October 2023

Stage 2: Appropriate Assessment -Natura Impact Statement

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





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Stage 2: Appropriate Assessment - Natura Impact Statement

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 Appropriate Assessment to assess the likely significant effects, if any, 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) on nearby sites with European conservation designations (i.e., European sites).

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').

This report has been prepared to inform the Consenting Authority with regard to Stage 2 (Appropriate Assessment) of the proposed works through the research and interpretation of best scientific, geographic and engineering knowledge and in view of the conservation objectives of the surrounding European sites. This report seeks to determine whether the proposed works will, on its own or in-combination with other plans / projects have a significant effect on European sites within a defined radius of the Site.

On completion of the Appropriate Assessment Screening Report, it was found necessary to progress to a Stage 2 of the Appropriate Assessment process and prepare a Natura Impact Statement (NIS) to assess effects on the integrity of the European sites.



Figure 1-1: Site Location

1.1 Statement of Authority

The report was reviewed and approved by Ms. Kathryn Broderick, Principal Environmental Consultant. Kathryn has over 6 years' experience working in the ecological consultancy sector, including the preparation of Appropriate Assessments, habitat surveys and specialist protected species surveys.

1.2 Regulatory Context

The following guidance documents were adhered to for the preparation of this NIS report:

- Appropriate Assessment for Screening for Development Management, The Office of the Planning Regulator [1];
- Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission [2, 3];
- *Guidelines for Ecological Impact Assessment in the UK and Ireland*, Chartered Institute of Ecology and Environmental Management [4];
- *Managing Natura 2000 Sites:* The Provision of Article 6 of the Habitats Directive 92/43/EEC [5];
- Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities, DoEGLH [6]; and,
- Appropriate Assessment under Article 6 of the Habitats Directive; Guidance for Planning Authorities. Circular NPW 1/10 and PSSP 2/10, DoEGLH [7].

This Natura Impact Statement (NIS) was prepared in accordance with and in compliance with the following legislation:

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna better known as "The Habitats Directive". This provides the framework for legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000.

For completeness, the Planning and Development Act 2000 (as amended) states that "European site" means:

- a. A candidate site of Community Importance;
- b. A site of Community Importance, F815 [(ba) a candidate Special Area of Conservation];
- c. A Special Area of Conservation (SAC);
- d. A candidate Special Area of Conservation (cSAC); or,
- e. A Special Protection Area (SPA)

These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/EEC as amended 2009/149/EC) (better known as "The Birds Directive"). Article 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect Natura 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment.

"Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually

or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public"

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. First, the project should aim to avoid any negative impacts on European sites by identifying possible impacts early in the planning stage and designing the project in order to avoid such impacts. Second, mitigation measures should be applied, if necessary, during the Appropriate Assessment (AA) process to the point, where no adverse impacts on the site(s) remain. If the project is still likely to result in adverse effects, and no further practicable mitigation is possible, it is rejected. If no alternative solutions are identified and the project is required for imperative reasons of overriding public interest (IROPI test) under Article 6 (4) of the Habitats Directive, then compensation measures are required for any remaining adverse effect.

1.3 Stages of Appropriate Assessment

There are four distinct stages to undertaking an AA as outlined in current European Union (EU) and Department of Environment, Heritage and Local Government (DOEHLG) guidance:

Stage 1: Screening

This process identifies the potential impacts of a plan or project on a European site, either alone or in combination with other plans and projects and considers whether these impacts are likely to be significant. If potentially significant impacts are identified the plan or project cannot be screened out and must proceed to Stage 2.

Stage 2: Appropriate Assessment

Where potentially significant impacts are identified, an assessment of the potential mitigation of those impacts is required; this stage considers the appropriateness of those mitigation measures in the context of maintaining the integrity of the European sites. If potential significant impacts cannot be eliminated with appropriate mitigation measures, the assessment must proceed to Stage 3.

Stage 3: Assessment of Alternatives Solutions

This process examines alternative ways to achieve the objectives of the plan or project that avoid adverse impacts on the integrity of the European site if mitigation measures are deemed insufficient.

Stage 4: Imperative Reasons of Overriding Public Interest (IROPI)

Assessment where no alternative solution exists for a plan or project and where adverse impacts remain. This includes an assessment of compensatory measures, where in the case of projects or plans, can be considered necessary for IROPI.

2 METHODOLOGY

2.1 Determining Zone of Influence

The starting point for this assessment was to determine the Zone of Influence. The Zone of Influence comprises of the area which the proposed works may potentially affect the conservation objectives (or qualifying interests) of a European site.

Guidance in Appropriate Assessment of plans and projects in Ireland notes that a distance of 15km is recommended for the identification of relevant European sites [6]. However, guidance from the NPWS recommends that the distance should be evaluated on a case-by case basis with reference to the nature, size and location of the project, the sensitivities of the ecological receptors, and the potential for in-combination effects (cumulative) [7]. For some projects the distance could be greater than 15km, and in some cases less than 100m.

Definition of the zone of influence for the proposed works includes evaluating the following:

- Identification of the European sites that are situated within, in close vicinity or downstream within the zone of influence of the proposed works;
- Identification of the designated habitats and species and Conservation Objectives for the identified European sites;
- Identification of the environmental conditions that stabilise and increase the qualifying interests of the European sites towards favourable conservation status;
- Identification of the threats/impacts actual or potential that could negatively impact the conservation objectives for the European sites;
- Identifying the activities of the proposed works that could give rise to significant adverse impacts; and,
- Identification of other plans or projects, for which in-combination impacts would likely have significant adverse effects.

2.1.1 Source-Pathway-Receptor Model

European sites are only at risk from significant effects where a source-pathway-receptor link exists between a proposed works and a European site. This can take the form of a direct impact (e.g., where the proposed works are located within / in close vicinity to the boundary of a European site), or an indirect impact where impacts outside of the European site but affect ecological receptors within (e.g., impacts to water quality which can affect estuarine habitats at a distance from the impact source).

The likely effects of the proposed works on any European site have been assessed using a source-pathway-receptor model. A source-pathway-receptor model is a standard tool used in environmental assessment [8] [9]. The model comprises of:

- A *source*: any potential impacts from the proposed works, e.g., the runoff of sediment / construction pollution.
- A *pathway*: the means or route by which a source can affect the ecological receptor.
- A *receptor*: the qualifying interests and / or special conservation interests of the European sites.

In order to establish the Zone of Influence of the proposed works, the likely key environmental impacts / changes associated with the proposed works were determined having regard to the project characteristics set out in Section 3.3 of this report. Zone of Influence for various potential impact pathways are discussed in Section 4.1.

2.2 Desk Based Studies

A desk-based review of information sources was completed, which included the following sources of information:

- Review of aerial maps of the Site and surrounding area;
- The National Parks and Wildlife Service (NPWS) website was consulted with regard to the most up to date detail on conservation objectives for the European sites relevant to this assessment [10];
- The Kilkenny County Council Planning Portal to obtain details about existing / proposed developments in the vicinity of the Site [11];
- The Waterford County Council Planning Portal to obtain details about existing / proposed developments in the vicinity of the Site [12];
- The Wexford County Council Planning Portal to obtain details about existing / proposed developments in the vicinity of the Site [13];
- The Department of Housing, Local Government and Heritage's planning portal the National Planning Application Database to obtain details about existing / proposed developments in the vicinity of the Site [14];
- The National Biodiversity Data Centre (NBDC) website was consulted with regard to species distributions [15]; and,
- The EPA Maps website was consulted to obtain details about watercourses in the vicinity of the Site [16].

2.3 Field Based Studies

2.3.1 Otter Surveys

A bankside otter survey was carried out at the Site and the wider area on the 19th of April 2023 by two (2No.) suitably qualified and experienced MOR ecologists. The survey took place at low tide when the mudflats were fully exposed and accessible.

The survey aimed to identify and examine areas where otter might occur by noting any evidence of otter observed. Evidence of otter searched for included:

- Holts (features log piles, caves and cavities);
- Slides (flattened areas of mud or vegetation);
- Couches (resting areas where the grasses or bank substrates have been flattened);
- Paw prints;
- Evidence of foraging (usually in the form of feeding remains such as fish scales and shellfish); and,
- Spraints (faeces containing food remains); and,
- Anal jellies & smears (gelatinous secretions that is typically brown in colour with the characteristic otter odour).

The survey also took note of the general habitat description, habitat evaluation, weather conditions, human impact and other notable species.

2.3.2 Survey Limitations

No survey limitations were encountered.

3 DESCRIPTION OF THE PROJECT

3.1 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 3-1: Site Context and Overview



3.2 Watercourses within the Vicinity of the Site

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

The Site is located within one (1No.) watercourse and there is 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 [16]. 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 [16]. 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 [16]. 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 [16]. The Eastern Celtic Sea is considered to have '*high*' water quality and is considered '*not at risk*' [16].

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 3-2.

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 [16]. 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 Luffany River is considered to be '*moderate*,' and the status of this river is considered to be under '*review*' [16].

The location of the key surface water features in the vicinity of the Site are illustrated in Figure 3-2 below.



Figure 3-2: Watercourses in the Vicinity of the Site

3.3 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.

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 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 which will allow the wharf substructure (i.e., the piles) to be designed. 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.

3.4 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 [17]. 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) [17]. Drilling can produce underwater pressure levels generally within the 145-190 dB re 1μ Pa @ 1m [17].

3.5 Construction Procedure

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 works to prevent environmental pollution that may occur within the area:

- C532 Control of Water Pollution from Construction, Guidance for Consultants and Contractors [18];
- C584 Coastal and Marine Environmental Site Guide for Protection of Water Quality and in turn Aquatic Life, During the Construction Phase of the Works [19];
- C741 Environmental Good Practice on Site (4th edition) [20];
- C774 Coastal and Marine Environmental Site Guide (Second Edition) [21];
- Guidance for the Treatment of Otters Prior to the Construction of National Road Schemes [22];
- BS 5930: 2015 Code of Practice for Ground Investigations; 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' [23].

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.

3.6 Monitoring Works

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 NIS, the Non-Statutory Environmental Report (NSER) and 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.

4 IDENTIFCATION OF EUROPEAN SITES

In accordance with the European Commission Methodological Guidance [5] 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 [6] 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 or not a particular European site is likely to be negatively affected by a project are:

- The physical distance from the project to the European 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 [1], few projects have a zone of influence this large, however the identification of European 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 4-1 and Table 4-1.



Figure 4-1: Site Location and European Designated Sites within 15km

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		

Table 4-1: European Designated Sites within 15km of the Site

4.1 Identification of European Sites within Zol

Habitat Loss / Degradation

The Site is located within an area adjacent to the Port of Waterford and is used primarily for activities relating to the Port. 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) [24]. 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' [25]. This habitat is not classified as designated habitat under the Lower River Suir SAC, in which the Site is located. Therefore, there is no potential for direct habitat loss as a result of the proposed works, given that there are no designated habitats located within the Site boundary.

However, the Site is hydrologically connected to the Lower River Suir SAC and the River Barrow and River Nore SAC. Therefore, there is potential for indirect habitat loss and degradation via potential water quality deterioration. For further details see water quality impairment below. Further consideration will be given to assess potential habitat loss and degradation due to water quality impairment within the Lower River Suir SAC and the River Barrow and River Nore SAC as a result of the proposed works.

Therefore, these two (2No.) European sites will be screened in for further consideration.

Water Quality Impairment

Potential water quality impacts would typically be associated with the release of sediment and other pollutants to surface water during the works, therefore the ZoI would be considered to include the receiving waterbodies within and downstream of the Site during the proposed works within 5km. The Lower River Suir SAC and the River Barrow and River Nore SAC are within the 5km ZoI. Therefore, further consideration will be given to this European site and its qualifying features of interest to assess potential impacts arising from water quality impairment as a result of the proposed works.

Air Quality Impairment

According to the Institute of Air Quality Management (IAQM) Guidelines, the potential adverse effects from dust occur to ecological receptors from dust associated with proposed works

within a distance of 50m from the boundary of the Site [26]. However, the proposed works will constitute only underwater works. Therefore, there is no potential for dust to arise as part of the proposed works and as such potential dust impacts have been screened out from further consideration.

Noise / Disturbance

Noise from the proposed works has the potential to cause disturbance to resting, foraging and commuting qualifying species of the European sites. As there will be in-river works required for the proposed works, there is potential for underwater noise impacts beyond the immediate vicinity of the Site.

Ambient Noise

Individual species will provoke different behavioural responses to disturbances at different distances from the source of disturbance.

- Transport Infrastructure Ireland (formally the National Roads Authority) has produced a series of best practice planning and construction guidelines for the treatment of certain protected mammal species (i.e. otter), which indicate that disturbance to terrestrial mammals would not extend beyond 150m [27]; and,
- Studies have noted that different types of disturbance stimuli are characterized by different avifaunal reactions, however, in general a distance of 300m can be used to represent the maximum likely disturbance distance for waterfowl [28].

The ZoI for noise / disturbance is therefore established as the Site with a 300m buffer.

The habitats onsite are suitable for otter which are a designated species for the Lower River Suir SAC and the River Barrow and River Nore SAC. Therefore, given the Site is located within the Lower River Suir SAC, this European site will be scoped in for further consideration.

Underwater Noise on 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) [29];
- 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 [29]; and,

• Fish species with an extension of the swim bladder that terminates within the inner ear – such as herring or Twaite shad. These species are able to 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 μ Pa [17]. 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 μ Pa range [17].

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 [30]. 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 4-2: 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 [30]

	Mortality &		Pohovioural		
Type of Animal	Potential Mortal Injury	Recoverable Injury	TTS	Masking	Effects
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, given the possibility of temporary threshold shift, masking and behavioural effects to designated fish species, the Lower River Suir SAC and the River Barrow and River Nore SAC will be screened in for potential underwater noise impacts.

Underwater Noise on Otter

Otters are known to have acute sense of sight, smell and hearing for which they rely on for traveling through muddy water and for foraging [30]. The potential impacts that are likely to occur to otter are not well studied, and as such the levels of Temporary Threshold Shift (TTS)¹ and Permanent Threshold Shift (PTS)² for otter are not known.

The Site is located within the waters immediately adjacent to an existing port, therefore, the area is currently subjected to anthropogenic noise from port related activities. As such, it can be concluded that otter within the vicinity of the Site are subject to anthropogenic noise sources and are habituated to anthropogenic noise.

However, taking a precautionary approach, it is considered that the noise from the proposed works will have the potential to adversely affect otter. Therefore, otter designated under the Lower River Suir SAC and the River Barrow and River Nore SAC will be screened in for potential underwater noise impacts.

Identification of European Sites

The boundaries of six (6No.) are located within 15km from the Site. The Site is located within the Lower River Suir SAC. The Site is hydrologically linked to the River Barrow and River Nore SAC.

Given the short duration of the proposed works, distance separating the Site from the Tramore Dunes and Backstrand SAC, Bannow Strand SAC, Tramore Back Strand SPA, and Bannow Bay SPA, and the intervening lands separating the Site from the European sites and the lack of impact pathways, it is considered that the proposed works will not result in adverse effects to these European sites, and they have therefore been screened out from further consideration.

The following European sites listed in Table 4-3 have been screened in for further consideration to assess potential adverse effects resulting from the proposed works.

Site Name	Code	Distance at closest point and source-pathway-receptor link
Lower River Suir SAC	002137	The Site is located within the Lower River Suir SAC, see Figure 4-2. Given the location of the Site within the SAC, potential water quality impairment that could result in habitat degradation and potential ambient and underwater noise disturbance will be taken forward for further consideration.
River Barrow and River Nore SAC	002162	The Site is located 1km southwest of the River Barrow and River Nore SAC, see Figure 4-1. Therefore, given the hydrological connection to the SAC, potential water quality impairment that could result in habitat degradation and potential ambient and underwater noise disturbance will be taken forward for further consideration.

Table 4-3: Eu	ropean Desi	gnated Sites	within Zol
		9	

The screening assessment for individual designated habitats and species for each of the screened in European sites and the potential for them to be adversely affected by the proposed works are presented in Section 6 below.

Further information on the screened in European sites is provided below.

¹ TTS may result in a reduction in hearing sensitivity but is not permanent.

² PTS may result in auditory injuries and in some cases can lead to death.

4.2 Lower River Suir SAC (Site Code: 002137)

The Lower River Suir SAC, is an extensive site, which covers the freshwater stretches of the River Suir from south of Thurles, Co. Tipperary, to the Barrow-Suir confluence east of Cheekpoint, Co. Waterford.

The SAC is comprised of a number of Annex I habitats, including the priority habitats alluvial forest and Yew woodland (Tables 4-4 and 4-5 below). Other habitats within the SAC include wet and dry grassland, marsh, reed swamp, improved grassland, tidal river, deciduous woodland and mudflats.

The SAC is of conservation interest for the presence of a number of Annex II species including Freshwater Pearl Mussel, Otter, White-clawed Crayfish, Salmon, Twaite Shad and three species of Lampreys- Sea, Brook and River Lamprey. The site is one of only three known spawning grounds in the country for Twaite Shad. The site is also of ornithological importance for the number of Annex I bird species, E.U. Birds Directive including Golden Plover, Whooper Swan and Kingfisher.

Intensive agriculture is the primary land use along the banks of the river. The widespread use of fertiliser and slurry pose the greatest threats to the conservation status of the SAC due to the related impairment in water quality. Furthermore, there are multiple industrial developments, which border the SAC, and discharge into the river. Fishing is the primary tourism attraction along the stretches of the Suir, including both commercial and leisure fishing with numerous Angler Associations [31].

Qualifying Habitats (* denotes Priority Habitat)	Code	Site Specific Conservation Objective
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1330	Restore favourable conservation condition
Mediterranean salt meadows (Juncetalia maritimi)	1410	Restore favourable conservation condition
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	3260	Maintain favourable conservation condition
Old sessile oak woods with Ilex and Blechnum in British Isles	91A0	Restore favourable conservation condition
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno- Padion, Alnion incanae, Salicion albae)	91E0	Restore favourable conservation condition
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	6430	Maintain favourable conservation condition

Table 4-4: Qualifying Annex I Habitats for the Lower Suir SAC

Table 4-5: Qualifying Annex II Species for the Lower Suir SAC

Species	Species Name	Code
Mammals listed on Annex II of the Habitats Directive	Otter (<i>Lutra lutra</i>)	1355
Fish listed on Annex II of the Habitats Directive	Atlantic salmon (Salmo salar)	1106
	Sea lamprey (Petromyzon marinus)	1095
	Brook lamprey (Lampetra planeri)	1096

Species	Species Name	Code
	River lamprey (Lampetra fluviatilis)	1099
	Twaite shad (Alosa fallax)	1103
Molluscs listed on Annex II of the Habitats Directive	Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)	1029
Crustaceans listed on Annex II of the Habitats Directive	White-clawed crayfish (Austropotamobius pallipes)	1092

4.3 River Barrow and River Nore SAC (Site Code: 002162)

The River Barrow and River Nore SAC consists of the freshwater stretches of the Barrow and Nore River catchments extending from the Slieve Bloom Mountains to the estuary and tidal elements in Creadan Head, Waterford.

Species rich habitats (Annex I of the EU Habitats Directive) including estuaries, alluvial forests, petrifying springs, and intertidal mudflats and sandflats can be found within this SAC.

This SAC is of considerable conservation significance for multiple reasons:

- Ornithological importance: This SAC supports Kingfisher, a nationally important bird population listed in Annex I of the EU Birds Directive. One SPA (River Nore), designated under the EU Birds Directive, is also located within the SAC; and,
- This SAC supports multiple species listed on Annex II of the EU Habitats Directive, including Otter, River Lamprey and Salmon.

Land use within the SAC is primarily agricultural, principally grazing and silage production. Fishing is also a main tourist attraction along stretches of the main rivers and their tributaries. Other recreational activities such as boating, golfing, and walking also occur within the SAC. The main threats to the SAC and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and sewage plants, along with over-grazing, invasion of non-native species and land reclamation [32].

Qualifying Habitats (*denotes Priority Habitat)	Code	Site Specific Conservation Objective
Estuaries	1130	Maintain favourable conservation condition
Mudflats and Sandflats not covered by seawater at low tide	1140	Maintain favourable conservation condition
Salicornia and other annuals colonizing mud and sand	1310	Maintain favourable conservation condition
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1330	Restore favourable conservation condition
Mediterranean salt meadows (Juncetalia maritimi)	1410	Restore favourable conservation condition
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho - Batrachion vegetation	3260	Maintain favourable conservation condition

Table 4-6.	Qualifying	Annex I Habita	ts for the River	Barrow and	River Nore SAC
	Quantynig			Darrow and	

Qualifying Habitats (*denotes Priority Habitat)	Code	Site Specific Conservation Objective
European dry heaths	4030	Maintain favourable conservation condition
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	6430	Maintain favourable conservation condition
Petrifying springs with tufa formation (Cratoneuron)*	7220	Maintain favourable conservation condition
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	91A0	Restore favourable conservation condition
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*	91E0	Restore favourable conservation condition

Table 4-7: Qualifying Annex II Species for the River Barrow and River Nore SAC

Qualifying Species	Species Name	Code
Mammals listed on Annex II of the Habitats Directive	Otter (Lutra lutra)	1355
Molluscs listed on Annex II of the Habitats Directive	Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)	1029
	Nore Freshwater pearl mussel (<i>Margaritifera durrovensis</i>)	1990
	Desmoulin's whorl snail (<i>Vertigo</i> <i>moulinsiana)</i>	1016
Crustaceans listed on Annex II of the Habitats Directive	White-clawed crayfish (<i>Austropotamobius pallipes)</i>	1092
Fish listed on Annex II of the Habitats Directive	Salmon (Salmo salar)	1106
	Sea Lamprey (Petromyzon marinus)	1095
	Brook Lamprey (Lampetra planeri)	1096
	River Lamprey (Lampetra fluviatilis)	1099
	Twaite Shad (Alosa fallax)	1103
Flora listed on Annex II of the Habitats Directive	Killarney Fern (Trichomanes speciosum)	1421

4.4 Conservation Objectives

European and national legislation places a collective obligation on Ireland and its citizens to maintain a favourable conservation status at areas designated as candidate Special Areas of Conservation. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

According to the EU Habitats Directive, favourable conservation status of a habitat is achieved when:

• Its natural range, and area it covers within that range, is stable or increasing;

- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the near future; and,
- The conservation status of its typical species is favourable as defined below.

The favourable conservation status of a species is achieved when:

- Population data on the species concerned indicate that it is maintaining itself.
- The natural range of the species is neither being reduced or likely to be reduced for the near future; and,
- There is, and will continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Conservation objectives for all identified European SAC Sites are as follows:

'To maintain or restore the favourable conservation condition of the Annex I habitat(s) and the Annex II species for which the SAC has been selected.'

The full reports for the conservation objectives for the Lower River Suir SAC³ and River Barrow and River Nore SAC⁴ can be found on the NPWS website.

³ <u>https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002137.pdf</u>

⁴ https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf

5 STUDY RESULTS

5.1 Desk Based Study Results

Table 5-1 provides a summary of records of legally protected or otherwise notable species protected under the Lower River Suir SAC and River Barrow and River Nore SAC that occur within 2km of the Site (Grid Squares: S6711, S6611, S6414, S6514, S6615, S6714, S6614, S61L, S61R) [15].

CIEEM's guidelines recommend that consideration be given to the biodiversity conservation value of the species that occur within this zone of influence (as appropriate) [4].

Table 5-1: NBDC Records for Species Designated for the Lower River Suir SAC and the River Barrow and River Nore SAC within 2km of the Site (S48G)

Common Name	Scientific Name	Date of Last Record *	Designation
European Otter	Lutra lutra	20/06/2013	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II and IV

*Note that only species recorded within the past 10 years were included in this table. The parameter of 10 years was chosen to allow for habitat adaption and modification, it is considered that any records over 10 years old are not representative of the current distribution of species populations.

5.2 Field Based Studies

5.2.1 Otter Survey

Otter Habitat Preference

Otters are predominantly found in aquatic habitats along rivers, estuaries, canals and in still water bodies such as lakes. An individual otter usually maintains multiple Holts and Couches within its territory, which can extend up to 15km. Holts are located underground and can take many forms, they use natural crevices, associated with the roots of trees that grow along the river and lake banks or use burrows previously made from other animals. A holt will typically have multiple entrances which will allow otters to escape when disturbed. Couches are resting places above ground.

Otter can breed year-round, but primarily give birth in the spring and summer months with broods consisting of 2-3 cubs.

Otters are nocturnal animals and can be described as crepuscular. At night and in dark / silty water, the otter relies on their highly sensitive whiskers which detect their prey. In clear waters they utilise their strong eyesight to locate prey usually along the bottom of the waterbodies. Otters are described as opportunistic predators with a broad varied diet, such as salmonids, eel, small fish species and invertebrate.

Onsite Habitat Suitability Results

The Site is comprised primarily of the River Suir. 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 NBDC does hold records for otters within 2km of the Site [15]. During the targeted otter survey, otter footprints were identified in the mudflat leading towards the Luffany Stream. 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.

However, 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 5-1: Otter Survey Results

5.2.2 Invasive Species

No invasive species were identified during the surveys.

6 STAGE 2 NIS

6.1 Assessment of Potential Significant Effects

As per the Stage 1: Appropriate Assessment – Screening Report identified a number of features that will be brought forward for further consideration.

Therefore, this section provides recommendations for measures which will mitigate against any potential significant impacts of the proposed works on qualifying habitats and species throughout the duration of the project as identified in the AA. Taking a precautionary principle, the following effects with potential to adversely affect the conservation objectives of Lower River Suir SAC and the River Barrow and River Nore SAC were identified and considered:

- Potential loss of, or disturbance to designated habitats of Lower River Suir SAC and the River Barrow and River Nore SAC including:
 - Lower River Suir SAC Atlantic salt meadows & Mediterranean salt meadows; and,
 - River Barrow and River Nore SAC Atlantic salt meadows, Mediterranean salt meadows, estuaries, reefs, mudflats and sandflats not covered by seawater at low tide & Salicornia and other annuals colonizing mud and sand.
- Potential disturbance to designated species of Lower River Suir SAC and the River Barrow and River Nore SAC including:
 - Lower River Suir SAC: Freshwater pearl mussel, sea lamprey, brook lamprey, river lamprey, Twaite shad, Atlantic salmon & otter; and,
 - River Barrow and River Nore SAC: Freshwater pearl mussel, sea lamprey, brook lamprey, river lamprey, Twaite shad, Atlantic salmon & otter.
- Potential impairment of water quality for the Lower River Suir SAC and the River Barrow and River Nore SAC.

6.1.1 Loss of, or Disturbance to Designated Habitats

The proposed works will not result in any direct or indirect loss or disturbance to any of the Annex I habitats for which the Lower River Suir SAC and River Barrow and River Nore SAC are designated. This conclusion is based on the location, and scale of the proposed works. Furthermore, there are no Annex I habitats for which the Lower River Suir SAC and River Barrow and River Nore SAC are designated within or in the vicinity of the Site boundary. Therefore, no designated habitats will be removed or disturbed directly.

However, the Site is located within the Lower River Suir and as such there is a hydrological connection between the proposed works and designated habitats within both SACs. It is considered unlikely that any designated habitats will be significantly affected by the proposed works given the distance separating the Site and the designated habitats, and the fact that should any potential pollutants enter the Suir, they will be dispersed and diluted immediately within the regular flow and large expanse of the estuary. Regardless, implementing precautionary principle, water protection mitigation measures will be implemented. Therefore, it is considered that there is no potential for any loss of habitats designated for the Great Island Channel SAC as a result of the proposed works.

6.1.2 Potential Disturbance to Designated Species

As discussed in Section 4.1, the designated species that are considered to have the potential to be disturbed by noise during the proposed works include fish and otter, designated for both the Lower River Suir SAC and the River Barrow and River Nore SAC.

<u>Fish</u>

Sound propagates at 1500m/s in water as opposed to 330 m/s in air. Therefore, sound propagates much faster in water. Underwater noise moves from its source, i.e., the hull of a ship, through the water column as a pressure change known as particle motion. This movement is dependent on several factors including temperature, salinity, and pressure. Noise can also move through the water column and seabed as a result of vibrations, which can be detected considerable distances from the noise source.

As discussed in Section 3.4, the noise generated from such drilling is difficult to predict as it would be influenced by a variety of factors such as the nature of the riverbed i.e., whether drilling is into bedrock or not. 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 μ Pa range [17]. Nevertheless, potential risks to fish species from continuous noise (which are applicable for drilling, shipping and vessel movements), are low for mortality and injury; however, potential effects may include temporary threshold shift, masking and behavioural effects (refer to Table 4-2) [30].

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 7-1 below; however, please note no piling will be required for the proposed works.

Table 6-1: 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 [29]

		Mortality &		Impairment		Behavioural
Type of Animal	Parameter	Potential Mortal Injury	Recoverable Injury	TTS	Masking	Effects
Fish with no swim	SEL, dB re 1 µPa²s	>219	>216	>>219	(N) Moderate	(N) High (I)
motion detection)	Peak, dB re 1 µPa	>213	>213	-	(I) Low (F) Low	Moderate (F) Low
Fish: where swim bladder is not	SEL, dB re 1 µPa²s	210	203	>186	(N) Moderate	(N) High (I)
(particle motion detection)	article motion Peak, dB re 1 >207 >20 tection)	>207	-	(I) Low (F) Low	Moderate (F) Low	
Fish: where swim bladder is involved	SEL, dB re 1 µPa²s	207	203	186	(N) High (I) High	(N) High (I) High
(primarily pressure detection)	Peak, dB re 1 µPa	>207	>207	-	(F) Moderate	(F) Moderate
Eggs and larvae	SEL, dB re 1 µPa²s	>210	(N) Moderate	(N) Moderate	(N) Moderate	(N) Moderate

Type of Animal Paramete		Mortality &		Impairment		Behavioural
	Parameter	Potential Mortal Injury	Recoverable Injury	TTS	Masking	Effects
	Peak, dB re 1 µPa	>207	(I) Low (F) Low	(I) Low (F) Low	(I) Low (F) Low	(I) Low (F) Low

In addition, Nedwell and Howell (2004) described the transmission of drilling sound in water as consisting of either ground borne or structure borne [33]. 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.

According to the 'Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters' drilling can produce underwater pressure levels generally within the 145-190 dB re 1μ Pa @ 1m [12]. 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 7-1.

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. 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.

<u>Otter</u>

As discussed in Section 5.2.1, the Site is considered suitable for foraging and commuting otter. Otters are known to have acute sense of sight, smell and hearing for which they rely on for traveling through muddy water and for foraging [30]. Noise sources from the proposed works have the potential to result in temporary adverse effects on the noise levels in the vicinity of the Site.

The potential impacts that are likely to occur to otter are not well studied, and as such the levels of Temporary Threshold Shift (TTS)⁵ and Permanent Threshold Shift (PTS)⁶ for otter are not known. Therefore, taking a precautionary approach, it is considered that the noise from the proposed works will have the potential to adversely affect otter.

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 drilling will not 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

⁵ TTS may result in a reduction in hearing sensitivity but is not permanent.

⁶ PTS may result in auditory injuries and in some cases can lead to death.

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.

In addition, it should be noted that due to the fact that the Site is located within the waters immediately adjacent to an existing port, it is anticipated that the area is currently subjected to anthropogenic noise from port related activities. Therefore, it can be concluded that otter within the vicinity of the Site are subject to anthropogenic noise sources. As such, given the evidence of otter within the immediate vicinity of the Port, it can be concluded that these otter are habituated to anthropogenic noise.

Also, it is considered that the process of getting the barge in place and setting up the drilling equipment at the set locations would be expected to deter otter from entering the immediate area of the works. Additionally, otter are highly mobile species, and given the abundance of suitable habitat located within the Waterford Estuary, it would be expected that any otter potentially disturbed by the proposed works would move to more suitable areas.

Nonetheless, mitigation measures will be put in place in order to ensure that there are no adverse effects to designated species 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.

In addition, to the above a suitably qualified marine mammal observer (MMO) shall be appointed to monitor for otter and marine mammals within the vicinity of the Site as per the recommendations made for drilling in the '*Guidance to Manage the Risk to Marine Mammal from Man-made Sound Sources in Irish Waters*' [17]. The MMO will log all relevant events using standardised data forms prepared by the Department of Arts, Heritage and the Gaeltacht (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.

Therefore, taking into account the above mitigation measures, the location of the Site within the immediate vicinity of the existing port, the fact that otters within the immediate locality are likely habituated to anthropogenic noise emissions, the abundance of suitable habitat within the wider area, the fact that there will be no works at night and the down time between drilling events, it can be concluded that the proposed works will not result in any adverse effects on or significant disturbance of designated species due to noise emissions.

6.1.3 Potential Impairment of Water Quality

The proposed works will involve drilling boreholes and coreholes within the River Suir. Therefore, should run-off of potential pollutants enter into the River Suir, this could adversely affect the water quality within the River Suir and further downstream in the River Barrow and Barrow Suir Nore Estuary. Such adverse effects resulting from the proposed works could include suspended solids and / or hydrocarbon leaks or spills that could affect both protected species within the European designated sites, such as designated aquatic habitats, designated fish species - Atlantic salmon, sea lamprey, brook lamprey, river lamprey, Twaite shad - and designated mammals - otter.

However, during the proposed works, all works will comply with all relevant legislation and best practice to reduce potential environmental impacts of the works. Furthermore, as a precautionary principle, the following mitigation measures will be put in place, to ensure that water quality will be protected within the vicinity of the Site and further downstream. The measures that will be put in place to 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 are outlined below.

These procedures will be communicated to all relevant site staff. The following best practice guidelines will be followed, which are based on Inland Fisheries Ireland [34] and National Roads Authority (NRA), now known as the Transport Infrastructure Ireland (TII), [35] guidance documents:

- 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.

6.2 Stage 2 - Analysis of 'In-Combination' Effects

Based on the mitigation measures as described in Section 7.1, the proposed works alone will not have any direct or indirect adverse effects on the integrity of any European Sites.

Following a review of the Kilkenny County Council Planning Portal [11], Waterford City and County Council Planning Portal [12], and the Wexford County Council Planning Portal [13] 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 incombination with the proposed works to result in significant impacts on the integrity of European Sites.

Although there are a number of developments located within the Lower River Suir SAC and the River Barrow and River Nore SAC 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.) boreholes and ca. ten (10No.) coreholes; and,
- The works will only take approximately three (3No.) weeks to complete.

It is therefore considered that the proposed works are unlikely to have any significant incombination contribution to possible significant effects on the Lower River Suir SAC and River Barrow and River Nore SAC.

This statement is supported by:

- I. The localised nature of the proposed works;
- II. The industrial setting of the local environment;
- III. The mitigation measures that will be put in place; and,
- IV. The best practice guidelines which will be implemented during the proposed works.

Taking the above into account and given the fact that the aforementioned projects will not result in any adverse effects to European Designated Sites, it can be concluded that the proposed works will not result in any in-combination contribution to adverse effects on the integrity of any European Sites.

7 NIS CONCLUSIONS AND STATEMENT

A detailed assessment of the layout and nature of the proposed works, the methods to be employed and the overall activities that will occur at the Site has been carried out and the potential for significant effects on European sites and qualifying features of interest within a 15km radius of the Site has been examined in detail.

As detailed in Section 6.3, the Stage 1 AA Screening conclusion states that the boundaries of four (4No.) designated sites, Tramore Dunes and Backstrand SAC, Bannow Strand SAC, Tramore Back Strand SPA, and Bannow Bay SPA, were screened out. It could be objectively concluded that the proposed works will not, either alone or in combination with other plans or projects, be likely to have significant effects on those sites.

However, the Site is located within the Lower River Suir SAC, and a hydrological connection was identified between the River Barrow and River Nore SAC and the Site, via the River Suir. Therefore, the Lower River Suir SAC and River Barrow and River Nore SAC European sites were taken forward for further detailed consideration.

Avoidance, design requirements and mitigation measures are set out within this NIS and the effective implementation of these mitigation measures will ensure that any impacts on the European sites, having regard to their conservation objectives, will be avoided during all phases of the proposed works, such that there will be no adverse effects on the integrity of any European sites.

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.

Accordingly, progression to Stage 3 of the Appropriate Assessment process (i.e., Assessment of Alternatives Solutions) is not considered necessary.

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APPENDICES

APPENDIX A



APPENDIX B





250m ORE Capable Quay Extension at Belview Port

Geotechnical Investigations

Date: May 2023 Job No: W20088

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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.





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 300/c (150mm) (90m) 18 inch to 175/c (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.



Release Date Feb 25th, 2008

PRODUCT OVERVIEW

The Delta Base 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
HQ/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 11
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

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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.

in-line oner and shock absorber are required for DTH drilling.







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DeltaBase 520 Technical Data Sheet

Release Date Feb 25th, 2008

TECHNICAL SPECIFICATIONS

METRIC SYSTEM	US CUSTOMARY SYSTEM
Deutz D914L04 air o	cooled engine, COM III
DI	esel
	4
4,31	263 cu. in
53 KW @ 2300 rpm	71 hp @ 2300 rpm
60	16 gal
225	g/kWh
1000 m @ 30°C 1700 m @ 0°C without power loss	
EMPERATURE OF HIGHER ELEVATION	S - OPTIONAL EQUIPMENT
Deutz BF4L914 air o	cooled engine, COM II
Diesel	
4, turbocharged	
4,31 I	263 cu. in
72,4 kW @ 2300 rpm	97 hp @ 2300 rpm
60	16 gal
223 g/kWh	
53 kW · 1000 m @ 60°C, 2000 m @ 50°C, 3000 m @ 35°C, 4000 m @ 25°C,	
5000 m @ 10ºC	
4890-977 Nm / 48-25 rpm	3606-720 lb-ft / 48-250 rpm
1859-371 Nm / 140-740 rpm	1371-273 lb-lt / 140-740 rpm
62 mm	2.44 In
22 mm	0.87 In
Danloss - variable / reversible with pressure remote	
23/8" API Reg PIN	
led	
t, diesel engine at 2200 rpm	
7.68 : 1	
2.9	2:1
	METRIC SYSTEM Deutz D914L04 air o Di 4,31 I 53 KW @ 2300 rpm 60 I 225 1000 m @ 30°C 1700 r CMPERATURE OF HIGHEF ELEVA (0) CMPERATURE OF HIGHEF ELEVA (0

Boart Longyear is constantly striving to improve its products and must therefore, reserve the right to change designs, materials, specifications and price without notice.



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Refease Date Feb 25th, 2008

TECHNICAL SPECIFICATIONS

	METRIC SYSTEM	US CUSTOMARY SYSTEM
IYDHAULIC SYSTEM	· · · · ·	
Primary Pump	Parker bent axis, fi)	ked 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
Aaximum Flow (2 nd)	48 lpm @ 2200 rpm	12.5 gpm @ 2200 rpm
Aaximum Pressure	175 bar	2538 psi
Dil Tank Capacity	200	53 g
HILL MAST AND FEED SYSTEM		
eed Stroke	3400 mm	11,2 tt
eed Speed - up	21 m/min	69 tt/min
- down	34 m/min	111 ft/min
ast Feed Speed - up	48 m/min	157 ft/min
- down	75 m/min	246 ft/min
ull Down Force	25 kN	5620 lbf
ull Back Force	38 KN	8550 lbf
rilling Inclination	45º horizontal to 90º vertical down	
last Dump	500 mm	1.6 ft
od Length	3000 mm max	9.84 It max
IAIN WINCH SH220	<u> </u>	
ine Pull	20 KN	4500 lbf
ine Speed	44 m/min	114 ft/min
able Length, 12 mm	30 m	98.4 ft
OD CLAMPS		
aximum Diameter	220 mm	8.6 in
aximum Clamping Capacity	175 kN	4500 lbf
laximum Breaking Torque	20,5 kNm	15120 lb ft





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Release Date Feb 25th, 2008

TECHNICAL SPECIFICATIONS

ſ	METRIC SYSTEM	US CUSTOMARY SYSTEM
UNDERCAFRIAGE		
Туре	Crawler mounted tripl	e grouser steel tracks
Maximum Driving Speed	1,5 km/h	1.0 mph
Axis Distance	1715 mm	67.5 ln
Maximum Ground Pressure	0,053 MPa	7.7 psi
Climbing Capacity	(Grade ability 60%)	approximately 30°
Optional Undercarriage	Traller Mounted, Skid Mounted	
MAST EXTENSION FOR LONGER ROD PU	<u>BL</u>	
Maximum Rod Puli	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 Con	npressor	
OPTIONAL EQUIPMENT		
WIRELINE WINOH		
Line Pull	6,5 kN	1461 lbf
Line Speed	100 m/min	328 ft/min
Cable Length 6 mm	250 m	820 lt
	60 H J	<u> </u>
	90 //min	
		26.4 gpm
Pressure	30 bar	435 þsi
Continuous Elaw	160 l/min	42 apm
Maximum Flow	180-200 l/min	42 gpm
Proceitre	30 bar	435 nsi
Elicebing Head with 42 mm ID included		400 bai
r astring from whit is mill ib isoluted		
EMIC PUMP LO918		
Flow	100 l/min	26 mm
Pressure	45 har	652 psi
		our her
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Release Date Feb 25th, 2008

TECHNICAL SPECIFICATIONS

	METRIC SYSTEM	US CUSTOMARY SYSTEM
SPT (STANDARD PENETRATION TEST)	ИТО НАММЕВ	
Impact Rate	1-301	əpm
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, 2	20 mm (Choose required sizes)
OIL LINE LUBRICATOR FOR DTH DRILLI	NG	
Oil Tank Capacity	20	5.3 gal
HIGH TEMPERATURE OIL COOLER		
Upgraded oil cooler for ambient temperat	ture over 35° C (95° F)	
Nicht Lichts	· · · · · · · · · · · · · · · · · · ·	
No. of Pieces	4	
APANY STORY STORY STANDS AND SHEETS AND ON	1 # 7(6)? (6(0) # { (C	
Jaw Plates for Coring	BQ/BW NQ/NW	
		1 VV
	F V	
MIST PUMP	L	
Flow	30 l/min	map 8
Pressure	200 bar	2900 ps
ACCESSORIES		
Auxiliary Work Vice	180 mm wide, 220 mm long, 120 mm de	ep clamp, rotating mounting base and
	separate rod supp	ort work bracket
Remote Control	Radio remote co	ntrol for driving
Auxiliary Diesel Filling Pump	Electric powered d	iesel filling pump
Data Logger Couplings	3 Couplings for data logger (feed pro	essure, 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 ba	sic maintenance and lubrication
Environmental oll in hydraulic system		

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DIMENSIONS AND WEIGHTS*

WEIGHT	
Operational Weight = 6500 kg (14330 lb)	Consisting of:
(approx.)	Diesel Power Unit Group DEUTZ D914L04 4.10 litre 4 cylinder
	Hydraulic Module
Dry Weigth = 6200 kg (13670 lb)	Main Winch c/w Cable
	Hydraulic Mast Raising (Independent)
	Lower Mast Assembly
	Levelling Jacks (Hydraulic)
	Rotary Head
	Crawler - triple grouser type
	Battery
11(=(0))))))))))))))))))))))))))))))))))	Foot Clamp and Breaking Clamp
Miga GIOMINDIZIANG	
UNDERCARRIAGE	6500/00
Width = 1900 mm (74.8 in)	(256 in)
Pad width = 300 mm (11.8 in)	
Weight = 1035 kg (2280 lb)	
	2470mn 197.2 in
SPT	
Hammer weight = 63,5 kg (140 lb)	
Drop stroke = 760 mm	
Total weight = 180 kg (397 lb)	1900 mm (74.6 in)
	7350 mm (289-3 in)

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

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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

