a comprehensive port on the EU's Ten-T network.

The KCCDP states that '*The Council will support the development of the necessary port infrastructure and associated road and rail connectivity required for the development of the Port, to enhance the role of the Port as an Economic Driver for the South-East subject to the outcome of appropriate appraisal, environmental assessments and the planning process.*' In

addition, the KCCDP states that '*The Council will support the Port of Waterford in the development of port facilities at Belview as outlined in its strategic masterplan* [Port of Waterford Masterplan 2020-2044].'

5 METHODOLOGY

The assessment of effects has been undertaken in accordance with best practice, legislation and guidance notes. This approach and methodology has been adopted throughout the AIMU Report, unless otherwise stated. Any differentiation has been outlined clearly in each specific chapter where relevant.

5.1 Assessment of the Effects – Evaluation Criteria

The evaluation of significance considers the magnitude of the change and the sensitivity of the resource or receptor. The criteria for determining the significance of impacts and the effects are set out in Figure 4-1 and Table 4-1 below, taken from EPA Guidance, *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* [12]. Definitions of impact, as outlined by the EPA, are included below and unless otherwise stated within the specific ER Chapter these definitions apply throughout this ER.

Figure 5-1: Determining Significance of Potential Effects

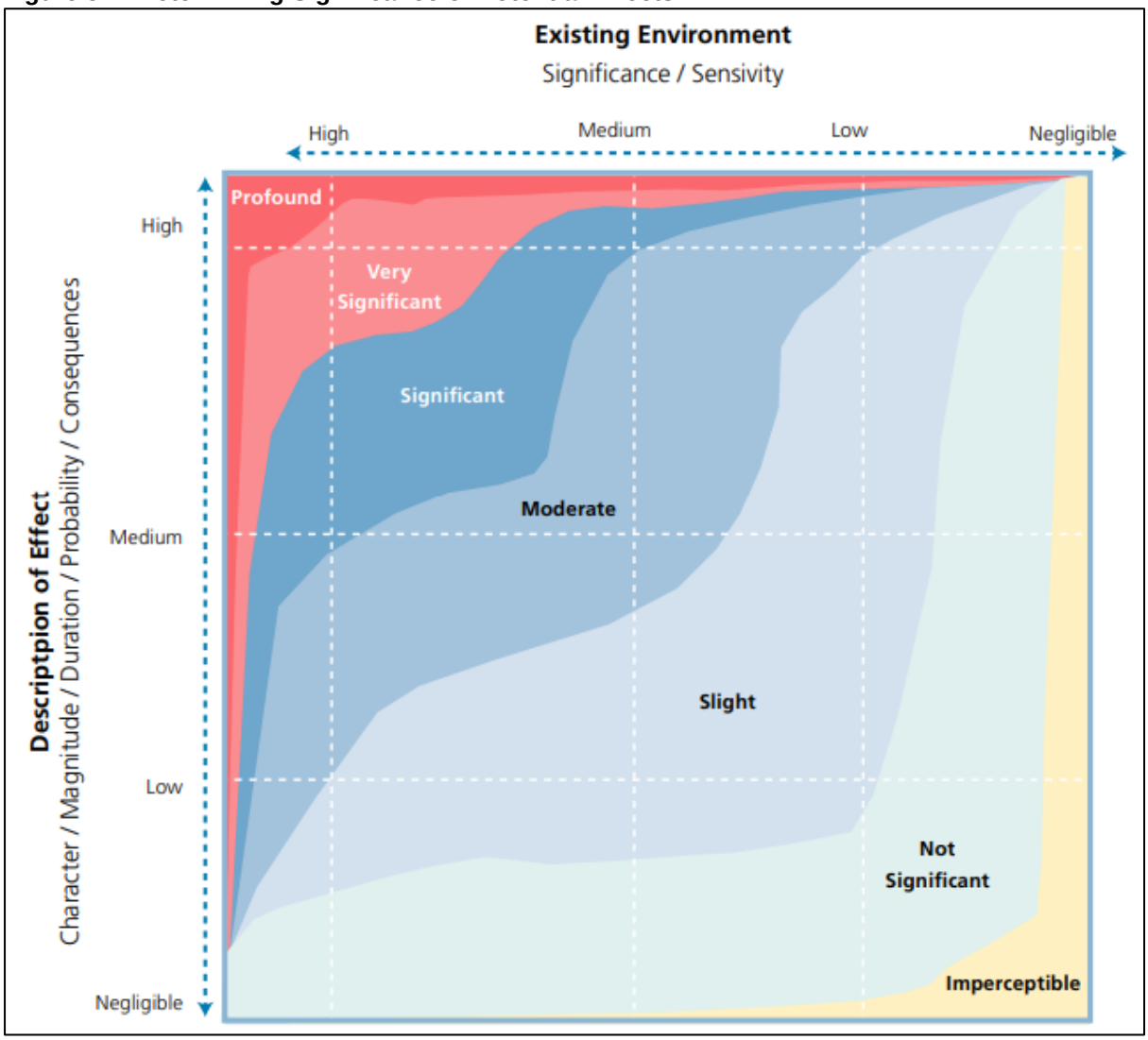


Table 4-1 defines the quality of effects from positive to negative on the environment.

Table 5-1: Quality of Effects

Type of Effect	Quality of Effect
Positive Effects	*A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities)*
Neutral Effects	*No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.*
Negative / Adverse Effects	*A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).*

Table 4-2 outlines the definitions for significance of effect, which range from imperceptible to profound.

Table 5-2: Describing the Significance of Effects

Classification	Criteria
Imperceptible	*An effect capable of measurement but without significant consequences.*
Not Significant	*An effect which causes noticeable 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 Effects	*An effect which obliterates sensitive characteristics.*

Table 4-3 describes the terminology used to discuss the extent and context of effect of a proposed works on the environment.

Table 5-3: Describing the Extent and Context of Effects

Magnitude	Description
Extent	*Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.*
Context	*Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?).*

Table 4-4 shows how likely an impact is to occur.

Table 5-4: Describing Probability of Effect

Magnitude	Description
Likely Effects	*The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.*

Magnitude	Description
Unlikely Effects	*The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.*

Table 4-5 discusses the duration and frequency of effects. Momentary effects lasting from seconds to minutes will often be less concerning than a long-term and permanent effects, depending on their severity.

Table 5-5: Duration and Frequency of Effect

Magnitude	Description
Momentary Effects	*Effects lasting from seconds to minutes.*
Brief Effects	*Effects lasting less than a day.*
Temporary Effects	*Effects lasting less than a year.*
Short-term Effects	*Effects lasting one to seven years.*
Medium-term Effects	*Effects lasting seven to fifteen years.*
Long-term Effects	*Effects lasting fifteen to sixty years.*
Permanent Effects	*Effects lasting over sixty years.*
Reversible Effects	*Effects that can be undone, for example through remediation or restoration.*
Frequency of Effects	*Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).*

Table 4-6 defines the types of effects that can potentially occur as a result of a proposed works.

Table 5-6: Describing Types of Effects

Magnitude	Description
Indirect Effects (a.k.a. Secondary Effects)	*Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.*
Cumulative Effects	*The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.*
'Do Nothing Effects'	*The environment as it would be in the future should the subject project not be carried out.*
`Worst case' Effects	*The effects arising from a project in the case where mitigation measures substantially fail.*
Indeterminable Effects	*When the full consequences of a change in the environment cannot be described.*
Irreversible Effects	*When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.*
Residual Effects	*The degree of environmental change that will occur after the proposed mitigation measures have taken effect.*

Magnitude	Description
Synergistic Effects	*Where the resultant effect is of greater significance than the sum of its constituents (e.g., combination of SOx and NOx to produce smog).*

The above terminology will be used throughout this report unless superseded by an environmental topic best practice in assessing ER. Where specialist topics defer from these terms, a topic specific methodology will be provided for within the relevant chapter.

5.2 Assessment of Cumulative Impacts

Cumulative impacts refer to impacts that result from incremental changes caused by other past, present, and approved developments, and as far as practicable from reasonably foreseeable development(s), together with the proposed works.

5.3 Zone of Influence (ZoI)

The Zone of Influence for the proposed works has been described in detail within the Stage 1: Appropriate Assessment (AA) & the & Stage 2: Natura Impact Statement (NIS) submitted in support of this application. The Zone of Influence comprises of the area which may be potentially affected by the proposed works.

A summary of the ZoI as outlined in the NIS has been included and expanded upon to include further information on the receiving environment that have potential to be affected outside of European Designated sites using a source-pathway-receptor model.

Table 4-7 describes the potential sources of impact on the receiving environment which were identified using this model.

Table 5-7: Source-Pathway-Receptor Matrix

Source	Pathway	Receptor
Survey Vessel – physical disturbance, pollution	Water and sediment	Benthic habitats & associated species, fish, marine mammals, avifauna
Borehole / Corehole – sediment disturbance and underwater noise	Water and sediment	Benthic habitats & associated species, fish, marine mammals, avifauna

The ZOI for the proposed works is considered to be relatively localised in its potential to impact benthic habtiats due to the small scale and localised nature of the works. It is considered that given the estuarine nature of the River Suir; any sediment generated during the drilling works will be quickly dissipated outside of the harbour area where current velocities increase significantly.

6 IMPACT ASSESSMENT

6.1 Biodiversity (Flora and Fauna)

This section of the ER has been prepared by the MOR team to establish the baseline ecological status of the Site and its immediate surroundings and to assess the potential impacts of the proposed works.

In addition to the ER, an AA, NIS and Annex IV Species Risk Assessment have been prepared and will be submitted as part of this application, these reports should be read in conjunction with the ER.

6.1.1 Intertidal and Benthic Communities

6.1.1.1 Baseline

The benthic habitat surrounding the Port of Waterford has been heavily modified by ongoing port related activities.

The benthic sediments within the Port of Waterford area are known from previous surveys undertaken by Aquafact and are described as muddy sands and is classified as belonging to the JNCC habitat SS.SMU.SMuVS.CapTubi *Capitella capitata* and *Tubificoides spp.* in reduced salinity infralittoral muddy sediment (EUNIS Code: A5.325) [27]. Furthermore, according to Infomar Data, the benthic habitat within the Site boundary is described as '*coarse sediment,*' and the area within the immediate vicinity of the Site boundary is described as '*coarse sediment'* and '*sands*' [28].

6.1.1.2 Impact Assessment

The benthic habitat present within the Site boundary will be disturbed during the proposed works. However, it should be noted that the boreholes and coreholes will only be ca. 200mm in diameter.

However, this disturbance will be temporary, and no permanent effects are anticipated. Furthermore, no rare, sensitive or unusual species or biotopes have been recorded for this area. Additionally, sediment transport will be temporary and siltation rates due to works will be highly localised and temporary.

6.1.1.3 Mitigation Measures

No mitigation measures are required for intertidal and benthic communities.

6.1.2 Avifauna

6.1.2.1 Baseline

Although the Site is not located within an SPA, bird species are considered likely to utilise the area within close proximity to the Site. Therefore, a data request was submitted to the Irish Wetland Bird Survey (I-WeBS), which is coordinated by BirdWatch Ireland and under contract to the National Parks and Wildlife Service (NPWS). The data request was for all available data from the I-WeBS sites within close proximity to the proposed works. This included a number of subsites within the River Suir Lower site and the Waterford Harbour site:

- Belview – Little Island – Faithlegg subsite (subsite code: 0M390);
- Barrow Bridge - Passage East subsite (subsite code: 0M496); and,
- Barrow Bridge - Creadan Strand subsite (subsite code: 0M498).

The records were reviewed in order to gain an understanding into the potential assemblage of bird populations that may utilise the areas within and within the vicinity of the proposed works.

The data received from BirdWatch Ireland covers a period from 2012/2013 winter season to 2021/2022 winter season. A total of thirty-five (35No.) species have been recorded during the 10-year period. However, during the 2020/2021 winter season, a total of fourteen (14No.) species were recorded, which included bean goose, black-headed gull, common gull, cormorant, curlew, greenshank, grey heron, greylag goose, little egret, mallard, mute swan, pink-footed goose, teal and whooper swan.

None of the species recorded in the last 10-years were recorded in numbers that would be considered of international importance. However, several species were recorded in numbers that would be considered to be of national importance, including:

- Bar-tailed godwit were recorded at numbers of national importance during the 2013/2014 season in the Waterford Harbour at Passage East - Creadan Head;
- Great crested grebe were recorded at numbers of national importance during the 2013/2014 season in the Waterford Harbour at Passage East - Creadan Head;
- Greylag geese were recorded at numbers of national importance during the 2013/2014 & 2014/2015 seasons in the River Suir at Coolfinn, Derrigal – Portnascully, Fiddown - Tibberaghny; and,
- Teal were recorded at numbers of national importance during the 2013/2014 & 2014/2015 seasons in the River Suir at Fiddown – Tibberaghny.

These bird species were recorded ca. 22km upstream of the Site over five (5No.) years ago. Therefore, these populations of bird species are not located within close proximity to the Site. Furthermore, it should be noted that none of these species identified are considered to exclusively occur within this area.

6.1.2.2 Impact Assessment

Although several bird species utilise the habitat within the Site and the wider area, the proposed works will occur within the river and within close proximity to the existing Port. It is considered that any bird species utilising this area are subject to regular human activities, such as shipping and other port related activities, and are therefore habituated to anthropogenic disturbances. Furthermore, the works will only be short-term temporary works (ca. three (3No.) weeks) and no permanent effects are anticipated.

In addition, birds are highly mobile and therefore will move away from disturbances. Given the availability of suitable habitats within the wider area it can be concluded that should any birds be temporarily disrupted during the works, they will move to a suitable area elsewhere.

6.1.2.3 Mitigation Measures

No mitigation measures are required for avifauna species.

6.1.3 Marine Mammals

An Annex IV Species Risk Assessment has been prepared as part of this application. This report fully assesses potentially impacts to the Annex IV species that occur in Ireland [29] that were identified as relevant to this risk assessment including:

- Otter;
- All Irish bat species;
- All Irish cetaceans (whales, dolphins and porpoise); and,
- All marine turtles.

Other legally protected non-Annex IV species, such as include pinnipeds (seals) and basking sharks, were included in the risk assessment to ensure no adverse effects occur to any protected species.

6.1.3.1 Baseline Environment

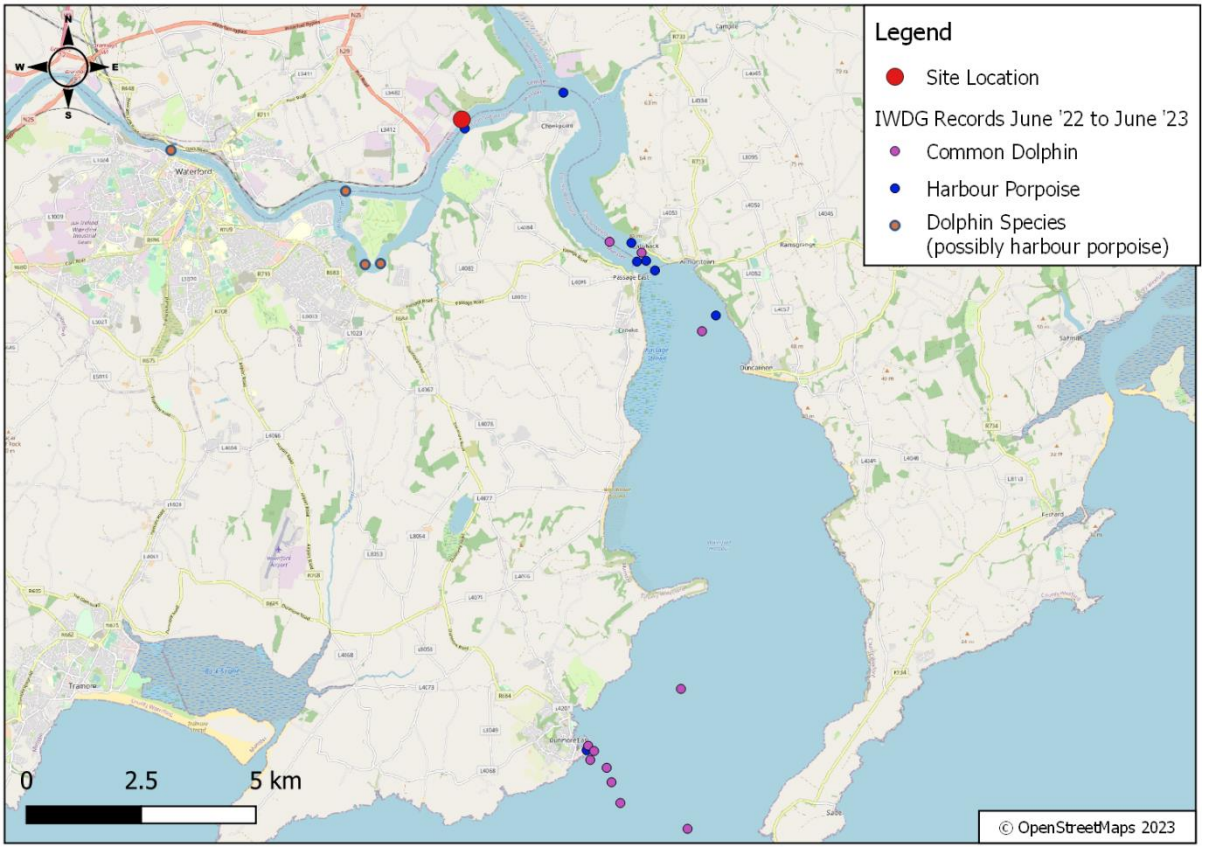
The risk assessment describes the follow species as being recorded with the Port of Waterford area and wider waters:

Cetaceans

At the time of writing this report, the most up to date records available from the Irish Whale and Dolphin Group (IWDG) sighting portal shows two (2No.) cetacean species, common dolphin (*Delphinus delphis)* and harbour porpoise (*Phocoena phocoena),* recorded within the Waterford Estuary between June 2022 and June 2023 [30].

In total nineteen (19No.) sightings were reported within the Waterford Estuary during this period, as shown in Figure 5-2. Additionally, there were four (4No.) sightings that were not identified to species level and record as '*dolphin species (possibly harbour porpoise)'.*

Figure 6-1: Cetacean records in the Waterford Estuary (June 2022 – June 2023)



Otter

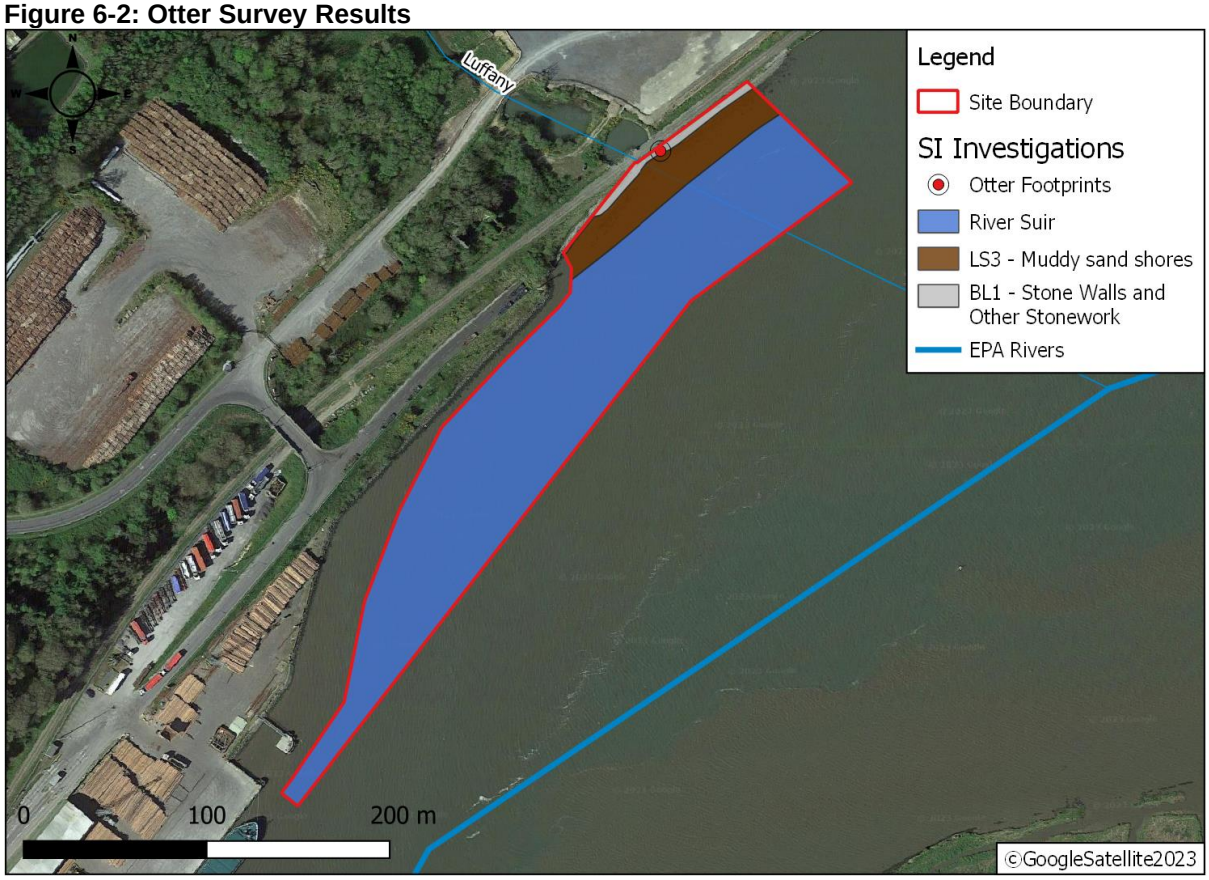
The NBDC holds a number of records for otters within 2km of the Site [31]. Furthermore, a targeted otter survey was undertaken on the 19th of April 2023 by two (2No.) MOR ecologists at low tide when the mudflats were fully exposed and accessible.

A majority of the Site is consistently covered by water; however, areas of mudflats and stonewalls / rock located within the northern section of the Site. The survey identified otter footprints in the mudflat leading towards the Luffany Stream (see Figure 5-3). No holt or couches were noted as part of the completed survey and given the lack of suitable habitat for

holting / couching; the Site was considered unsuitable for these purposes. Furthermore, the River Suir offers suitable prey species for foraging otter.

It should be noted that otter are currently utilising areas of the River Suir within close proximity to the active Belview Port. Therefore, it can be concluded that these otters are habituated to anthropogenic activities. Overall, it is concluded that the Site is not suitable for holting / couching otter but does provide commuting and foraging habitat for this species.

Figure 6-2: Otter Survey Results



Marine Turtles

The NBDC holds historical information on leatherback sighting around the Irish coast, these records show the nearest sighting of a leatherback was over 8km southwest of the Site in 1984 [31]. The most recent sighting of a leatherback turtle in the vicinity of the Waterford Estuary was located off the east coast of Hook Head, Co. Wexford, ca.17km southwest, on 11th August 2012.

Loggerhead turtles have also been recorded in low abundances along the southeast coast of Ireland, the most recent recording of a loggerhead turtle in the southeast of Ireland was recorded on 20th December 2015 east of the Saltee Islands, Co. Wexford [31].

There have been no sightings of marine turtles within the vicinity of the Site. Additionally, no marine turtles have been recorded by the IWDG in the past 12 months in the southeast of Ireland [30].However, two (2No.) records of leatherback turtles were recorded in County Clare and County Cork on the 24th of September and 17th September 2022, respectively [30].

Bats

The NBDC provide a habitat suitability index for the nine (9No.) resident bat species within Ireland [31]. The habitat suitability index identifies the geographical areas that are suitable for individual species and ranges from 0 to 100, with 100 being the most favourable to bats. The

Site itself is located within the River Suir and as such, according to the NBDC, there are no habitat suitability indices provided for this area [31]. The habitat suitability index for the area located north of the Site is considered to be high (Score: 36.44 – 58.56) [31]. Overall, it is considered that given the fact that the Site is located within the River Suir, there are no onsite habitats or suitable features for roosting bats. Furthermore, following a review of the NBDC there were no records held for any bat species within 2km of the Site within the last ten (10No.) years (Grid Codes: S61L, S61M, S61R and S61X) [31].

Some bats are known to forage over waterways, such as Daubenton's bat; however, these bats tend to require slow moving waters as they forage for insects a few centimetres above the surface of the water. It should be noted that this section of the River Suir is ca. 330m in width and is subject to tidal water movements and has a high flow of water. It is not considered that this section of the river would have slow-moving or still waters that would be suitable for foraging bats.

Pinnipeds

The NBDC holds records of grey seal ca. 1km downstream of the Site, while the nearest NBDC record of harbour seal is off the east coast of Hook Head [31]. Harbour seal and grey seal are both known to have colonies located around the southeast coast of Ireland including in the Slaney River Valley SAC and the Saltee Islands SAC [32].

Given the mobile nature of this species, it is considered possible that these species could utilise the areas within the vicinity of the Site to forage and / or commute upstream and downstream.

Basking Shark

This species is known to be in high abundances during the summer months feeding on plankton off the coast of Ireland. There are records on the IWDG sighting portal of basking sharks within the vicinity of the Waterford Estuary in March and April in 2022, >21km downstream of the Site, however, there were no records of this species travelling up the estuary [30].

Basking sharks are known to occur in areas of open ocean and along coastal areas; however, only in occasional instances do basking sharks enter brackish waters similar to those within the vicinity of the Site. Therefore, given the location of the Site and the lack of records of basking sharks using the upper stretches of the Waterford Estuary, it is considered unlikely that basking sharks occur within the vicinity of the Site due the lack of suitable area for the filter feeding of plankton.

6.1.3.2 Impact Assessment

The Risk Assessment concluded that although sightings of cetaceans are rare within the Port of Waterford waters, dolphins and harbour porpoise have occasionally been reported and do occur more regularly further down the Waterford Estuary. Additionally grey seal have been recorded within 1km of the Site, and otter are known to regularly utilise the mudflats and waters within the Port of Waterford and the adjacent areas

Therefore, these species have the potential to be disturbed during the proposed works from noise impacts (ambient and underwater).

Therefore, as discussed in the Risk Assessment, mitigation measures will be implemented during the works in order ot ensure no impacts occur to marine mammal species.

6.1.3.3 Mitigation Measures

The mitigation measures that have been recommended during the proposed works include the following.

Cetaceans & Pinnipeds

In line with recommendations made for drilling in the '*Guidance to Manage the Risk to Marine Mammal from Man-made Sound Sources in Irish Waters'* [2]*,* a suitably qualified marine mammal observer (MMO) shall be appointed to monitor for marine mammals and otter and will log all relevant events using standardised data forms prepared by the DAHG.

Prior to the commencement of any works and any equipment starting, a pre-start monitoring procedure will be undertaken. Given the depth of water within the vicinity of the Site is less than 200m in depth, the pre-start monitoring will initiate at least 30 minutes prior to the start time. A monitoring zone will be employed of 500m in radial distance from the sound source. Should otter or marine mammals be identified within the monitoring zone, works will be delayed until these species have not been sighted for 30 minutes within the monitoring zone. The MMO will use a range finder to determine the distance of marine mammals from the sound source. Following the pre-start monitoring, works will commence.

Where visual observations are not possible due to sea state or weather conditions, a Passive Acoustic Monitoring (PAM) system and experienced operator will be employed to undertake the pre-start monitoring.

As per the guidelines, once the drilling works have fully commenced, there is not requirement to halt the procedure if weather conditions deteriorate or due to a lack of daylight or if otter / marine mammals enter the monitoring zone. However, should drilling operations pause for a period of 30 minutes or more than a full pre-start monitoring procedure will be required prior to drilling activity.

Otter

In addition to the MMO monitoring, the following mitigation measures will be put in place in order to ensure that there are no adverse effects to otter due to noise emission. These measures include:

- In advance of the works commencing, a pre-commencement otter survey will take place along the shoreline to ensure no otter holts are located within 150m;
- In advance of works, all Site personnel will receive a Site induction or toolbox talk which will include reference to measures detailed in the CEMP;
- Activities onsite to occur only during permitted hours;
- All plant where possible shall be low noise rated;
- Onsite policy for all plant and equipment, including Site delivery vehicles, to power off rather than to be left with idling engines;
- All plant will be in a fit condition for use, to prevent the addition of noise from maintenance issues;
- Management of deliveries and vehicles to minimise vehicles idling onsite;
- Careful selection of quiet plant and machinery to undertake the required work, where available; and,
- Handling of all materials will take place in a manner which minimises noise emissions;

The proposed works are anticipated to take three (3No.) weeks, which could be considered a disturbance to the foraging area of otter within the vicinity of the Site. However, it should be noted that the works will be limited to the proposed working hours 08:00 and 17:00 hours Monday to Friday inclusive, 08:00 and 13:00 hours on Saturdays, and as such no works will be carried out at night, thereby limiting the noise effects on crepuscular species, such as otter. Furthermore, there will be downtime between the drilling of individual boreholes, coreholes

and dynamic probes which will also provide an opportunity for otter to pass the Site, and the proposed works will not result in any physical impediment / barrier to passage through the estuary for any otters moving to suitable habitat within the wider area.

Therefore, subject to compliance with the above measures, it can be concluded that the proposed works will not result in any adverse effects on or significant disturbance of otter due to noise emissions.

Marine Turtles

No mitigation measures are required for marine turtles.

Basking Shark

No mitigation measures are required for basking shark.

6.1.4 Fish and Shellfish

6.1.4.1 Baseline Environment

Finfish and Annex II Fish Species

The Site is located within the Lower Suir Estuary, which makes up part of the Lower River Suir SAC. This SAC is designated for several fish species:

- Sea lamprey (*Petromyzon marinus*);
- Brook lamprey (*Lampetra planeri*);
- River lamprey (*Lampetra fluviatilis*);
- Twaite shad (*Alosa fallax fallax*); and,
- Atlantic salmon (*Salmo salar*).

All of these fish species, with the exception of brook lamprey, migrate to the sea for part of their life cycle. There is little known about these species' exact migration routes, however, given the fact that this project is located within the River Suir, it is reasonable to assume that the migration of these species is likely located within close proximity to the Site.

Furthermore, studies undertaken the Barrow-Nore-Suir transitional waters in 2019 by the Inland Fisheries Ireland (IFI) recorded forty-five (45No.) fish species including: ballan wrasse, brill, brown trout, butterfish, cod, common goby, dab, dace, European eel, European seabass, fifteen-spined stickleback, fivebeard rockling, flounder, hake, herring, lesser spotted dogfish, lesser weever, long-spined sea scorpion, mackerel, minnow, Nilsson's pipefish, painted ray, plaice, pogge, pollack, pouting, river lamprey, red mullet, roach, rock goby, salmon, sand goby, sand smelt, scad, sea trout, smelt, smooth-hound, sole, sprat, thick-lipped grey mullet, thin-lipped grey mullet, three spined stickleback, tub gurnard, Twaite shad and whiting [33].

Commercial Fisheries

The Site is not located within any commercial fishing areas. Furthermore, given the nature of the Site is not considered a viable sport fishing or commercial fisheries area.

Shellfish & Aquaculture

The Site is not located within any licenced aquaculture operations. The Site is located ca. 1.3km from the nearest shellfish designated waters, Waterford Harbour Shellfish Area. The shellfish licenced areas within the designated Waterford Harbour shellfish area are for mussels, oysters and other [34]. There are no licenced aquaculture sites, harvesting mussels and oysters, within the immediate vicinity of the Site. According to the Marine Institute [35], the nearest licenced aquaculture sites:

- T04/37A – South East Shellfish co-op Ltd. harvesting mussels located ca. 2.7km downstream of the Site; and,
- T04/151 – Oceanus Fishing Ltd. harvesting blue mussels (*Mytilus edulis*) located ca. 3.3km downstream of the Site.

Therefore, none of these sites occur within close proximity to the proposed works.

Also, the Lower River Suir SAC is designated for two (2No.) shellfish species:

- Freshwater Pearl Mussel (*Margaritifera margaritifera*); and,
- White-clawed Crayfish (*Austropotamobius pallipes*).

However, white-clawed crayfish do not occur within the tidal areas within the proximity of the Site. Freshwater pearl mussel are known to occur within the River Suir during parts of its life cycle; however, this species has not been recorded within the Site and the nearest record held by the NBDC is ca. 26.6km upstream of the Site.

6.1.4.2 Impact Assessment

Fish

Underwater noise and vibration impacts on designated fish may cause the following:

- Behavioural effects (Substantial change in behaviour for the animals exposed to a sound, i.e., changes in swimming behaviour and orientation, communication between individuals of the same species and detection of predators / prey);
- Masking effects (i.e., the reduction in the detectability of a given sound as a result of the simultaneous occurrence of another sound);
- Temporary Threshold Shift (TTS) in hearing (short-or long-term changes in hearing sensitivity that may or may not reduce fitness);
- Recoverable tissue injury (injuries including hair cell damage, minor internal or external hematoma etc. Injuries that are noy likely to result in mortality.); and,
- Mortality and potential mortal injury (immediate or delayed death)

Fish species can typically be classified into the following groups:

- Fish species that lack a swim bladder - such as flatfish and lamprey. These fish have a lower hearing ability than many other fish species and, as such, rely on the detection of particle motion (the oscillatory displacement of fluid particles in a sound field) [36];
- Fish species with swim bladders with no connection to the inner ear – such as cod, eel or Atlantic salmon. These fish have better hearing and can also detect particle motion [36]; and,
- Fish species with an extension of the swim bladder that terminates within the inner ear – such as herring or Twaite shad. These species can hear sounds over a far greater range than other species and can detect both particle motion and sound pressure (a form of stress measured in term of force / unit area).

Underwater activities such as higher energy pulse sounds produced by underwater explosions, a seismic air-gun arrays or impact pile driving operations are considered to have a high impact to the aquatic environment. These activities can introduce single or multiple sound pulses with rapid rise times and at sound pressure levels (SPLs) exceeding 220-250 dB re: 1 µPa [2]. However, drilling is considered to be less impactful on the aquatic environment but is understood to produce moderate levels of continuous omnidirectional sound at low frequency (several tens of Hz to several thousand Hz and up to c.10 kHz). Source

sound pressure levels have generally been reported to lie within the 145-190 dB re: 1 µPa range [2].

For fish, the most relevant criteria for injury are considered to be those contained in ASA S3/SC1.4 TR-2014, Sound Exposure Guidelines for Fishes and Sea Turtles [37]. The guidelines set out criteria for injury due to different sources of noise. The most relevant to the proposed works are considered to be those for injury due to continuous noise (which are applicable for drilling, shipping and vessel movements).

Table 6-1: Suggested criteria for proposed mortality, potential injury, temporary threshold shift (TTS), masking and behavioural effects for fish due to continuous sound. Relative risk (High, Moderate, Low) is given for animals at three distances from the source defined in relative terms: N - near; I - intermediate; F - far [37]

Type of Animal	Mortality & Potential Mortal Injury	Impairment			Behavioural Effects
		Recoverable Injury	TTS	Masking	
Fish with no swim bladder (particle motion detection)	(N) Low (I) Low (F) Low	(N) Low (I) Low F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: where swim bladder is not involved in hearing (particle motion detection)	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: where swim bladder is involved in hearing (primarily pressure detection)	N) Low (I) Low (F) Low	170 dB rms for 48h	158 dB rms for 12h	(N) High (I) High (F) High	(N) High (I) Moderate (F) Low
Eggs and larvae	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low	(N) Moderate (I) Moderate (F) Low

Based on the suggested criteria, it is considered unlikely that any fish species will be mortally impacted by the proposed works, however, it is considered possible that there could be temporary threshold shift, masking and behavioural effects to finfish species depending on the noise levels and distance of the fish.

It should be noted that specific data on the potential impacts of noise generated by drilling methods, such as those proposed for the site investigation works, is limited. Therefore, for the purposes of this assessment, data relating to pile driving in water will be utilised to inform the assessment. For fish, guidelines set out criteria for injury due to different sources of noise and the criterion for piling noise is outlined in Table 5-3 below; however, please note no piling will be required for the proposed works.

Table 6-2: Suggested criteria for proposed mortality, potential injury, temporary threshold shift (TTS), masking and behavioural effects for fish due to impulsive sound. Relative risk (High, Moderate, Low) is given for animals at three distances from the source defined in relative terms: N - near; I - intermediate; F - far [36]

Type of Animal	Parameter	Mortality & Potential Mortal Injury	Impairment			Behavioural Effects
			Recoverable Injury	TTS	Masking	
Fish with no swim bladder (particle motion detection)	SEL, dB re 1 μPa^2s	>219	>216	>>219	(N) Moderate (I) Low (F) Low	(N) High (I) Moderate (F) Low
	Peak, dB re 1 µPa	>213	>213	-		
Fish: where swim bladder is not involved in hearing (particle motion detection)	SEL, dB re 1 μPa^2s	210	203	>186	(N) Moderate (I) Low (F) Low	(N) High (I) Moderate (F) Low
	Peak, dB re 1 µPa	>207	>207	-		
Fish: where swim bladder is involved in hearing (primarily pressure detection)	SEL, dB re 1 μPa^2s	207	203	186	(N) High (I) High (F) Moderate	(N) High (I) High (F) Moderate
	Peak, dB re 1 µPa	>207	>207	-		
Eggs and larvae	SEL, dB re 1 μPa^2s	>210	(N) Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low
	Peak, dB re 1 µPa	>207				

British Standard (BS) 5228-1:2009+A1:2014 presents a sound level of 74dB (A) at 10m for ground investigation drilling using a cable percussion drilling rig. It would be expected that this noise level would be indicative of that produced by the drilling equipment proposed for the investigation works. However, a noise source is approximately 15 – 20dB louder when underwater and hence a noise level in the region of 97 - 100 dB at 10m would be expected when drilling underwater. At this level it would not be anticipated that significant injuries to fish would be sustained as expected levels are well below the interim criteria presented in Table 5-3.

In addition, Nedwell and Howell (2004) described the transmission of drilling sound in water as consisting of either ground borne or structure borne [38]. Ground borne vibration is created at the drill-rock interface by the movement of the drill head which then radiates outwards as compressional and shear waves. The mechanical vibrations that are generated may also be transmitted to the water via the drill shaft. These transmission mechanisms are in relation to drilling of wind turbine pile foundations, but it is expected that they would also apply to smaller scale drilling such as that proposed for the investigation works.

In addition, drilling will not be carried out at night. This will leave significant downtime for migratory fish to pass the Site, should species be migrating through the area and most species tend to migrate at night. Furthermore, there will be downtime between the drilling of individual boreholes, coreholes and dynamic probes which will also provide an opportunity for fish to pass the Site, and the proposed works will not result in any physical impediment / barrier to passage through the estuary for any migratory fish species.

It should be noted that fish species in the area are likely already exposed to anthropogenic noise sources in the area due to port activities and it is not anticipated that the additional noise generated from the proposed works will significantly contribute to this. Based on this and the expected noise level from the drilling equipment it is not expected that there will be significant impacts on fish species as a result of the proposed works.

Furthermore, water mitigation measures that will be implemented as part of the proposed works (see Section 5.2.3), which will ensure no impacts occur to fish as a result of water quality impairment.

Therefore, within this context and given the short duration and temporary nature of the works, it is considered that there will be no significant effects on fish.

Commercial Fisheries

As the Site is not located within any commercial fishing areas and given the fact that the Site is not considered a viable sport fishing or commercial fisheries area, it can be concluded that there will be no effects to commercial fisheries.

Shellfish & Aquaculture

Given the distance separating the Site and the nearest aquaculture site, it is considered highly unlikely that the works will have any significant direct or indirect negative effects on this species given the fact that any potential pollutants that enter the Suir will be dispersed and diluted immediately within the regular flow and large expanse of the estuary. However, regardless, water mitigation measures will be implemented as part of the proposed works (see Section 5.2.3). Therefore, it can be concluded that there will be no effects to shellfish & aquaculture.

6.1.4.3 Mitigation Measures

No mitigation measures are required for fish, commercial fisheries and shellfish.

6.1.5 Protected Sites

6.1.5.1 Baseline Environment

European Designated Sites

In accordance with the European Commission Methodological Guidance [39] a list of European sites that can be potentially affected by the proposed works has been compiled. Guidance for Planning Authorities prepared by the Department of Environment Heritage and Local Government [40] states that defining the likely zone of impact for the screening and the approach used will depend on the nature, size, location and the likely significant effects of the project. The key variables determining whether a particular Natura 2000 site is likely to be negatively affected by a project are:

- The physical distance from the project to the Natura 2000 site;
- The presence of impact pathways;
- The sensitivities of the ecological receptors; and,
- The potential for in-combination effects.

All SPAs and SACs within 15km have been considered to assess their ecological pathways and functional links. As acknowledged in the OPR guidelines [41], few projects have a zone of influence this large, however the identification of Natura 2000 sites within 15km has become widely accepted as the starting point for the screening process. For this reason, all SPAs and SACs in 15km have been identified for consideration as part of the screening.

There are six (6No.) European sites located within 15km of the Site - these are identified in Figure 5-3 and Table 5-3. The Site is located within the Lower River Suir SAC and is located ca. 1.4km to the River Barrow and River Nore SAC.

Figure 6-3: Site Location and Natura 2000 Designated Sites within 15km

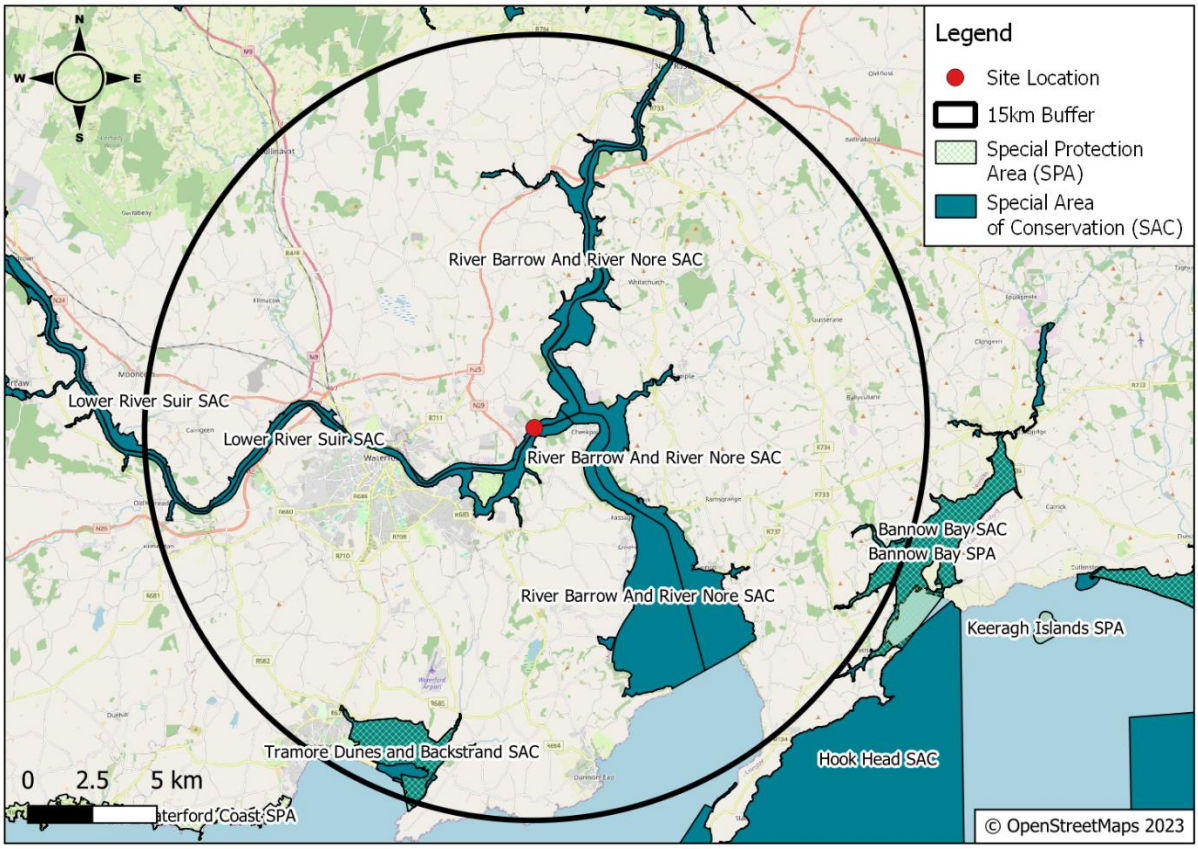


Table 6-3: European Designated Sites within 15km of the Site

Site Name	Code	Distance (km)	Direction from the Site
Special Areas of Conservation (SAC)			
Lower River Suir SAC	002137	Within	-
River Barrow and River Nore SAC	002162	1.1km	NE
Tramore Dunes and Backstrand SAC	000671	11.3km	SW
Bannow Bay SAC	000697	13km	SE
Special Protection Area (SPA)			
Tramore Back Strand SPA	004027	11.3km	SW
Bannow Bay SPA	004033	13.6km	SE

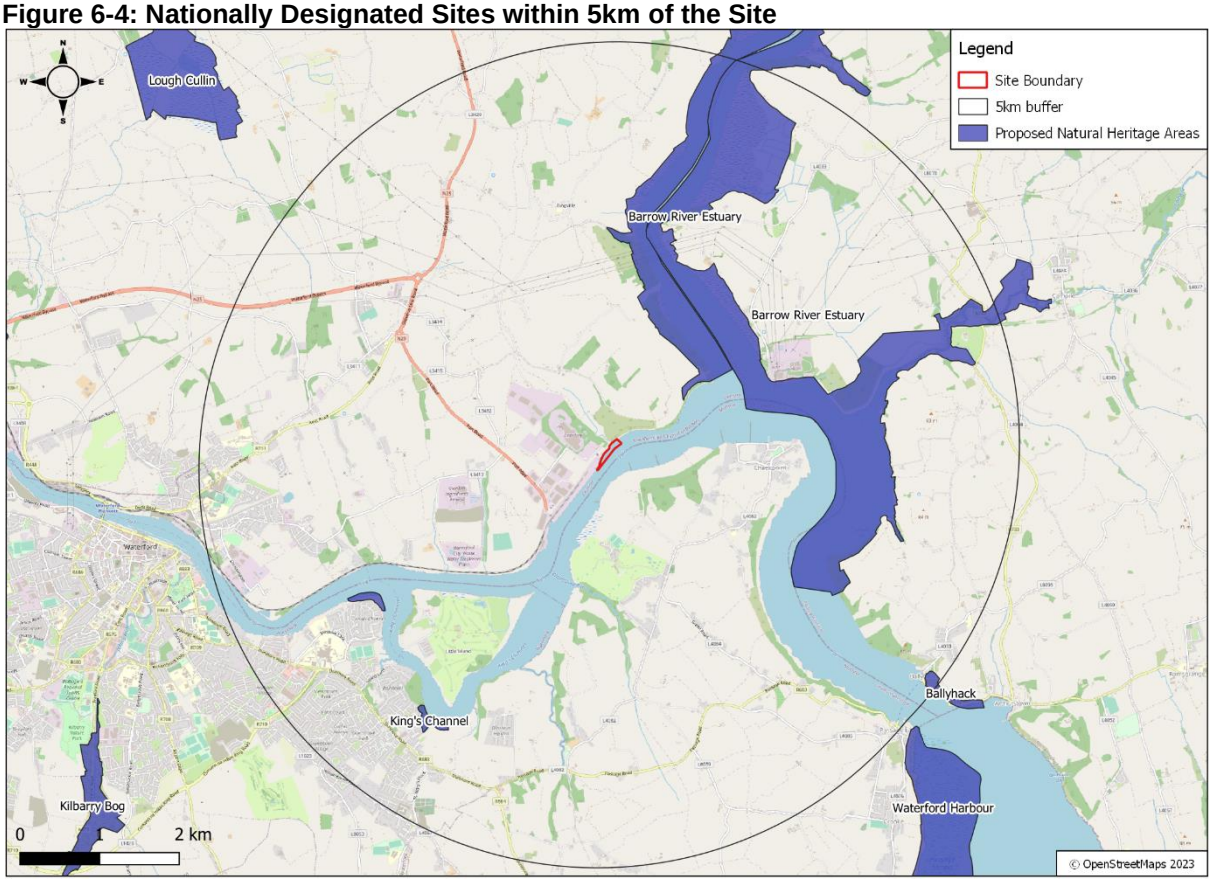
Nationally Designated Sites

No Natural Heritage Areas (NHA) are located within 5km of the Site. There are three (3No.) proposed Natural Heritage Areas (pNHAs) located within 5km of the Site; however, none of these sites are located within the Site or within the immediate vicinity of the Site. Refer to Figure 5-4 for context.

Table 6-4: Proposed Natural Heritage Areas within 5km of the Site

Site Name	Code	Distance (km) & Direction	Qualifying Interest
Proposed National Heritage Areas (pNHA)			
Barrow River Estuary	000698	0.97km NE	No description available.
King's Channel	001702	3.1km SW	No description available.
Ballyhack	000695	4.8km SE	No description available.

Figure 6-4: Nationally Designated Sites within 5km of the Site



6.1.5.2 Impact Assessment

<u>European Designated Sites</u>

A NIS has been prepared and undertook further assessment to potential sources of impact on the European sites that have been 'screened in'. Following an assessment of the European designated sites located within the Zone of Influence, the Lower River Suir SAC and the River Barrow and River Nore SAC were taken forward for further consideration based on the potential for water quality impairment and potential ambient and underwater noise disturbance in the absence of appropriate mitigation measures.

Following further assessment of the potential sources of impacts on the screened in European designated sites, the NIS concluded:

> *'It has been objectively concluded, following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed works and all associated works, and with implementation of the*

proposed mitigation measures, that the proposed works will not, either alone or in combination with other plans or projects, adversely affect the integrity of Lower River Suir SAC and River Barrow and River Nore SAC or any other European site in light of the site's conservation objectives and best scientific knowledge, and no reasonable scientific doubt exists in relation to this conclusion.'

Refer to the NIS for full details of the assessment.

Nationally Designated Sites

There are no NHAs or pNHAs located within the Site boundary. Furthermore, the pNHAs located downstream of the Site will not be impacted by the proposed works, due to the fact that all works will comply with all relevant legislation and best practice to reduce potential environmental impacts of the works.

Furthermore, implementing precautionary principle, mitigation measures to protect water quality will be implemented (see Section 5.2.3). Therefore, no impacts will occur to any pNHAs or NHAs.

6.1.5.3 Mitigation Measures

Taking a precautionary principle, several mitigation measures were proposed to protect water quality and to ensure no disturbance to designated species (specifically otter).

Refer to the NIS for full details of the assessment.

6.2 Water Quality

6.2.1 Baseline Environment

The Site is situated within the Suir WFD Catchment [Catchment_ID: 16] and the Blackwater[Kilmacow]_SC_010 subcatchment [Subcatchment_ID: 16_29] [10].

The Site is located within one (1No.) watercourse and there are one (1No.) hydrological features of note within close proximity to the Site.

1. River Suir

The Site is located within the River Suir known as the Lower Suir Estuary by the EPA [10]. This river flows in a northeast direction for ca. 1.5km and then converges with the River Barrow and forms the Barrow Suir Nore Estuary according to the EPA [10]. This watercourse then flows south into the Waterford Harbour ca.12.6km downstream and then the Eastern Celtic Sea a further ca. 6.5km downstream.

The Site is located within a section of the River Suir that forms part of the Lower River Suir SAC and flows into the River Barrow and River Nore SAC ca.1.1km downstream.

Under the Water Framework Directive (WFD) 2000/60/EC, the EPA classifies the status and the risk of not achieving good water quality status for all waterbodies in Ireland [10]. According to the river waterbody WFD 2016-2021, the most up-to-date data at the time of writing this report, the water quality within the River Suir (Lower Suir Estuary), the Barrow Suir Nore Estuary and Waterford Harbour are all considered to be 'moderate' and '*at risk*' of not receiving good water quality [10]. The Eastern Celtic Sea is considered to have '*high'* water quality and is considered '*not at risk'* [10].

2. Luffany River

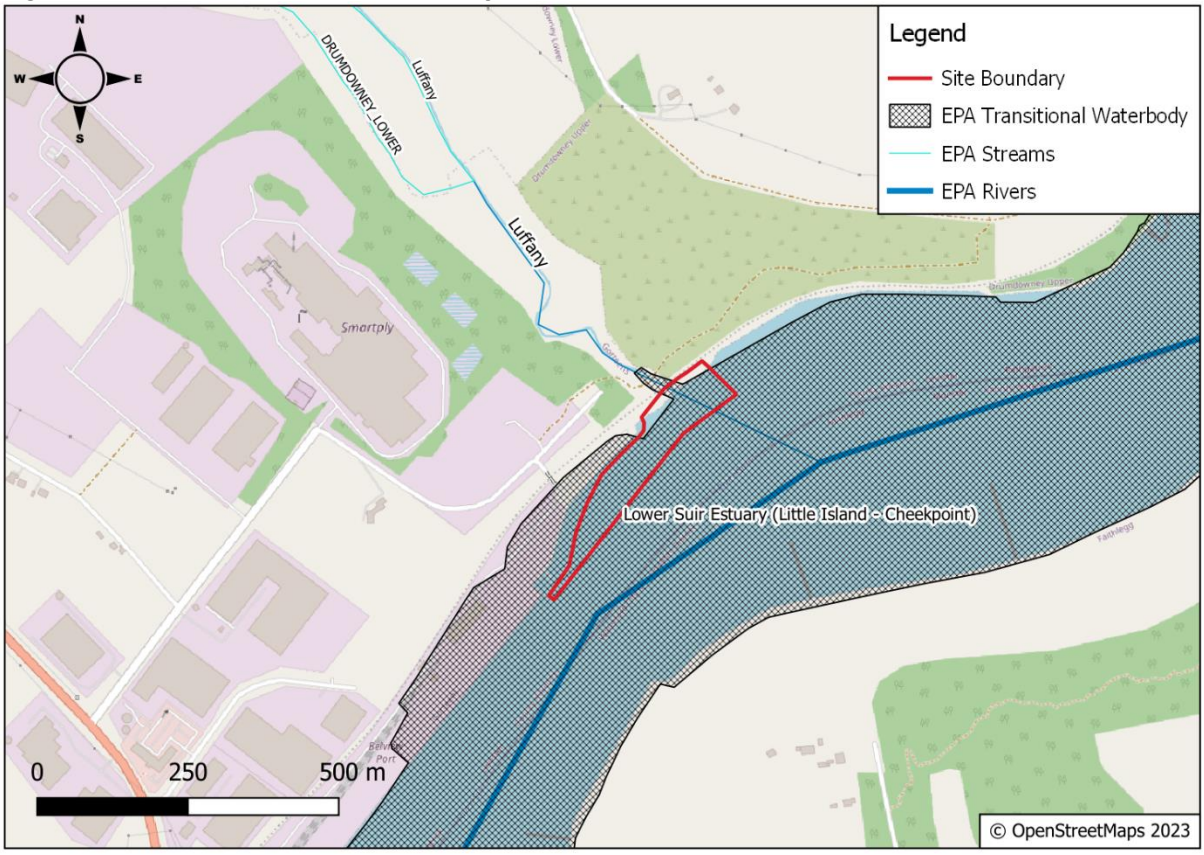
The confluence of the Luffany River and the River Suir is located adjacent to the Site boundary, as shown below in Figure 5-4.

Under the Water Framework Directive (WFD) 2000/60/EC, the EPA classifies the status and the risk of not achieving good water quality status for all waterbodies in Ireland (EPA, 2022).

According to the river waterbody WFD 2016-2021, the water quality within the Luffany River is considered to be '*under review,'* and the status of this river is considered *'moderate'* [10].

The location of the key surface water features in the vicinity of the Site are illustrated in Figure 5-4 below.

Figure 6-5: Watercourses in the Vicinity of the Site



6.2.2 Impact Assessment

The proposed works will require the use of a shell and auger, rotary core and dynamic probe equipment which will be placed on a barge. Therefore, because the works will be within the River Suir, should pollutants get into the watercourse, this could impact the water quality of the River Suir.

However, it is considered highly unlikely that the proposed works will have any adverse effect on water quality given the fact that all works will comply with all relevant legislation and best practice to reduce potential environmental impacts of the works. Regardless, implementing precautionary principle, mitigation measures will be implemented to protect the water quality. The measures that will be put in place will remove the risk from potential contamination and emergency procedures to be implemented in the event of an accidental release or spill of potentially contaminating substances.

6.2.3 Mitigation Measures

The measures and procedures will be implemented during the works will be communicated to all relevant site staff. Best practice guidelines will be followed, which are based on Inland Fisheries Ireland and National Roads Authority (NRA), now known as the Transport Infrastructure Ireland (TII), guidance documents. The measures that will be implemented include:

- All plant and machinery will be serviced before being mobilised to the Site;

- Preventative maintenance and relevant maintenance logs will be kept for all onsite plant and equipment;
- Prior to any works commencing, all equipment will be checked to ensure that they are mechanically sound, to avoid leaks of oil, fuel, hydraulic fluids and grease;
- Adequate spill kits including absorbent booms and other absorbent material will be maintained onsite;
- All contractor workers will be appropriately trained in the use of spill kits;
- Emergency response procedures will be put in place;
- Chemicals used will be biodegradable where possible;
- Measures will be implemented to minimise waste and ensure correct handling, storage and disposal of waste;
- The use of drip trays for the collection of spills/leaks from drilling equipment will be implemented;
- All refuelling of equipment and the barge should take place away from the water's edge, where possible;
- The Appointed Contactor will put in place a specific, step-by-step refuelling procedure which will be communicated to all relevant employees onsite;
- Only designated trained operators will be authorised to refuel plant onsite;
- All fuel should be stored in appropriately bunded containers;
- All bunds will have the capacity of the largest tank volume plus 10 percent, at a minimum, with additional capacity to hold 30mm of rainfall;
- All drainage from bund areas will be directed to secure containment prior to suitable disposal;
- Fuels, lubricants and hydraulic fluids for equipment used onsite will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to current best practice; and,
- Vehicle or equipment maintenance work will be carried out in a designated area on the Site.

Therefore, the mitigation measures outlined above will minimise the identified potential risks to water quality associated with the proposed works.

6.3 Air Quality, Climate, Noise and Vibration

6.3.1 Baseline Environment

The POW is located in Zone D, within the 'Rural East' Air Quality Index Region [10]. The nearest air monitoring station to the Site is Station 87 (Merchants Quay, Waterford City, Co. Waterford). The air quality recorded at this air monitoring station on 1st of June 2023 is reported as being of '*good*' status [42].

Furthermore, the Site is located within the River Suir adjacent ot the existing Port of Waterford. Therefore, the Site is subject to the operational noise generated from the Port and surrounding developments. Currently there is no publicly available data present regarding the ambient under-water acoustic environment.

6.3.2 Impact Assessment

Due to the fact that the works will require a vessel, emissions to air from the vessel exhausts are unavoidable. However, the level of such emissions would not be significantly above background levels in this area and would not have the potential to lead to air quality standards being exceeded. Therefore, it is concluded that there will be no impacts to air quality as a result of the proposed works.

Indirect impacts on climate change resulting from the use of vessel fuel during the proposed works will be short-term and will not have the potential to impact climate change trends.

Furthermore, the proposed works will contribute to ambient noise levels, the noise level generated would not be significantly above background levels with the potential to lead to significant impacts on any terrestrial receptors. Furthermore, the works will be short-term and localised. Therefore, no ambient noise impacts are anticipated. Underwater noise has been assessed relative to impacts on marine mammals and fish. No significant vibration as a result of the proposed project is anticipated.

6.3.3 Mitigation Measures

No mitigation measures are required for air quality, climate, noise or vibrations.

6.4 Cultural Heritage

6.4.1 Baseline Environment

A review of the National Monument Service Wreck Viewer has shown that there are no known shipwrecks within or within close proximity to the Site [43]. The nearest known shipwreck is located ca. 1.8km downstream of the Site, there is no publicly available information about this shipwreck [43].

Additionally, a review of the Historic Environment Viewer has shown that there are no intertidal archaeological features within close proximity to the Site [44]. The nearest recorded monument is located ca. 1.4km northwest of the Site and is a castle (Reference: KK047-001---) [44].

6.4.2 Impact Assessment

Due to the fact that there are no known archaeological features within the Site or within close proximity to the Site, it can be concluded that there will be no impacts from the proposed works on any archaeological features.

6.4.3 Mitigation Measures

No mitigation measures are required for cultural heritage.

6.5 Navigation

6.5.1 Baseline Environment

There are no Aids to Navigation (AtoN) infrastructure (cardinal buoy marks or lateral buoy marks) located within the Site. The Site is located outside the navigational channel.

6.5.2 Impact Assessment

Due to the fact that the proposed works will be short-term and localised in nature, it is considered that the proposed works will not impact on navigation. Furthermore, the Site is located outside the navigational channel and will not cause disruptions to vessel movements.

6.5.3 Mitigation Measures

No mitigation measures are required for navigation. However, it should be noted that the Harbour Master for the Port of Waterford will be informed of the works, and risk assessments and method statements for the works will be approved by the Harbour Master prior to the commencement of works.

6.6 Cumulative Impacts

Following a review of the Kilkenny County Council Planning Portal [45], Waterford City and County Council Planning Portal [46], and the Wexford County Council Planning Portal [47] and the Department of Housing, Local Government and Heritage's planning portal – the National Planning Application Database, no current or previously granted plans or projects were identified in the immediate vicinity that are considered to have the potential to have any in-combination with the proposed works to result in significant impacts on ecological, hydrological, acoustic, cultural heritage or navigational receptors.

Although there are several developments located within the Lower River Suir and the wider Waterford Estuary it is unlikely that the proposed works will contribute to any in-combination effects with these developments. This conclusion is based on the following:

- The minimal, short-term and localised in nature;
- The works will only involve the drilling of ca. ten (10No.) borehole and ca. ten (10No.) coreholes;
- The works will only take approximately three (3No.) weeks to complete;
- The mitigation measures that will be put in place; and,
- The best practice guidelines which will be implemented during the proposed works.

7 SUMMARY OF MITIGAITON MEASURES

The NIS that was submitted in support of this application outlines a number of mitigation measures that will be adhered to during the works.

The mitigation measures that are compiled below have been developed in accordance with current policy, regulations and guidelines. These mitigation measures will be adhered to during the works to ensure no impacts occur to any environmental receptors.

Marine Mammal Mitigation Measures

Cetaceans & Pinnipeds

In line with recommendations made for drilling in the '*Guidance to Manage the Risk to Marine Mammal from Man-made Sound Sources in Irish Waters'* [2]*,* a suitably qualified marine mammal observer (MMO) shall be appointed to monitor for marine mammals and otter and will log all relevant events using standardised data forms prepared by the DAHG.

Prior to the commencement of any works and any equipment starting, a pre-start monitoring procedure will be undertaken. Given the depth of water within the vicinity of the Site is less than 200m in depth, the pre-start monitoring will initiate at least 30 minutes prior to the start time. A monitoring zone will be employed of 500m in radial distance from the sound source. Should otter or marine mammals be identified within the monitoring zone, works will be delayed until these species have not been sighted for 30 minutes within the monitoring zone. The MMO will use a range finder to determine the distance of marine mammals from the sound source. Following the pre-start monitoring, works will commence.

Where visual observations are not possible due to sea state or weather conditions, a Passive Acoustic Monitoring (PAM) system and experienced operator will be employed to undertake the pre-start monitoring.

As per the guidelines, once the drilling works have fully commenced, there is not requirement to halt the procedure if weather conditions deteriorate or due to a lack of daylight or if otter / marine mammals enter the monitoring zone. However, should drilling operations pause for a period of 30 minutes or more than a full pre-start monitoring procedure will be required prior to drilling activity.

Otter

In addition to the MMO monitoring, the following mitigation measures will be put in place in order to ensure that there are no adverse effects to otter due to noise emission:

- In advance of the works commencing, a pre-commencement otter survey will take place along the shoreline to ensure no otter holts are located within 150m;
- In advance of works, all Site personnel will receive a Site induction or toolbox talk which will include reference to measures detailed in the CEMP;
- Activities onsite to occur only during permitted hours;
- All plant where possible shall be low noise rated;
- Onsite policy for all plant and equipment, including Site delivery vehicles, to power off rather than to be left with idling engines;
- All plant will be in a fit condition for use, to prevent the addition of noise from maintenance issues;
- Management of deliveries and vehicles to minimise vehicles idling onsite;
- Careful selection of quiet plant and machinery to undertake the required work, where available; and,

- Handling of all materials will take place in a manner which minimises noise emissions;
- The works will be limited to the proposed working hours 08:00 and 17:00 hours Monday to Friday inclusive, 08:00 and 13:00 hours on Saturdays, and as such no works will be carried out at night, thereby limiting the noise effects on crepuscular species, such as otter.

Water Quality Mitigation Measures

The measures and procedures will be implemented during the works will be communicated to all relevant site staff. Best practice guidelines will be followed, which are based on Inland Fisheries Ireland and National Roads Authority (NRA), now known as the Transport Infrastructure Ireland (TII), guidance documents. The measures that will be implemented include:

- All plant and machinery will be serviced before being mobilised to the Site;
- Preventative maintenance and relevant maintenance logs will be kept for all onsite plant and equipment;
- Prior to any works commencing, all equipment will be checked to ensure that they are mechanically sound, to avoid leaks of oil, fuel, hydraulic fluids and grease;
- Adequate spill kits including absorbent booms and other absorbent material will be maintained onsite;
- All contractor workers will be appropriately trained in the use of spill kits;
- Emergency response procedures will be put in place;
- Chemicals used will be biodegradable where possible;
- Measures will be implemented to minimise waste and ensure correct handling, storage and disposal of waste;
- The use of drip trays for the collection of spills/leaks from drilling equipment will be implemented;
- All refuelling of equipment and the barge should take place away from the water's edge, where possible;
- The Appointed Contactor will put in place a specific, step-by-step refuelling procedure which will be communicated to all relevant employees onsite;
- Only designated trained operators will be authorised to refuel plant onsite;
- All fuel should be stored in appropriately bunded containers;
- All bunds will have the capacity of the largest tank volume plus 10 percent, at a minimum, with additional capacity to hold 30mm of rainfall;
- All drainage from bund areas will be directed to secure containment prior to suitable disposal;
- Fuels, lubricants and hydraulic fluids for equipment used onsite will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to current best practice; and,
- Vehicle or equipment maintenance work will be carried out in a designated area on the Site.

Navigation Mitigation Measures

No mitigation measures are required specifically for navigation. However, it should be noted that the Harbour Master for the Port of Waterford will be informed of the works, and risk assessments and method statements for the works will be approved by the Harbour Master prior to the commencement of works.

8 CONCLUSIONS

This Assessment of Impact on the Maritime Usage (AIMU) Report has assessed the implications of the proposed works, alone and in-combination with other projects on the receiving environment. It is considered that the full implementation of the proposed mitigation measures will ensure that no negative impacts on the receiving environment will occur.

- The Site is located in an area adjacent to the shoreline within the River Suir in an area ca. 2.48 ha in size. This area is located within the area adjacent to the active Port of Waterford;
- The proposed works will consist of drilling of ca. ten (10No.) boreholes, ca. ten (10No.) coreholes with the associated sampling and testing;
- The proposed works are anticipated to only take ca. three (3No.) weeks in duration and no works will take place at night;
- Although the Site is located within the River Suir, the Ecological Assessment concluded that the proposed works will not have any direct or indirect adverse impacts on the conservation objectives of any Natura 2000 sites or on any notable / protected flora and fauna following the implementation of appropriate mitigation measures;
- The assessment concluded that the proposed works will not result in any adverse impacts to the hydrological or hydrogeological regime of the receiving environment following the implementation of appropriate mitigation measures;
- The assessment concluded that the proposed works will not result in any significant ambient noise, air quality or climate impacts.
- The assessment concluded that underwater noise associated with the drilling would not impact on fish and would not result in and impacts to marine mammals following the implementation of the appropriate mitigation measures;
- There are no known monuments or shipwrecks located within the Site. The assessment concluded that the proposed works will not result in any significant impact on any protected monuments or features in the wider area; and,
- The Site is not located within the navigational channel, therefore, there will be no impacts to navigation. However, the Harbour Master for the Port of Waterford will be informed of the works, and risk assessments and method statements for the works will be approved by the Harbour Master prior to the commencement of works.

9 REFERENCES

[1] Department of Transport, Tourism and Sport (DTTS), “National Ports Policy,” 2013.

[2] Department of Arts, Heritage and the Gaeltacht, “Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters,” 2014.

[3] CIRIA, “CIRIA C532 Control of Water Pollution from Construction, Guidance for Consultants and Contractors,” Construction Industry Research and Information Association , 2001.

[4] CIRIA, “C584 – Coastal and Marine Environmental Site Guide for protection of water quality and in turn aquatic life, during the construction phase of the works,” 2003.

[5] CIRIA, “C741 - Environmental Good Practice on Site (4th edition),” Construction Industry Research and Information Association , 2015.

[6] CIRIA, “C774 - Coastal and Marine Environmental Site Guide (Second Edition),” 2015.

[7] National Roads Authority, “Guidelines for the Treatment of Otters prior to the Constrcution of National Road Schemes,” National Roads Authority, 2006.

[8] IFI, “Guidance and Protection of Fisheries during Construction Works in an adjacent to Water,” IFI, Dublin, 2016.

[9] Department of Housing, Local Government and Heritage, “Draft River Basin Management Plan for Ireland 2022-2027,” Governement of Ireland, 2021.

[10] EPA, “EPA Map Viewer,” 2023. [Online]. Available: http://gis.epa.ie/Envision.

[11] Department of Housing, Local Government and Heritage, “Public Consultation on Ireland’s Marine Strategy Part 2: Programme of Measures,” Government of Ireland, 2022.

[12] EPA, “Guidelines on the Information to be Contained in Environmental Impact Assessment Reports,” Environmental Protection Agency, Dublin, 2022.

[13] Statutory Instrument, “The Planning and Development (Amendment) Act,” office of the Attorny General, Dublin, 2018.

[14] Statutory Instrument, “the Planning and Development Regulations (as amended),” 2001.

[15] European Parliament, “Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance,” 2014.

[16] Statutory Instrument, “Forshore Act 1993 (as amended),” Statutory Instrument, 2023.

[17] European Commission, “Interpretation of Definitions of project Categories of Annex I and II of the EIA Directive”.

[18] EU, “Environmental Impact Assessment of Projects. Guidance on Screening,” 2017.

[19] DEHLG, “Guidance for Consent Authorities regarding Sub-Threshold Development,” 2003.

[20] EPA, “Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft),” EPA, 2017.

[21] DHPLG, “Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive) - Circular 1/2017’, 15th May 2017,” 2017.

[22] DHPLG, “Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment,” 2018.

[23] Department of Housing, Local Government and Heritage, “Draft Planning and Development Bill,” 2023.

[24] Government of Ireland, “Climate Action Plan 2023: Changing Ireland for the Better,” Department of the Environment, Climate and Communications, 2023.

[25] SRA, “Regional Spatial & Economic Strategy (RSES) for the Southern Region.,” Southern Regional Assembly, 2020.

[26] Kilkenny County Council, “Kilkenny City and County Development Plan 2021 - 2027,” 2021.

[27] Aquafact International Services Ltd., “Marine Sediment and Benthic Studies Waterford Harbour Dredging and Disposal Operations,” 2013.

[28] INFOMAR, “Seabed and Sediment,” GSI, Marine Institute, & Deparment of Environment, Climate and Communications, [Online]. Available: https://www.infomar.ie/maps/interactive-maps/seabed-and-sediment.

[29] NPWS, “Legislation,” 2021. [Online]. Available: https://www.npws.ie/legislation.

[30] IWDG, “Recent Sightings Portal,” Irish Whale and Dolphin Group, 2023. [Online]. Available: https://iwdg.ie/browsers/sightings.php.

[31] NBDC, “National Biodiveristy Live Maps,” 2023. [Online]. Available: http://maps.biodiversityireland.ie/.

[32] NPWS, “National Parks and Wildlife Service,” 2023. [Online]. Available: https://www.npws.ie.

[33] D. Ryan, J. Cooney, E. Leonard, K. Nolan and W. Roche, "Fish Stock Survey of Transitional Waters in the Southern River Basic District - Barrow, Nore & Suir Estuary 2019," Inland Fisheries Ireland, 2020.

[34] DHLGH, "Shellfish Pollution Reduction Programme - Characterisation Report Number 35: Waterford Harbour Shellfish Area County Waterford," 2009.

[35] Marine Institute, "Ireland's Marine Atlas," 2016. [Online]. Available: http://atlas.marine.ie/#?c=52.2699:-6.9904:14. [Accessed 2023].

[36] A. Popper and A. Hawkins, "An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes," *Journal of Fish Biology,* 2019.

[37] A. Popper, A. Hawkins, R. Fay, D. Mann, S. Bartol, T. Carlson, S. Commbs, W. Ellison, R. Gentry, M. Halvorsen, S. Lokkeborg, P. Rogers, B. Southall, D. Zeddies and W. Tavolga, "ASA S3/SC1.4 TR-2014, Sound Exposure Guidelines for Fishes and Sea Turtles," 2014.

[38] J. Nedwell and D. Howell, "A review of offshore windfarm related underwater noise sources," Collaborative Offshore Wind Energy Reserach into the Environment (COWIE), 2004.

[39] EC, "Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC," European Commision, 2018.

[40] DoEHLG, "Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities," Department of the Environment, Heritage and Local Government, 2010.

[41] OPR, "Appropriate Assessment Screening for Development Management," 2021.

[42] EPA, "AirQuality.ie," Environmental Protection Agency (EPA), 2023. [Online]. Available: https://airquality.ie/. [Accessed 18 04 2023].

[43] Underwater Archaeology Unit, "National Monument Service: Wreck Viewer," National Monument Service, 2023. [Online]. Available: https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=89e50518e5f4437abfa6284ff39fd640. [Accessed April 2023].

[44] National Monumnet Service, "Historic Environment Viewer," Government of Ireland, 2023. [Online]. Available: https://maps.archaeology.ie/HistoricEnvironment/. [Accessed April 2023].

[45] Kilkenny Councy Council, "Kilkenny County Council Planning Portal," 2023. [Online]. Available: https://kilkennycoco.ie/eng/services/planning/planning-applications/.

[46] Waterford City and County Council, "Online Planning Enquiries," 2023. [Online]. Available: https://www.waterfordcouncil.ie/departments/planning/planning-enquiries/online-planning-enquiries.htm.

[47] Wexford County Council, “Search Planning Applications,” 2023. [Online]. Available: https://www.wexfordcoco.ie/planning/search-planning-applications.

APPENDICES

APPENDIX A

DON'T SCALE DIMENSIONS

BOREHOLE / COREHOLE CO-ORDINATES

BH 1 / CH 1 E 266435.2168 N 113429.1219
BH 2 / CH 2 E 266466.7254 N 113501.8833
BH 3 / CH 3 E 266500.3719 N 113577.0874
BH 4 / CH 4 E 266529.5586 N 113581.8649
BH 5 / CH 5 E 266553.0895 N 113643.6120
BH 6 / CH 6 E 266597.6736 N 113668.2627
BH 7 / CH 7 E 266638.5441 N 113720.5109
BH 8 / CH 8 E 266677.6178 N 113769.4727

BOREHOLE CO-ORDINATES

BH 9 E 266517.8176 N 113618.8365
BH10 E 266596.6604 N 113708.3039

O.S. MAP SHEETS - 5633-B & 5633-D

AREA FOR WHICH LICENCE IS APPLIED FOR SHOWN THUS:-
= 2.48Ha approx.

BH8/CH8
BH7/CH7
BH10
BH6/CH6
BH5/CH5
BH9
BH3/CH3
BH4/CH4
BH2/CH2
BH1/CH1

NAVIGATION CHANNEL

BULK HANDLING TERMINAL

EXTENT OF EXISTING WHARVES

PROPOSED BOREHOLE LOCATIONS (200mm Ø MIN)

PROPOSED BOREHOLE / COREHOLE LOCATIONS (200mm Ø MIN)

KEY PLAN

DON'T SCALE DIMENSIONS

Health and Safety:

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, THE SPECIFICATION AND THE SAFETY AND HEALTH PLAN.

THE APPOINTMENT OF THE PROJECT SUPERVISOR DESIGN PROCESS IS THE CLIENT'S RESPONSIBILITY.

TEMPORARY WORKS PROPOSALS AND/OR METHOD STATEMENTS TO BE SUBMITTED TO THE PSDP AND THE PSCS FOR WORKS WHICH INVOLVE PARTICULAR RISKS.

Notes:

1. NO PART OF THIS DRAWING MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR STORED IN ANY RETRIEVAL SYSTEM OF ANY NATURE WITHOUT THE WRITTEN PERMISSION OF MALONE O'REGAN CONSULTING ENGINEERS AS COPYRIGHT HOLDER EXCEPT AS AGREED FOR USE ON THE PROJECT FOR WHICH THE DRAWING WAS ORIGINALLY ISSUED.
2. THE APPOINTMENT OF THE PROJECT SUPERVISOR DESIGN PROCESS IS THE CLIENT'S RESPONSIBILITY.
3. ALL DIMENSIONS IN mm UNLESS NOTED OTHERWISE.
4. THE CONTRACTOR SHALL CHECK ALL DIMENSIONS PRIOR TO COMMENCEMENT OF CONSTRUCTION. DISCREPANCIES SHALL BE REPORTED TO THIS OFFICE IN WRITING.
5. THIS DRAWING TO BE READ IN ACCORDANCE WITH ALL RELEVANT ENGINEERS' DRAWINGS AND SPECIFICATIONS.

Rev.	Description	Date	Drawn	Chkd	Appr
P	Application for a Maritime Usage Licence under the Maritime Area Planning Act 2021	20.10.2023	SD	ES	ES

THIS DRAWING TO BE USED FOR PLANNING PURPOSES ONLY

MALONE O'REGAN CONSULTING ENGINEERS
[redacted]
Offices also in:
[redacted]
[redacted]

Client: PORT OF WATERFORD COMPANY

Job: BELVIEW PORT MASTER PLAN DELIVERY PROJECT SITE INVESTIGATION WORKS

Drawing: SITE INVESTIGATIONS LOCATION PLAN

Job No	Drg No	Stage	Revision	Scale
W20088	MA 803	PL	P	A3 1:2500

APPENDIX B

MALONE O'REGAN
CONSULTING ENGINEERS

Port of Waterford

250m ORE Capable Quay Extension at Belview Port

Geotechnical Investigations

Date: May 2023
Job No: W20088

Table of Contents

INTRODUCTION

The Geotechnical Investigations at Belview Port will involve mobilising a jack up marine plant which will be assembled alongside the existing quay structure in a suitable area. The Cable Percussive and Rotary Drilling Rigs will be crane lifted onto the barge and secured to the deck which will act as a work platform for the drilling works over water. Boreholes and coreholes will be carried out in accordance with the attached method statements by a trained geotechnical crew under the supervision of the specialist company's Geotechnical Engineer. The works are works limited to the specific exploratory hole locations envisaged to have a limited impact on the surrounding area with the specified. As the proposed plant involves the use of a jack up barge, the use of anchors or casting ropes other than for the safety boat is not anticipated. Very limited impact on the river bed is expected with openings limited to 50 to 200mm diameter and no spoil mounds generated as all works will be contained within metal casings. On completion of the works all plant and equipment will be returned to the quay and craned off the jack up barge which will then be disassembled and demobilised from site. The field works are anticipated to be completed in a five week period, subject to tidal movements and weather conditions.

Typical equipment and rig details for the below listed plant are included in the preliminary method statements in the following sections of this document;

- Data Sheet for Edgetch 3100P proposed to be used for the geophysical survey
- Data Sheet for proposed Cable Percussive Boring Rig (Dando 2000/3000)
- Data Sheet for proposed Rotary Coring Rig (Boart Longyear Delta Base 520)
- Details of proposed Dynamic Probing Rig (Archway Competitor 130)
- Method Statements for the above mentioned items

PRELIMINARY METHOD STATEMENT – LIGHT CABLE PERCUSSIVE BORING

INTRODUCTION

Work will be undertaken to conform to the current BS 5930 and BS 1377 standards, BDA 'Code of Safe Drilling Practice' and 'Guidance Notes for the Safe Drilling of Landfills and Contaminated Land' as appropriate and the contract specification.

INITIAL LOCALTION

The drilling rig will be set up in a manner that is safe for operating personnel. In particular the vicinity will be checked for any obvious signs of services or other hazards. Where appropriate harris fencing will be used to surround the mobilisation and assembly area. Other signage will be provided as required.

Equipment arisings and spoil will be placed so as not to present a hazard to the operatives or the general public.

The borings will be numbered precisely as outlined by the engineer on the drilling instructions.

BORING EQUIPMENT AND DIAMETER OF BORING

Boring will normally be carried out using a cable percussion rig such as a Dando 2000/3000 rig or similar, and tools, such as shells, clay cutters or chisel and sinker bars, as required. Spill kits shall accompany the rig for all works over water. Refuelling and storage of fuel for the rig shall be limited to small individual containers of maximum 25 litres each and shall be undertaken in a fully controlled manner.

The minimum diameter of borings or internal diameter of casing will be 150mm and the maximum will be 200mm.

Where borings are of such depth that the advancement of a casing may become impracticable or where hard strata and obstructions are likely to be met, additional strings of casing of sufficient diameter to complete the work will be provided.

The diameter and depth of boring and the diameter and depth of all casing will be noted on the Daily Report.

WATER IN BORING AND OBSTRUCTIONS

Water will not be added unless specific permissions is given by the geotechnical specialist.

For conditions where the addition of water is permitted the driller will use the minimum amount of water necessary for advancing the boring.

In boring where hard strata or obstructions are encountered the driller will continue boring using chisel or similar approved tool for a minimum approved time (normally of 1 hour) in an attempt to penetrate the hard strata or obstruction.

BEST PRACTICE FOR SAMPLING

The preparation for the methods of taking sampling, together with their size, presentation and handling will be in accordance with British Standards BS 5930: 1981 – Code of Practice for Site Investigations.

Samples will be returned to the site office or to a safe store protected from the weather and from high or low temperatures, at the end of each shift. All samples will be protected at all times from temperatures below 5 and above 25 degrees Celsius, and from wetting or drying out due to weather exposure.

SAMPLING AND TESTING INTERVAL AND RECORDING

At each stage in soil type or change in consistency a small disturbed sample will be taken.

Sampling will be in accordance with drilling instructions issued.

The depths from which all samples are taken will be recorded on the Daily Reports.

For “undisturbed” samples the levels at the top and at the bottom of sample, and the length of sample obtained will be given or “not recovered”. A small disturbed sample will be taken from the shoe.

For “bulk disturbed” samples the limits of the samples zone will be recorded.

For SPT’s the full length of the drive will be recorded together with non recovered samples being noted.

In inspection pits a “small disturbed” sample will be taken at each change in soil type or 0.5m intervals whichever is closest. Bulk disturbed samples of granular materials or major units will be taken.

IN SITU TESTING AND MEASUREMENTS

The Standard Penetration Test (SPT) will be carried out as per BS 1377: 1990.

The SPT assembly will be lowered to the base of the hole and then any penetration due to self-weight will be recorded.

During the SPT the blows for two increments of 75mm, or the penetration after 25 blows will be recorded as the seating drive. The seating drive will be terminated after 150mm penetration or 25 blows whichever is reached first and the test drive will then be started.

After the seating drive of the SPT blows for four increments of 75mm will be recorded as the test drive. The test drive will be terminated after 300mm penetration or a total of 50 blows in the test drive, whichever if reached first and the penetration and blows and for each increment will be recorded. In the case of weak rocks a total of 100 blows for a test drive will be recorded.

A small disturbed sample from the split spoon sampler will be taken, or a bulk disturbed sample of the soil in the zone of the test if no split spoon sample is available.

DANDO 2000 MK2 AND 3000 MK2

A Geotechncal shell and auger drill rig with a host of new features carefully designed to complement the reliable, versatile nature of the tried and tested Dando 2000 and 3000.

New, more powerful clutch - Gives the driller a more responsive "snappy" feel

Improved winch guarding

Electric mast raising system - For faster, safer raising of the rig

Increased engine silencing

Composite, maintenance free crown sheave with a new sheave material - allowing for longer life without the need for maintenance or greasing

Emergency stop button

DANDO DRILLING INTERNATIONAL LTD

Dando 2000/3000 Mk 2

Specification details

Complete mobile drilling rig for operating percussion drilling tools and casing, sampling and testing equipment. Suitable for towing behind Landrover or light truck.

The mk 2 features a new clutch, giving an improved snatch capability to the rig.

Full clutch and winch guards are fitted as standard.

GENERAL SPECIFICATIONS

	2000	3000
Engine Power	18 hp (13kW) @ 1800 rpm	20 hp (15kW) @ 1600 rpm
Winch (Single Line Pull)	2000 kgf	3000 kgf
Drilling Depths and Diameters	6 inch to 250ft (150mm) (75m) 15 inch to 150ft (380mm) (45m)	6 inch to 300ft (150mm) (90m) 18 inch to 175ft (460mm) (55m)

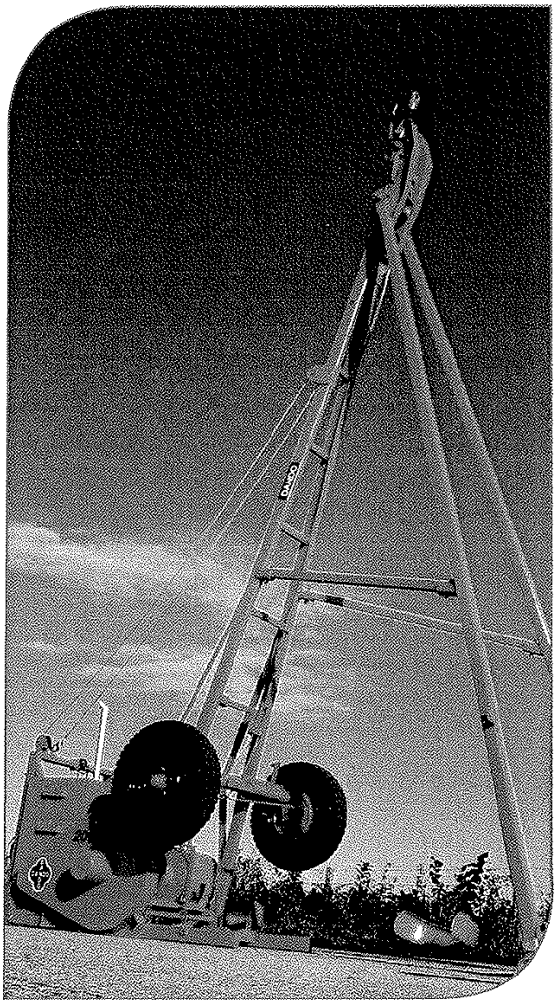
NOTE: The maximum drilling capacity is dependent on drilling conditions and type and size of tools. The figures given provide a general guide only.

	2000	3000
Derrick Working Height under sheaves	5.2m	5.2m
Overall Height derrick erected	6.65m	6.55m
Derrick loading	6000kg	9000kg
Travelling Dimensions - length	7.5m	8.5m

Shipping Specification - Engine and Winch Unit
LENGTH: 2.44m(8'0") WIDTH:1.62m(5'3")
HEIGHT:1.38m(4'6")
Shipping Specification - Mast Unit
LENGTH: 6.7M (21'9") WIDTH:1.8m(2'9")
HEIGHT:1.10m(1'6")

An independent electrically operated winch with remote cable control is fitted to the Sampson post so that the derrick legs can be raised and lowered safely.

Also including removable mud guards and overrun braking mechanism incorporating towing eye and parking brake lever.



DANDO DRILLING
INTERNATIONAL LTD

PRELIMINARY METHOD STATEMENT – ROTARY DRILLING

INTRODUCTION

All foreman drillers will be suitable trained and experienced. Work will be undertaken to conform to the current BS 5930 and BS 1377 standards, BDA 'Code of Safe Drilling Practice' and 'Guidance Notes for the Safe Drilling of Landfills and Contaminated Land' as appropriate and the contract specification.

The geotechnical engineer will issue written instructions for each borehole before it is started.

INITIAL LOCALTION

The drilling rig will be set up in a manner that is safe for operating personnel. In particular the vicinity will be checked for any obvious signs of services or other hazards.

Equipment arisings and spoil will be placed so as not to present a hazard to the operatives or the general public.

The borings will be numbered precisely as outlined by the engineer.

Rotary drilling will be undertaken using a top drive Deltbase 520 or Soil Mech Rotary Rig.

A crane shall be utilised to lift the rotary rig onto the deck of the jack up platform. The rig shall then be chained / welded to the deck of the jack up platform.

Spill kits shall be carried by all rigs.

Fuel shall be limited to 25 litre containers and spill trays utilised when refuelling. No fuel will be stored on board the marine plant.

TYPES OF DRILLING

Rotary drilling will be carried out into the bedrock. Open hole drilling may be carried out where core drilling is not required. Borehole size will vary depending on the requirement of the project but will generally be a minimum of 150mm diameter and a maximum of 190mm in overburden. In rock the borehole size shall be approximately 100mm diameter. Typical depths for rotary drilling shall be 0 to 30m below ground level and will be determined by the geotechnical engineer.

Rotary core drilling will normally be carried out with diamond or tungsten carbide tipped bits which will be suitable for the percentage core recovery and diameters specified.

Where rotary drilling is required within weathered rock strata which include friable or soft layers, softer lenses within solid rock, or other than solid continuous strata, the driller will bring to site suitable well maintained equipment to produce cores in such strata as to meet the recovery requirements and the specification.

The drilling fluid will normally be potable water or reservoir water.

Rotary core drilling will produce cores of circular cross section of the nominal specified diameter throughout the core length. The type and state of the drill bit, feed rates and management of the drill will be such that the specified core recovery in any single run can be obtained where the condition of the rock permits.

The depth of the start and finish of the core run, the depth to the base of the casing and the diameters of the core and casing will be recorded, together with the water level whenever practicable. The flush returns, loss of flush and condition of core bit and barrel, core recovery and possible location of any core losses will also be recorded. For any overwater boreholes it is intended that the flush returns are released directly into the reservoir.

Where it is necessary to provide rock by open hole drilling from ground level or by rotary core drilling, then the rock will be proved to 1.5m depth or as otherwise instructed by the Engineer.

The core will be extruded in the same direction as it entered the barrel, without vibration and in a manner to prevent disturbance. The cores will be extruded directly into the core box or into a correctly sized detachable channel.

After extrusion all cores will be wrapped/taped in mylar and will immediately be placed in core boxes to prevent damage to the cores.

CORE BOXES, PACKAGING ARRANGEMENT, LABELLING, STORING

Core boxes will be soundly constructed in timber in other approved material, fitted with stout carrying handles, fastening and hinged lids.

Cores will be placed in the box with the shallowest core to the top left hand corner, the top being considered adjacent to the hinged section.

Depth will be indicated by durable markers at the end of each drill run. The depth at the beginning and end of each channel in the core box will likewise be labelled. Where 100% recovery has not been achieved, core spacer pieces clearly indicating the missing lengths will be placed in the boxes.

IN SITU TESTING AND MEASUREMENTS

The Standard Penetration Test (SPT) will be carried out as per BS 1377: 1990.

The SPT assembly will be lowered to the base of the hole and then any penetration due to self-weight will be recorded.

During the SPT the blows for two increments of 75mm, or the penetration after 25 blows will be recorded as the seating drive. The seating drive will be terminated after 150mm penetration or 25 blows whichever is reached first and the test drive will then be started.

After the seating drive of the SPT blows for four increments of 75mm will be recorded as the test drive. The test drive will be terminated after 300mm penetration or a total of 50 blows in the test drive, whichever if reached first and the penetration and blows and for each increment will be recorded.

A small disturbed sample from the split spoon sampler will be taken.

The details of the SPT will be recorded on the Daily Report. Th size and depth of casing and depth of water will be recorded. The number of blows for each of the 75mm increments will be recorded together with the sample length. If the full penetration is not obtained, then the number of blows and actual penetration for the increment will be recorded.

During the normal boring operations when groundwater is encountered the depth and point of entry will be noted and operations stopped for not more than 20 minutes and the depth from ground level to water level recorded at five minute intervals. The boring will then be continued unless otherwise instructed. The depth at which casing seals off the entry of water will be recorded.

If groundwater occurs as a slow seepage then the level will be noted and the boring continued.

Water levels will be recorded at the beginning and end of each shift.

At each occasion groundwater is recorded the depth of hole and sizes of casing will be noted.

Field permeability tests will be carried out under the direction of the Engineer. A record of each test will be made on the Daily Report.

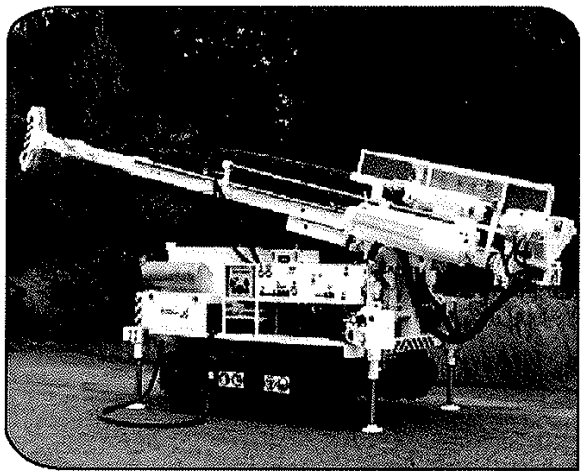
For periods where the rig is unattended / outside of work shift, then the rig shall be left standing in a manner that does not allow tidal variation to influence the works. Where a jack up is involved this will require jacking the work platform to a height beyond the influence of the tides / swell / waves.

DeltaBase 520
Technical Data Sheet

Release Date: Feb 25th, 2008

PRODUCT OVERVIEW

The DeltaBase 520 is a compact and lightweight multipurpose drill rig designed for geotechnical investigation, construction and exploration drilling. Its ability to perform a variety of different types of drilling makes the DB520 a valuable asset to any drill fleet.



Features:

- Fast and easy changes between wireline coring, DTH drilling, flush rotary and auger drilling
- Automatic SPT equipment with digital blow counter
- Hydraulic mast raising and independent hydraulic jacks for fast rig mobilization
- Standard safety features including an interlocked safety cage and low speed, low torque rotation for safer rod management
- Hydraulic make and break rod clamps

STANDARD DRILLING SYSTEMS

	METRIC SYSTEM	US CUSTOMARY SYSTEM
CORE DRILLING		
NO / NO2" / NV / NV2"	210 m	690 ft
HO / HV	150 m	490 ft
PO / PV	100 m	330 ft
SQ	60 m	196 ft
ROTARY DRILLING (TRICONE)		
Hole diameter - 216 mm (8.5 in)	120 m	390 ft
AUGER DRILLING		
Hole diameter - 150 mm	15-20 m	49-65 ft
DTH DRILLING PACKAGE		
Maximum Size DTH Hammer	98 mm (3 7/8") @ max 17,2 m³ / min @ max 24 bar	
Maximum Depth Capacity	200 m	656 ft
Recommended Hole Size	115 mm	4.5 in
Maximum Hole Size	127 mm	5 in
Recommended Rod Size	76,1 mm	3 in

DTH SHOCK ABSORBER FOR ROTARY HEAD INCLUDED
Notes: Air compressor must be selected according to hammer used.
In-line oiler and shock absorber are required for DTH drilling.

DeltaBase 520
Technical Data Sheet

Release Date Feb 25th, 2008 Page 2 of 6

TECHNICAL SPECIFICATIONS

	METRIC SYSTEM	US CUSTOMARY SYSTEM
PRIME MOVER		
Standard	Deutz D914L04 air cooled engine, COM III	
Fuel	Diesel	
No. of Cylinders	4	
Swept Volume	4,31 l	263 cu. in
Power	53 KW @ 2300 rpm	71 hp @ 2300 rpm
Fuel Tank Capacity	60 l	16 gal
Specific Fuel Comsumption	225 g/kWh	
Standard engine for work up to	1000 m @ 30°C 1700 m @ 0°C without power loss	
PRIME MOVER FOR HIGHER AMBIENT TEMPERATURE OR HIGHER ELEVATIONS - OPTIONAL EQUIPMENT		
Engine	Deutz BF4L914 air cooled engine, COM II	
Fuel	Diesel	
No. of Cylinders	4, turbocharged	
Swept Volume	4,31 l	263 cu. in
Power	72,4 kW @ 2300 rpm	97 hp @ 2300 rpm
Fuel Tank Capacity	60 l	16 gal
Specific fuel consumption	223 g/kWh	
Maximum altitude without power loss	53 kW - 1000 m @ 60°C, 2000 m @ 50°C, 3000 m @ 35°C, 4000 m @ 25°C, 5000 m @ 10°C	
ROTARY HEAD DD52		
Low Gear	4890-977 Nm / 48-25 rpm	3606-720 lb-ft / 48-250 rpm
High Gear	1859-371 Nm / 140-740 rpm	1371-273 lb-ft / 140-740 rpm
Bore - Inside Diameter	62 mm	2.44 in
Flushing Head - Inside Diameter	22 mm	0.87 in
Rotation Motors	Danfoss - variable / reversible with pressure remote	
Top drive Flange	2 3/8" API Reg PIN	
Floating spindle and flushing head included		
Hydraulic motor at max/min displacement, diesel engine at 2200 rpm		
Gear Ratio - 1st	7.68 : 1	
- 2nd	2.92 : 1	
Rotary Head Carriage with side shift		

DeltaBase 520
Technical Data Sheet

Release Date: Feb 25th, 2008 Page 3 of 6

TECHNICAL SPECIFICATIONS

	METRIC SYSTEM	US CUSTOMARY SYSTEM
HYDRAULIC SYSTEM		
Primary Pump	Parker bent axis, fixed displacement	
Maximum Flow	66 lpm @ 2200 rpm	17.5 gpm @ 2200 rpm
Maximum Pressure	250 bar	3626 psi
Secondary Pump	Cassappa gear pump	
Maximum Flow	59 lpm @ 2200 rpm	15.5 gpm @ 2200 rpm
Maximum Flow (2nd)	48 lpm @ 2200 rpm	12.5 gpm @ 2200 rpm
Maximum Pressure	175 bar	2538 psi
Oil Tank Capacity	200 l	53 g
DRILL MAST AND FEED SYSTEM		
Feed Stroke	3400 mm	11.2 ft
Feed Speed - up	21 m/min	69 ft/min
- down	34 m/min	111 ft/min
Fast Feed Speed - up	48 m/min	157 ft/min
- down	75 m/min	246 ft/min
Pull Down Force	25 kN	5620 lbf
Pull Back Force	38 kN	8550 lbf
Drilling Inclination	45° horizontal to 90° vertical down	
Mast Dump	500 mm	1.6 ft
Rod Length	3000 mm max	9.84 ft max
MAIN WINCH SH220		
Line Pull	20 kN	4500 lbf
Line Speed	44 m/min	114 ft/min
Cable Length, 12 mm	30 m	98.4 ft
ROD CLAMPS		
Maximum Diameter	220 mm	8.6 in
Maximum Clamping Capacity	175 kN	4500 lbf
Maximum Breaking Torque	20,5 kNm	15120 lb ft

DeltaBase 520
Technical Data Sheet

TECHNICAL SPECIFICATIONS

	METRIC SYSTEM	US CUSTOMARY SYSTEM
UNDERCARRIAGE		
Type	Crawler mounted triple grouser steel tracks	
Maximum Driving Speed	1,5 km/h	1.0 mph
Axis Distance	1715 mm	67.5 in
Maximum Ground Pressure	0,053 MPa	7.7 psi
Climbing Capacity	(Grade ability 60%) approximately 30^0	
Optional Undercarriage	Trailer Mounted, Skid Mounted	
MAST EXTENSION FOR LONGER ROD PULL		
Maximum Rod Pull	2 x 3 m (6 m)	19.7 ft
Fitted onto standard mast to pull 6 m rod		
Rod Storage Rack	30 pieces of 76 mm rods	
Towing Hook on Rear of Rig		
Air Connection on Rear of Rig for DTH Compressor		
OPTIONAL EQUIPMENT		
WIRELINE WINCH		
Line Pull	6,5 kN	1461 lbf
Line Speed	100 m/min	328 ft/min
Cable Length 6 mm	250 m	820 ft
MUD PUMP DP100		
Continuous Flow	90 l/min	23.7 gpm
Maximum Flow	100 l/min	26.4 gpm
Pressure	30 bar	435 psi
MUD PUMP DP200		
Continuous Flow	160 l/min	42 gpm
Maximum Flow	180-200 l/min	47-53 gpm
Pressure	30 bar	435 psi
Flushing Head with 42 mm ID included		
FMC PUMP LO918		
Flow	100 l/min	26 gpm
Pressure	45 bar	652 psi

DeltaBase 520
Technical Data Sheet

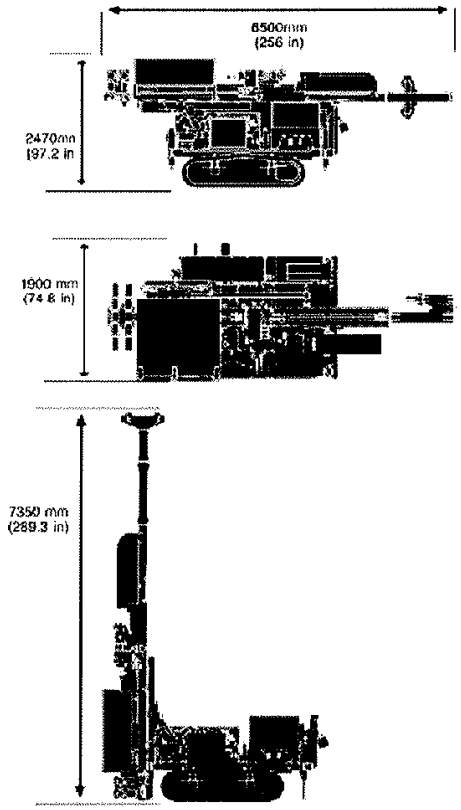
Release Date: Feb 25th, 2008 Page 5 of 6

TECHNICAL SPECIFICATIONS

	METRIC SYSTEM	US CUSTOMARY SYSTEM
SPT (STANDARD PENETRATION TEST) AUTO HAMMER		
Impact Rate	1-30 bpm	
Travel Length	762 mm	30 in
Hammer Weigth	63,5 kg	140 lb
CENTRALIZER - ROD GUIDE		
Exchangable Inserts for Rods	76, 89, 114, 127, 140, 168, 193, 220 mm (Choose required sizes)	
OIL LINE LUBRICATOR FOR DTH DRILLING		
Oil Tank Capacity	20 l	5.3 gal
HIGH TEMPERATURE OIL COOLER		
Upgraded oil cooler for ambient temperature over 35^0 C (95^0 F)		
NIGHT LIGHTS		
No. of Pieces	4	
JAW BODY FOR CLAMP AND BREAK OUT FOR CORING		
Jaw Plates for Coring	BQ / BW	
(choose required sizes)	NQ / NW	
	HQ / HW	
	PW	
MIST PUMP		
Flow	30 l/min	8 gpm
Pressure	200 bar	2900 psi
ACCESSORIES		
Auxiliary Work Vice	180 mm wide, 220 mm long, 120 mm deep clamp, rotating mounting base and separate rod support work bracket	
Remote Control	Radio remote control for driving	
Auxiliary Diesel Filling Pump	Electric powered diesel filling pump	
Data Logger Couplings	3 Couplings for data logger (feed pressure, rpm, mud pump pressure)	
Instrument Vandal Covers	Lockable covers for control panels and instruments	
Rubber Crawler Pads	Full set (76 pcs)	
Tool Box	With necessary set of tools for basic maintenance and lubrication	
Environmental oil in hydraulic system		

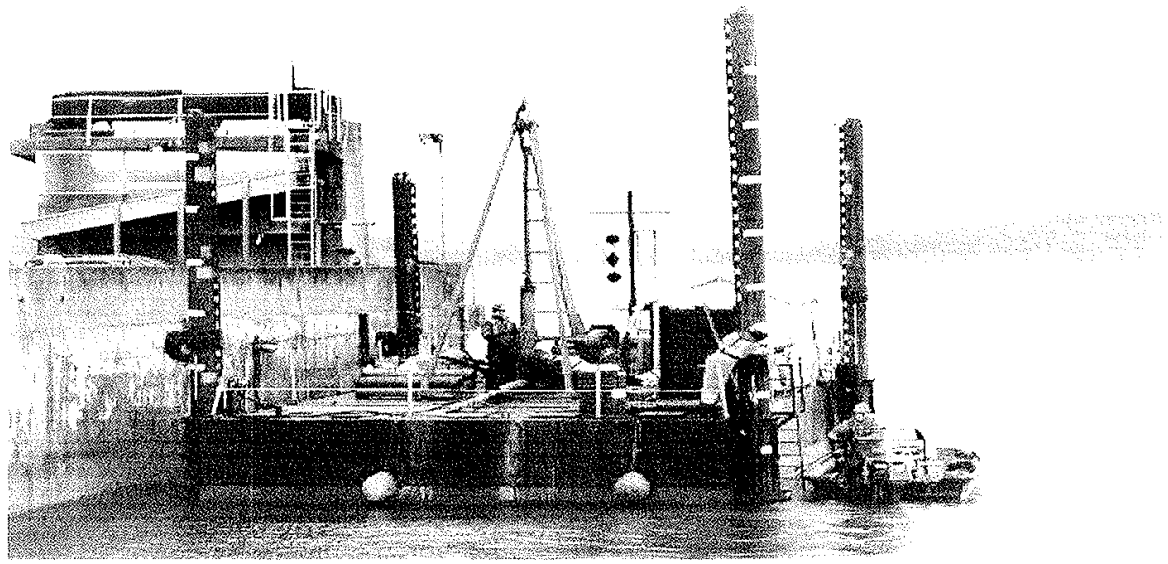
DeltaBase 520
Technical Data Sheet

DIMENSIONS AND WEIGHTS*

WEIGHT	
Operational Weight = 6500 kg (14330 lb) (approx.) Dry Weigth = 6200 kg (13670 lb)	Consisting of: Diesel Power Unit Group DEUTZ D914L04 4.10 litre 4 cylinder Hydraulic Module Main Winch c/w Cable Hydraulic Mast Raising (Independent) Lower Mast Assembly Levelling Jacks (Hydraulic) Rotary Head Crawler - triple grouser type Battery Foot Clamp and Breaking Clamp
MEASUREMENTS	
UNDERCARRIAGE Width = 1900 mm (74.8 in) Pad width = 300 mm (11.8 in) Weight = 1035 kg (2280 lb) SPT Hammer weight = 63,5 kg (140 lb) Drop stroke = 760 mm Total weight = 180 kg (397 lb)	

* Dimensions and weights may vary depending on options and should be checked before starting an operation.

JACK UP BARGE



The typical pontoon may be made up of 2 main saddle pontoons with two more floatation tanks and a bridge that joins all together which gives a working deck area of 67 sq.m. With 4 x 18m spud legs this allows it to work in depths of up to 15 metres. Twin rams on each leg give a stroke of 1.53 metres and this can give a payload of up to 13 tons. The Hydraulics is worked by two power packs which provide maximum reliability and rapid movement of the rams.

Dimensions & Specifications:

Deck Area	11m x 6m
Moulded Depth	2m
Legs	4 x 18m
Rams	Two per leg 1.53m stroke
Power pack	Twin Diesel with twin pump
Deck Load	12 tones approx.
Total Buoyancy	15 tons
Year Built	1999 (refurbished in 2008)
Dead Weight	26 tons with legs