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Supporting Information for Screening for Appropriate Assessment (SISAA)

Uisce Éireann - Waterford City Wastewater Treatment Plant Upgrade Survey

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1. Introduction

Uisce Éireann is seeking a Marine Usage Licence (MUL) to undertake marine site investigations in the River Suir Estuary (Figure 1) to progress a Waterford City Wastewater Treatment Plant (WwTP) Upgrade. The proposed site investigation works comprise a suite of geophysical, geotechnical, bathymetric, ecological, archaeological and CCTV surveys within the River Suir estuary. Their purpose is to gather high-quality baseline data on seabed conditions, subsurface geology, environmental receptors and the condition of the existing outfall. This information is essential for determining the optimal route for a new marine outfall, informing the detailed engineering design, and potentially supporting future environmental consenting processes. All works are temporary and limited to the defined MUL area.

Waterford City Wastewater Treatment Plant (WWTP), commissioned in 2010, serves the Waterford City agglomeration and provides preliminary, primary, and secondary treatment, including a dedicated sludge treatment facility that produces biosolids. The plant operates under an EPA Wastewater Discharge Licence issued in 2010 and is currently constrained by nitrogen removal capacity within the secondary treatment process, with an assessed maximum capacity of 113,000 population equivalent (PE). Forecast population growth, industrial expansion and the designation of the site as a Bioresources Regional Centre are expected to result in a substantial increase in hydraulic and organic loading, with capacity demands projected to reach approximately 276,000 PE by 2040 and 290,000 PE by 2055. These increases, together with the need to comply with increasingly stringent requirements of the Urban Wastewater Treatment Directive and to protect sensitive receiving waters, necessitate the proposed upgrade of the WWTP and associated outfall infrastructure.

This document constitutes Supporting Information for Screening for Appropriate Assessment (SISAA) to assist the Competent Authority (Maritime Area Regulatory Authority (MARA)) in undertaking a screening for Appropriate Assessment (AA). The screening will determine, in view of best scientific knowledge, if the proposed works, individually or in combination with other plans or projects, is likely to have significant effects on any European site/s, with consideration to their conservation objectives. Under Article 6(3) of the EU Habitats Directive, an Appropriate Assessment must be undertaken for any plan or programme that is likely to have a significant effect on the conservation objectives of a Natura 2000 site. Article 6(4) of the Habitats Directive sets out the decision-making test which must be applied to plans or projects that may impact on a Natura 2000 site.

Appropriate Assessment is a four-stage process as detailed below:

Stage One: Screening — the process which identifies the likely impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant;

Stage Two: Appropriate Assessment — the consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts;

Stage Three: Assessment of alternative solutions — the process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site;

Stage Four: Assessment where no alternative solutions exist and where adverse impacts remain — an assessment of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed

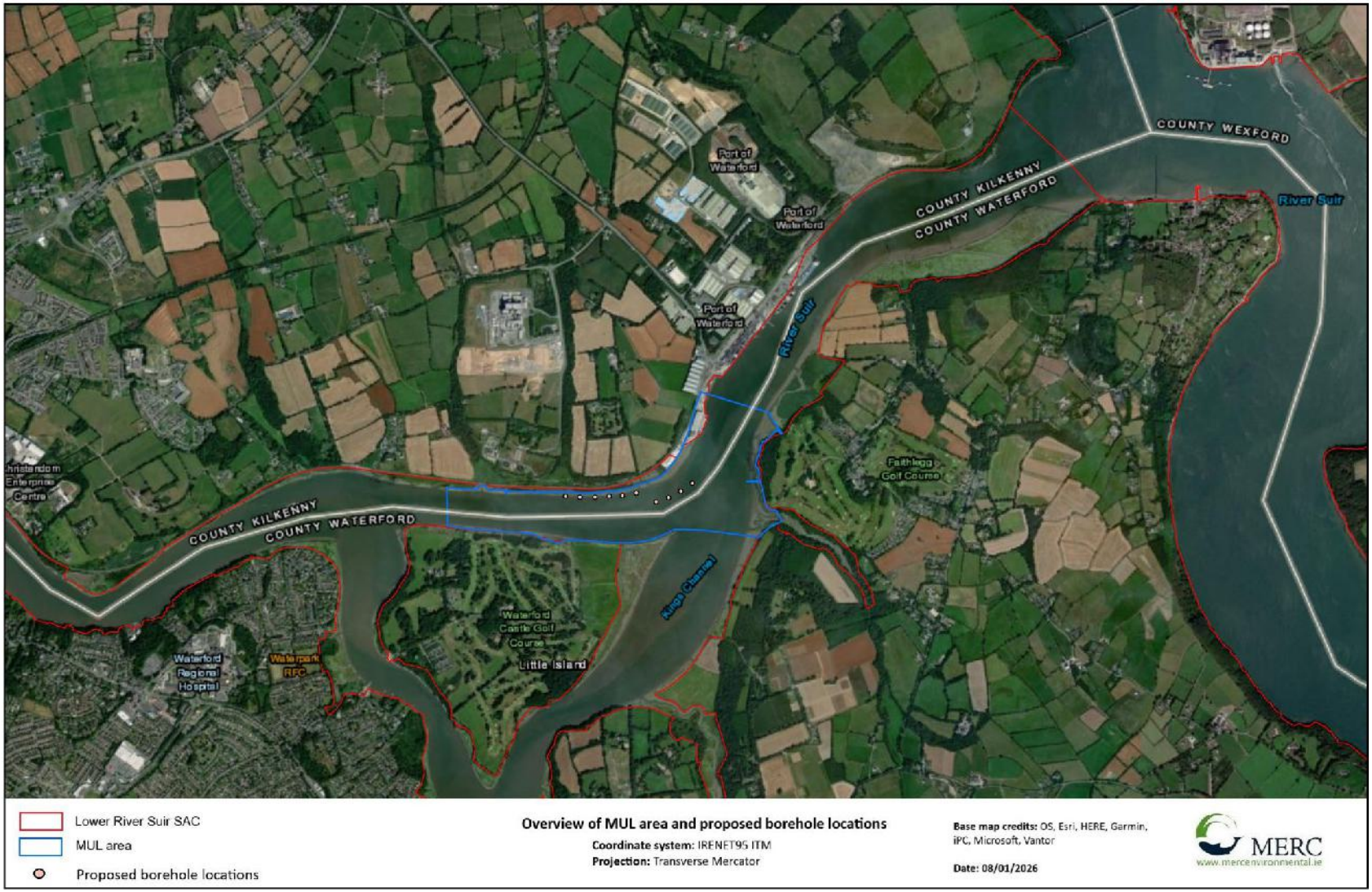

Figure 1. Site overview showing MUL application area (71 ha) and proposed borehole locations.

2. Statement of authority

This report was prepared by Ronan Browne and Louise Scally of MERC Consultants. MERC are a specialist marine ecological survey and consultancy firm. Core staff have more than 60 years of combined experience and specialist knowledge in relation to Irish marine habitats and species in addition to the assessment and management of conservation interests. MERC have been responsible for conducting national surveillance monitoring of EU Annex I marine habitats for compliance under Article 17 of the EU Habitats Directive since 2015. In this context MERC have been responsible for surveillance monitoring, under Article 11, and reporting under Article 17 of the EU Habitats directive for the 2019 and 2025 reporting cycles. Between 2005 and 2010 MERC conducted the survey, monitoring and assessment of sensitive subtidal habitats in Ireland to inform the conservation objective setting for Irish marine SACs.

Louise Scally MCIEEM is a professional marine ecologist with a wide range of experience in the field of conservation biology, marine habitat mapping and ecology. She completed a M.Sc. in ecology and taxonomy at Trinity College Dublin in 1989 and a Ph.D. in taxonomy also at Trinity College Dublin in 2001. She is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). For the last 20 years she has specialised in the ecology of marine ecosystems. She has specialised in the assessment of benthic habitats with a focus on intertidal and subtidal reef habitats and sensitive seabed species and habitats. Over the last 20 years she has conducted extensive marine monitoring surveys and assessments of EU Habitats Directive marine Annex I habitats and their associated species within European sites in Ireland to assist Ireland in complying with monitoring obligations under the EU Habitats Directive.

Ronan Browne is a marine and environmental scientist with extensive experience in coastal ecology, WFD water-quality monitoring, and the assessment of intertidal and subtidal habitats. He holds qualifications in aquatic biology, shellfish biology, and fisheries (MSc, Bangor), and in fisheries science (PhD, University of Galway). He has worked across national marine monitoring programmes and applied research with organisations including BIM, the Marine Institute, CLS and MERC Environmental.

3. Methods

3.1 Guidelines and legislation

This report has been prepared with reference to the following European Directives, national legislation and guidance on the appropriate assessment of projects and plans with regard to the implementation of the provisions of Article 6(3) and (4) of the EU Habitats Directive 92/43/EEC.

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna. Official Journal of the European Communities.
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version).
- European Communities (Birds and Natural Habitats) Regulations 2011. SI No. 477 of 2011.
- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. European Commission 2018. 7621 final. Office for Official Publications of the European Communities, Luxembourg.
- Assessment of plans and projects in relation to Natura 2000 sites-Methodological Guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC 2021/C 437/01-Publication office of the EU (europa.eu).
- Appropriate Assessment Screening for Development Management. OPR Practice Note PN01. Office of the Planning Regulator. March 2021.
- Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Department of Arts, Heritage and the Gaeltacht, 2014.
- MARA (2025). Guidance for Applicants: Marine Usage Licence (MUL) Applications. Version 7, updated 5 November 2025.
- MARA (n.d.). Marine Usage Licence (MUL) – Application Form. Accessed December 2025.
- MARA (n.d.). Technical Mapping Guidance Notes for MAC/MUL Applications under the Maritime Area Planning Act 2021 (MAPA). Accessed December 2025.

3.2 Assessment of the receiving environment

A description of the proposed project was compiled and is set out in section 4. The description details all works required to carry out the proposed project.

To fully understand the receiving environment, relative to project related effects, the literature consulted included the available National Parks and Wildlife Service (NPWS) data sources for all European sites within the Zone of Influence (ZoI) of the proposed project (see section 3.3 for methods used to determine the ZoI). This included the relevant European sites, conservation objectives and GIS layers (habitats and species). Further data was obtained from the following sources (non-exhaustive):

- Biodiversity Data Centre species maps.
- Irish Whale and Dolphin Group live sightings.
- ObSERVE Aerial Surveys.
- Tailte Éireann: High Water Mark and Low Water Mark.

3.3 Impact Assessment approach

The zone of influence (ZoI) of a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. In the context of Appropriate Assessment Screening, the ZoI is the area over which a plan or project could affect the receiving environment, such that it could potentially have significant effects on the conservation status of European Sites. Within the ZoI those receptors that are sensitive to change must be identified and considered.

To define the ZoI of a project, the potential for project related effects on sensitive receptors must first be established. For this purpose, a **Source-Path-Receptor (SPR)** model was applied. The SPR model is a well-established model frequently applied to the analysis of project related effects on ecosystems and is the one which we have applied to the assessment of the proposed project.

Using this approach all elements of the proposed project were reviewed to assess potential pathways and receptors which might be affected so that a ZoI could be established. This process involved the following steps:

- The identification of sources of potential impacts and their pathways from the proposed project site to European Sites.
- Consideration of sensitive receptors and their dependent ecosystems within the aforementioned European sites.
- Identifying and characterising project related impacts and their likely effects, direct, indirect and cumulative on the identified sensitive receptors.

Once the ZoI was established, the following steps were taken to assess the potential for likely significant effects on sensitive receptors:

1. The scale, scope and location of the project was examined.
2. A desk review of the available literature describing the habitats and species known to occur at the Marine Usage Licence (MUL) application area and surrounding area was undertaken.
3. Any project related activities likely to affect migratory or highly mobile species were considered.
4. Any use of the proposed project site by mobile species that make regular movements to, from, or across the site was assessed.
5. An assessment was carried out of the key ecological processes and species activity periods including seasonal variations in distribution, abundance and activity.

3.4 Review of European sites

Once the ZoI of the proposed project was determined, European sites within this ZoI were documented, and an analysis of the sensitivity of ecological receptors therein was conducted. In determining the sensitivity of ecological receptors, consideration was given to the scale, scope and location of the proposed project relative to the aforementioned receptors.

4. Proposed survey activities

4.1 Overview

Uisce Éireann proposes to undertake a suite of geophysical, geotechnical, bathymetric, ecological, archaeological, and CCTV surveys within the River Suir estuary. Their purpose is to gather high-quality baseline data on seabed conditions, subsurface geology, environmental receptors and the condition of the existing outfall. The proposed survey area, which corresponds to the MUL application area, is 71 ha. It encompasses an area of the Suir extending upstream from the existing Waterford City WWTP outfall location at Gyles Quay (Kilkenny) south to Little Island (Waterford) and eastwards to Bellview Port beyond the confluence of the Kings Channel and River Suir (Figure 1).

The following survey investigations are considered necessary and are detailed further in Table 1.

- Geophysical survey, including:
    - Side-scan sonar (SSS)
    - Magnetometer
    - Sub-bottom profiler (SBP) - Parametric Sub Bottom Profiler
    - Sub-bottom profiler (SBP) - Boomer
    - Sub-bottom profiler (SBP) - Sparker
    - Multibeam Echo Sounder (MBES)
    - Marine Refraction Seismic
    - Marine Electrical Resistivity Tomography (ERT)
- Marine Environmental/Ecological surveys, including:
    - Benthic ecology Subtidal Drop down video and intertidal walkover/drone surveys
    - Grab sampling
    - Intertidal hand coring
- Archaeological surveys, including:
    - Intertidal walkover surveys potentially with the use of a metal detector
    - Potential diver surveys
- Geotechnical surveys, including:
    - Drop-down camera survey
    - Boreholes
    - Standard Penetration Testing (SPT)

    - Grab sampling
- Bathymetric surveys
    - Multibeam Echo Sounder (MBES)
- CCTV Survey of the Existing Outfall
    - Diver-operated cameras/Remotely Operated Vehicle (ROV)
- Additional potential surveys
    - Deployment of tidal gauges
    - Deployment of Sondes
    - Collection of water samples

It is intended that surveys will commence as soon as practicable following an award of the Marine Usage Licence (MUL). A high-level programme, including indicative numbers of samples, durations and timings, is outlined in Table 1. The surveys estimated time and duration are shown in **Table 2**, while the vessels and equipment to be used are described in sections 4.2 and 4.3, respectively.

Table 1. Proposed Survey activity estimated time and maximum duration of survey work.

Survey	Method	Method detail	Sampling Effort
Geophysical **Up to 16 weeks**	Side Scan Sonar (SSS)	SSS surveys are used to determine sediment characteristics and seabed features. The EdgeTech 4205 may be taken as an indicative example of an SSS device and for these surveys will have a potential operating frequency range of approximately 300/600kHz in the offshore area and 600/900kHz in the shallower nearshore area with sound pressure levels of 220-230dB re1µPa @1m. The SSS will be towed behind a small survey vessel using 20 m spacing of main lines and cross lines at 100 m spacing.	SSS may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Magnetometer	A magnetometer is used to identify magnetic anomalies and hazard mapping for metal obstructions, shipwrecks and unexploded ordnance on the surface and in the shallow sub-surface. The Geometrics G-882 can be taken as an indicative equipment example. It is a passive device (i.e. it does not emit any sound waves into the marine environment) the sensor responds to local variability in magnetic field. The magnetometer will be towed behind a small survey vessel using 20 m spacing of main lines and cross lines at 100 m spacing.	Magnetometer survey may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Sub-Bottom Profiling (SBP) – Parametric Sub Bottom Profiler	SBP is used to develop an image of the subsurface, identifying different strata encountered in the shallow sediments. The Innomar "standard" Sub-Bottom Profiler is an indicative example of a parametric system with a primary and secondary frequency range of 85-115kHz and 2-22kHz, respectively, and sound pressure levels of up to 232 dB (typically operated at <200dB) re1µPa @ 1m, which would be used in both nearshore and offshore areas. The SBP will be towed behind a small survey vessel using 20 m spacing of main lines and cross lines at 100 m spacing.	SBP Parametric Sub Bottom Profiler may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Sub-Bottom Profiling (SBP) - Boomer	The Applied Acoustics AA301 is an indicative example of a boomer, the instrument consists of a piezo electric plate transducer mounted on a surface tow catamaran frame. Reflected sound signals are recorded using a separate hydrophone such as the Applied acoustics HYD-360/08 (50m). The Boomer SBP operates in a frequency range of 0.5 kHz to 5 kHz, with sound pressure levels in the range of 205-211dB re1µPa @ 1m which would be used in the nearshore shallower area. The SBP will be towed behind a small survey vessel using 20 m spacing of main lines and cross lines at 100 m spacing.	SBP Boomer may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Sub-Bottom Profiling (SBP) - Sparker	The applied Acoustics Dual 400 Tip is an indicative example of a sparker system used in sub-bottom profiling. Reflected sound signals are recorded using a separate hydrophone such as the Applied acoustics HYD-360/08 (50m) or a multi-	SBP Sparker may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is

Survey	Method	Method detail	Sampling Effort
		channel hydrophone such as the Geometrics GeoEel LH-16™ Digital Streamer. The sparker source has a frequency range of between 0.4-5kHz and a recorded sound pressure of 203dB re1µPa @1m. The SBP will be towed behind a small survey vessel using 20 m spacing of main lines and cross lines at 100 m spacing.	anticipated to occur within daylight hours over a period of up to 10 days.
	Multibeam Echo Sounder (MBES)	A bathymetric survey will be conducted using multibeam echo sounders. These systems may be mounted on a dedicated survey vessel or towed behind a smaller vessel, depending on site conditions and water depths. Multibeam systems emit wide acoustic signals to generate high-resolution images, creating three-dimensional maps of the seabed. Line spacing will be between 5 and 20m, depending on depth. The operating frequencies emitted from MBES will be 300-700 kHz, with a peak operating frequency of approximately 400kHz. Exposure time is approx. 0.05 ms per 1 ms for multibeam operating with 200-400 kHz, or 0.05 per 0.3 ms for higher frequencies (>400 kHz). Sound pressure levels will be approximately 215-220dB re 1µPa @ 1m.	MBES may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Marine Refraction Seismic	Marine refraction surveys use controlled seismic sources, such as air guns or weight drops, to generate seismic waves that travel through sediment and rock layers. Arrays of hydrophones or geophones deployed on the seabed record the refracted seismic waves as they bend and travel along subsurface interfaces. By analysing the travel times and velocities of these refracted waves, detailed models of sediment thickness, bedrock depth, and structural features can be developed. Airgun impulse energy is mostly concentrated within low frequencies, with peak frequencies between 5 and 90kHz. Source levels are predicted to be within the range of 186-220dB re 1µPa @1m.	Marine Refraction Seismic may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 8 days.
	Marine Electrical Resistivity Tomography (ERT)	ERT surveys are conducted to investigate the electrical properties of subsurface sediments and rocks. The technique involves deploying a series of electrodes along the seabed, either towed or fixed. As a non-invasive, non-seismic geophysical method, marine ERT produces no significant underwater noise and has minimal environmental impact.	Maximum 20 ERT lines of 315m length line with diameter of 20mm. This activity is anticipated to occur within daylight hours over a period of up to 8 days.
Marine Environmental / Ecological	Benthic ecology samples (including subtidal and intertidal habitats surveys)	Identify benthic communities and habitats at the site. Subtidal sample locations may be subject to drop down video in advance of sampling; intertidal sample locations may be subject to walkover/drone survey in advance of sampling.	There will be up to **30 no.** dedicated subtidal benthic ecology grab sampling locations within the proposed MUL Area and multiple samples (max 4) may be taken at each location. Samples

Survey	Method	Method detail	Sampling Effort
Up to 5 days			would be of volume 0.1 m^2. There will be up to **30 no**. dedicated intertidal coring /grab locations if shoreline conditions allow for sediment sampling.
Archaeological **Up to 5 days**	Walkover	Intertidal walkover to be undertaken at low tide to assess for the presence of sensitive archaeological features. Survey methodology may also involve the use of a metal detector along the foreshore. Pending the results of geophysical surveys there may be a requirement for further archaeological surveys (i.e. underwater video, dive surveys, etc.)	To be confirmed pending the results of the geophysical surveys.
Geotechnical **Up to 16 weeks**	Drop-down video	Drop-down video survey to inspect the seabed and identify any reef structures in the vicinity without disturbance to the seabed.	There will be up to **30 transects** of up to 30 m each using a drop-down camera and video surveillance.
	Boreholes	Boreholes will be advanced to depths of up to 10 m below the riverbed, with drilling terminated earlier where competent bedrock is encountered. Drilling within the river channel will be carried out using cable percussion and rotary coring techniques through the overlying sediments, with rotary coring employed to progress into the underlying bedrock where present. Standard Penetration Tests (SPTs) will be undertaken at appropriate depth intervals in accordance with BS EN ISO 22476-3 to assess in-situ soil resistance and stratigraphy. All drilling equipment and procedures will comply with relevant BS EN ISO technical specifications for geotechnical investigations. In-river boreholes will be drilled from a jack-up barge or stable floating platform to ensure safe working access during tidal or flowing water conditions. Deployment of the jack-up legs may result in minor, localised and temporary disturbance to the riverbed, with each leg typically occupying a footprint of less than 1 m^2. Preliminary investigation point locations are shown in Figure 3. The locations may require adjustment to address localised access conditions.	A maximum of **10 no**. boreholes of a diameter of 300 mm will be required within the proposed MUL Area.
	Standard	Standard Penetration Tests (SPTs) will be undertaken within the proposed	A total of approximately 40 no. SPTs

Survey	Method	Method detail	Sampling Effort
	Penetration Tests (SPTs)	foreshore and in-river boreholes to characterise subsurface stratigraphy and assess in-situ soil resistance. The test involves driving a split-spoon sampler at the base of the borehole using a 63.5 kg hammer dropped from a height of 760 mm, with the resulting blow count recorded in accordance with BS EN ISO 22476-3. The sampler is driven through a total penetration of 450 mm, and the number of blows required for the final 300 mm is reported as the N-value. SPTs will be performed at appropriate depth intervals or where changes in strata are observed to provide a representative profile of the ground conditions within the foreshore investigation area. All testing equipment and procedures will comply with the relevant international standards to ensure consistency and reliability of the results.	will be carried out within the foreshore and in-river investigation area. SPTs will be undertaken in the 10 no. boreholes located within the river channel, with tests performed at appropriate depth intervals in accordance with the marine investigation specification.
	Grab samples	Grab samples will be collected from the foreshore and in-river investigation area to obtain disturbed sediment suitable for geotechnical classification and chemical testing. The samples will be analysed to determine particle size distribution, soil grading, moisture content, Atterberg limits, organic content, particle size distribution, and other parameters required to characterise the natural sediments present within the foreshore zone. Engineering tests such as moisture condition value (MCV) testing, California Bearing Ratio (CBR) analyses and soil compaction testing on bulk samples will also be undertaken. Chemical testing will also be undertaken to assess potential aggressivity, including measurements of pH, sulphate concentration, redox potential and resistivity, to inform the design of concrete and other construction materials associated with the proposed works. All sampling, handling and testing procedures will be carried out in accordance with relevant international standards to ensure the acquisition of consistent and reliable geotechnical and chemical data.	A maximum of 14 no. grab samples will be collected within the proposed MUL Area.
Bathymetric Surveys **Up to one week**	Multibeam echo sounders (MBES)	This survey will provide high-resolution data on seabed features, depths, and morphology of the intertidal and subtidal zones within the proposed MUL Area. Bathymetric surveys will be conducted using multibeam echo sounders (MBES) and associated positioning systems. The MBES system may be mounted on a dedicated survey vessel or towed behind a smaller craft, depending on site conditions and water depths. The system emits wide acoustic signals to generate three-dimensional maps of the seabed, with line spacing between 5 and 20 meters, depending on depth. Operating frequencies will typically range from 300	Bathymetric surveys will be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days, subject to weather, tidal conditions, and vessel availability

Survey	Method	Method detail	Sampling Effort
		to 700 kHz, with a peak operating frequency of approximately 400 kHz. Sound pressure levels are expected to be approximately 215–220 dB re 1µPa @ 1m. Exposure time is approximately 0.05 ms per 1 ms for multibeam operating with 200–400 kHz, or 0.05 per 0.3 ms for higher frequencies (>400 kHz). The survey will focus on the marine section of the existing outfall route, potential alternative corridors, and the intertidal zone delineated by the high-water mark, as required for the MUL application. The survey will be undertaken in accordance with best practice guidelines to minimize environmental impact, including adherence to the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014). The maximum extent of the bathymetric survey area is presented in Figure 4.	
CCTV Survey of the Existing Outfall **Up to one week**	Diver-operated cameras/Remotely Operated Vehicle (ROV)	The outfall has been in continuous service since the plant was commissioned in 2010. While significant defects are not expected, there has been no recent condition assessment to confirm its current state. A Closed-Circuit Television (CCTV) survey is therefore proposed to ensure continued performance and compliance. The survey will be undertaken using either diver-operated cameras or a Remotely Operated Vehicle (ROV), depending on site conditions and accessibility. In deeper or higher-risk sections of the outfall, high-resolution imaging and sonar-equipped systems will be used to ensure safe and comprehensive inspection. The survey will help identify any defects or deteriorations such as cracking, deformation, leakages or blockages, any of which could compromise discharge performance or regulatory compliance.	CCTV Survey of the Existing Outfall will be undertaken along the existing outfall within the proposed MUL Area. This activity is anticipated to occur within daylight hours over a period of up to 5 days.

Table 2. Surveys and their timeline

Survey	Timeline
Geophysical survey	Up to 16 weeks
Marine Environmental / Ecological survey	Up to 5 days
Archaeological survey	Up to 5 days
Geotechnical survey	Up to 16 weeks
Bathymetric survey	Up to one week
CCTV survey of the existing outfall	Up to one week

4.2 Survey vessel

A multipurpose workboat will be used, based on suitable vessel available at the time of mobilisation. It is considered that a shallow draught vessel with a large wheelhouse, suitable for survey support and operations requiring frequent manoeuvring in confined waters will be used. A vessel size in the range of 16 m with a shallow draught and gross tonnage of ~45 is assumed. Noting that survey operations are typically undertaken at low speeds, appropriate to equipment deployment and data acquisition, vessel speeds are likely to be in the range of < 10 knots. Deck equipment will include a crane, hydraulic A-frame and winch system, allowing safe deployment/recovery of towed sensors and ancillary equipment. Standard navigational and communications equipment includes VHF, radar, electronic chart plotter, GPS, autopilot, echo sounder and AIS. Figure 2 shows an example of the type of survey vessel that would be required. Other smaller vessels supporting project works, have yet to be identified, as their availability will be subject to grant of MUL licence.

Figure 2. Example of required vessel type.

All vessels will be fit for purpose, certified and capable of safely undertaking all required survey work. Marine vessels will be governed by the provisions of the Sea Pollution Act 1991, as amended, including the requirements of MARPOL. In addition, all vessels will adhere to published guidelines and best working practices such as the National Maritime Oil/HNS Spill Contingency Plan (NMOSCP), Marine Pollution Contingency Plan (MPCP), Chemicals Act 2008 (No. 13 of 2008), Chemicals (Amendment) Act 2010 (No. 32 of 2010) and associated regulations. Vessels shall have a Health, Safety and Environmental Managements system which should conform to the requirements of the latest International Maritime Organization (IMO), Safety of Life at Sea (SOLAS) and environmental requirements for their classification and with any national requirement of the territorial or continental / EEZ waters to be operated in.

The vessels to be considered for the provision of survey works will be represented by small and medium size vessels. Acoustic broadband source pressure levels with smaller vessels (<50 m) having source pressure levels 160-175 dB (re 1µPa at 1m) and medium size vessel (50-100 m) 165-180 dB (re 1µPa at 1m) (DECC, 2011). The survey works will be undertaken from vessels in accordance with the relevant guidelines required to manage the risk to marine mammals from man-made sound sources in Irish waters.

4.3 Equipment description and specifications

A suite of instruments will be used for the site investigation survey as detailed in Table 1. The choice of equipment will depend on factors such as depth of interest below the seafloor, the nature of shallow rock likely to be encountered, and the resolution required for mapping subsurface materials.

Table 3 provides a consolidated list of all proposed survey equipment—including geophysical, geotechnical, benthic, metocean, and passive devices—with example models, deployment methods, companies, and indicative sound pressure levels to represent a worst-case assessment scenario.

Table 3. Indicative specifications, models, deployment method and sound pressure levels.

Equipment	**Example Model**	**Deployment**	**Company**	**Sound Pressure level re 1µ in water @ 1m from source**
Geophysical Equipment				
Multibeam Echo Sounder	EM2040 (200–400 kHz)	Retractable hull mount	Kongsberg Maritime	210 dB
Side Scan Sonar	Edgetech 4205 (300–900 kHz)	Towed system	Edgetech	228 dB
SBP – Parametric Sub Bottom Profiler	TBC	Vessel mount	TBC	N/A
Marine Refraction Seismic	Small airgun + hydrophone streamer	Towed system	Applied Acoustics / Seistec	186–220 dB
Marine ERT System	AGI SuperSting Marine or ABEM Terrameter	Electrode streamer or seabed array	AGI / ABEM	N/A (non-acoustic)
Geotechnical Equipment				
Equipment	Example Model	Deployment	Company	Sound Level
Borehole Drilling	Geobor S or similar	From vessel	Fugro / similar	145–190 dB

Standard Penetration Tests (SPT)	SPT hammer (63.5 kg, 760 mm drop)	Conducted within boreholes	Fugro / similar	N/A (mechanical impact only)
Geotechnical Grab Sampling	14 sediment grabs	Overboard	Contractor	N/A
Benthic Sampling & ecological survey Equipment				
Equipment	Example Model	Deployment	Company	Sound Level
Day Grab	N/A	Overboard	N/A	N/A
Hammon Grab	N/A	Overboard	N/A	N/A
Drop-down Video Camera	N/A	Overboard	N/A	N/A
Diver Surveys	SCUBA	Overboard	N/A	N/A
0.1 m² Benthic Grab	0.1 m² Van Veen-type	Overboard	N/A	N/A
Intertidal Sediment Corer	0.01 m² hand corer	Hand deployed	N/A	N/A
ROV System	BlueROV2 or equivalent	Tethered from vessel	Blue Robotics / similar	N/A
Metocean & passive recording Equipment				
Magnetometer	TBC	Towed	TBC	N/A
Additional Equipment				
Tidal gauge	InSitu AquaTroll,	Post installed	e.g. YSI/ InSitu	NA
Multi parameter Sonde	e.g. YSI Exo2/ In Situ Aqua Troll, Hydrolab – sensors - Turbidity, conductivity, pH, temperature	Post installed	e.g. YSI/ *In Situ*	NA
*Note: Where the exact model to be used is yet To Be Confirmed (TBC) a worst-case scenario has been used to determine the upper-level sound pressure possible. The equipment type and model are indicative only, exact equipment to be specified by the contractor but the examples provided are consisted standard and any variations will be minor.				

4.4 Geophysical equipment

Side scan sonar

Side scan Sonar (SSS) is another device that transmits sound pulses that provide the information required to map the seabed. It differs from MBES in that SSS has a finer beam width and smaller footprint to MBES and therefore higher resolution. It is generally towed behind the vessel very close to the seabed and emits fan-shaped acoustic pulses directed down toward the seafloor which are recorded as a series of cross-tracks. The sound frequencies used by side-scan sonar range generally range from 100 to 1000kHz; higher frequencies yielding better resolution but less range.

Magnetometer

A magnetometer is a passive instrument that measures the Earth's magnetic field allowing magnetic anomalies to be measured. It is towed behind the survey vessel where it samples background magnetism. When the magnetometer detects an anomaly, such as ferrous objects such as fragments of a ship hull or a geological formation of basalt. This is detected as a change to the background magnetic field. This tool can detect artifacts above or below the seabed.

Sub-bottom profiler

A Sub-bottom profiler employs an acoustic signal, to provide the information required to identify and measure marine sediment layers that exist below the sediment/water interface. The proposed equipment comprises a Knudsen Chirp system or similar which transmit a sweep of frequencies (e.g. 2-10 kHz) in a single pulse. Depending on the profile of the seabed (rock, sand, mud etc.) and level of compaction, the energy reflected back can be related to the sub-bottom composition.

Sub-Bottom Profiling (SBP) - Boomer

A sub-bottom profiler boomer is an instrument used to image sediment layers beneath the seafloor. A Boomer system is a seismic reflection profiling instrument that operate in the 700 to 2000 Hz region.

Boomers are generally used in oastal waters down to a few hundred meters depth when sub-bottom penetration requirements can not be met with higher frequency systems. The proposed equipment will operate at frequencies within the range of 85-115kHz and 2-22kHz, respectively, and sound pressure levels of up to 232 dB (typically operated at <200dB) re1µPa @ 1m.

Sub-Bottom Profiling (SBP) - Sparker

A Sub-Bottom Profiling Sparker is an instrument used to used to image sediment and rock layers beneath the seafloor, it has a similar purpose to that of the boomer described above but is

designed when deeper penetration is required. The proposed equipment will operate at frequencies within the range of 0.5 kHz to 5 kHz, with sound pressure levels in the range of 205-211dB re1µPa @ 1m

Multibeam echosounder

A multibeam echosounder (MBES) is a type of sonar frequently used to map bathymetry. It operates by emitting an acoustic wave in a fan shape beneath the point of its transceiver attached to the hull of the vessel. The time it takes for the sound waves to bounce off the seabed and return to the transceiver is used to calculate the water depth within the arc of the fan. The proposed MBES operates at a sound pressure level of ~215–220 dB re 1 µPa @1m and 300–700 kHz (peak ~400 kHz).

Marine Refraction Seismic

Marine Refraction Seismic systems are used to determine the structure and properties of subsurface layers beneath the seafloor by analysing refracted seismic waves. They use controlled seismic sources, such as small airguns or sparkers, to generate acoustic waves that travel through the sediment and refract along geological boundaries. Arrays of hydrophones or geophones record these refracted waves, allowing interpretation of sediment thickness, bedrock depth and structural features. Peak frequencies typically range between 5–90 Hz, with expected source levels in the range of 186–220 dB re 1 µPa @ 1 m.

Marine Electrical Resistivity Tomography (ERT)

Marine Electrical Resistivity Tomography (ERT) is a non-invasive geophysical method used to image the subsurface beneath the seabed or coastline by measuring variations in electrical resistance. It involves deploying a series of electrodes along the seabed, either in a fixed layout or towed configuration. Low-voltage electrical currents are passed through the seabed, and resulting potential differences are measured to map variations in subsurface electrical resistivity. As a non-acoustic, non-invasive technique, ERT produces no underwater noise and is used to assess sediment layering, groundwater influence, and bedrock morphology.

4.5 Marine environmental/ecological surveys

Seabed imagery- drop down video/ROV surveys

Underwater camera systems or Remotely Operated Vehicles (ROVs) may be used for visual inspection of the existing benthic conditions within the MUL area. High quality video recordings and stills may be collected for further analysis and confirmation of suitable conditions for further intrusive activities e.g. benthic sampling or geotechnical works.

Benthic sampling

A Day grab is an instrument used for sampling soft seabed sediments. When deployed overboard it is lowered on a winch to the seabed where the jaws open to take a small (approx. 5L) sample of the surface sediment (top 20cm). A Hammon grab is a very similar type of sampler, but the jaw mechanism is slightly different which allows it to sample coarser sediments (e.g. gravel and shelly sediments). The samples retained can then be analysed to obtain an overview of the sediment fauna, and particle size. Both samplers are routinely used for surveillance monitoring to support a number of EU Directives such as the Habitats Directive and Water Framework Directive. Day or Hammon grabs do not introduce noise into the underwater environment other than that produced from a slight impact with the grab making contact with the seabed.

Intertidal coring and walkover surveys

For intertidal sediment assessment a 0.01m^2 hand core taken to a depth of 20cm for benthic faunal analysis will be used. Additional surveys of intertidal hard strata may also be carried out by conducting walk over surveys of the relevant hard strata to record biotopes and species present.

4.6 Archaeological surveys

Intertidal walkover to be undertaken at low tide to assess for the presence of sensitive archaeological features. Survey methodology may also involve the use of a metal detector along the foreshore. Pending the results of geophysical surveys there may be a requirement for further archaeological surveys (i.e. underwater video, dive surveys, etc.).

4.7 Geotechnical surveys

Boreholes

Up to 10 boreholes with a diameter of up to 300mm and a depth of up to 10m below the seabed will be carried out. To facilitate this, a drill head is lowered to the seabed from the vessel via a drill string and stabilised using a seabed frame. The drill head penetrates the seabed via rotation of the drill string and the application of a downward pressure. Soils and rock samples are then retrieved for laboratory testing via the drill string. Borehole drilling may be combined with *in-situ* testing such as cone penetration testing or down the hole testing at some investigative locations.

Standard Penetration Tests (SPTs)

Standard Penetration Tests may be undertaken within selected boreholes. A 63.5 kg hammer is dropped from a height of 760 mm to drive a split-spoon sampler into the sediment. The blow count for the final 300 mm of penetration is recorded as the N-value. Up to 40 SPTs may be undertaken to characterise sediment density and stratigraphy.

Geotechnical grab samples

Up to 14 grab samples may be collected within the MUL area for geotechnical classification, including grain size, moisture content, Atterberg limits and associated chemical testing to assess sediment aggressivity (pH, sulphates, redox and resistivity).

4.8 Ancillary data collection

Additional ancillary data may be collected. This may include collecting water samples and data on temperature, turbidity, and conductivity/salinity using a multi-parameter sonde deployed during the deployment and deployment of tidal gauges.

5. Receiving environment

The MUL application area, within which surveys will take place, is 71 ha. It encompasses an area of the Suir extending upstream from the existing Waterford City WWTP outfall location at Gyles Quay (Kilkenny)30 south to Little Island (Waterford), and east to Bellview Port downstream beyond the confluence of the Kings Channel and River Suir (Figure 1). The footprint consists of a partially mixed estuarine system, dominated by subtidal soft sediments within an active navigational channel influenced by strong tidal currents and by existing port and industrial activity. The characterising biotope recorded within the MUL is EUNIS code A5.321 - *Polydora ciliata* and *Corophium volutator* in variable salinity infralittoral firm mud or clay. This biotope occurs only in very firm mud and clay and possibly submerged relict saltmarsh with a high detrital content (Kennedy, 2008).

The site is located within the Lower River Suir SAC (002137), designated for a range of estuarine and freshwater habitats and species, including Atlantic salt meadows, alluvial and wet woodland, saltmarsh vegetation, and important migratory fish such as Lamprey, Twaite Shad, and Atlantic Salmon, as well as Otter.

6. Identification of potential impacts

6.1 Zone of Influence (ZoI)

The determination of the Zone of Influence (ZoI) was based on the scale, scope and location of the project, hydrological corridors of connectivity (direct and indirect source-path-receptor links) and potential cumulative impacts for the duration of the proposed project.

The likely direct and indirect impacts of the project will result from intrusive works (grab sampling, borehole drilling, CPD testing) and bathymetric surveys (MBES, SBP, Borehole drilling etc).

Intrusive works will result in small and localised (meters) disturbance to benthic sediments within a tidally dominated, partially mixed estuarine system characterised by strong twice-daily tidal currents, variable salinity, and a deep navigational channel. It forms the transitional zone where the freshwater River Suir meets the marine influences of Waterford Harbour. Whereby disturbance to benthic sediments would be rapidly reversable within a short time period (days) and is considered to be insignificant. Direct impacts on benthic habitats as a result of the accidental spillage of hydrocarbons are also considered to be small and localised due the limited volume of hydrocarbons carried on small vessels and as vessels will be MARPOL compliant.

Intrusive elements of the survey programme may generate a short-lived turbidity plume in the immediate vicinity of each sampling location and minor near-field re-deposition of fine material (with the potential for very small-scale smothering). Given the small footprint of each activity and the tidally energetic nature of the receiving environment, any sediment mobilisation is expected to be temporary and highly localised, with suspended material dispersing rapidly and re-deposition limited to the near field.

Vessel activity and intertidal personnel presence could cause disturbance to species using the intertidal or nearshore waters (waterbirds/waders, wildfowl and otter) should any of these species be present during survey activities.

Bathymetric surveys and borehole drilling will introduce noise into the marine environment with the potential to impact marine mammals, fish and diving seabirds. Screening, therefore, considers a precautionary zone of influence based on the sound source proposed and the sensitivity of relevant mobile receptors. Table 4 presents an analysis of each element of the proposed project relative to its potential for impact based on a SPR model.

Table 4. Source-Path-Receptor (SPR) matrix

Element	Potential source (pressure)	Path	Receptor(s)
Vessel presence and movement (all survey vessels, USVs/ASVs, support craft)	Disturbance, displacement or risk of injury/collision from vessel noise and movement	Direct and indirect via water column, surface activity and repeated transits within channel	Marine mammals, migratory fish (salmon, lamprey, shad), otter, waterbirds/seabirds
Vessels – accidental pollution	Accidental spillage/leakage of hydrocarbons or chemicals (fuel, oils, hydraulic fluids, drilling fluids)	Direct to water column and via deposition to sediments and shoreline	Estuarine water quality, benthic habitats and invertebrates, migratory fish, otter (via prey and shoreline use), waterbirds, saltmarsh/Atlantic salt meadows along banks

Jack-up barge legs / vessel anchoring	Localised penetration of jack-up legs and/or anchors causing seabed disturbance and resuspension	Direct disturbance/smothering of subtidal sediments within MUL area	Subtidal benthic habitats and invertebrates; indirect effects on migratory fish through short-term turbidity
Multibeam echosounder (MBES)	Continuous high-frequency non-impulsive underwater noise	Direct and indirect propagation through water column	Marine mammals, migratory fish, otter (foraging), diving birds
Side-scan sonar (SSS)	Continuous high-frequency non-impulsive underwater noise	Direct and indirect	Marine mammals, migratory fish, otter (foraging), diving birds
Marine refraction seismic (small airgun/weight drop)	Low-frequency impulsive noise (c. 5–90 Hz)	Direct and indirect over the water column; potential for wider propagation along the channel	Marine mammals, migratory fish (especially shad, salmon, lamprey), and otter (foraging)
Magnetometer	Passive sensor; no sound generation	N/A – no meaningful pressure	No significant ecological receptor (negligible risk)
Marine Electrical Resistivity Tomography (ERT)	Localised seabed contact by electrode streamer or arrays; minor sediment disturbance	Direct physical interaction with seabed	Subtidal sediments and associated species within immediate footprint (very small scale)
Borehole drilling and SPTs (from vessel / jack-up)	Continuous low-frequency mechanical noise and localised sediment disturbance; minor cuttings release	Direct to seabed and near-field water column/ short term turbidity increase	Subtidal benthic habitats and associated species, migratory fish (minor turbidity), otter (via prey)
Geotechnical grab samples (sediment grabs for lab testing)	Small-scale removal of sediment and associated fauna	Direct/ localised turbidity	Subtidal benthic species and habitats (very localised)
Benthic ecology grabs (Day/Hammon and 0.1 m² grabs)	Localised removal of surface sediments and associated fauna	Direct	Subtidal benthic species and habitats within MUL footprint
Intertidal sediment coring	Small-scale penetration of sediments and removal of infauna	Direct	Intertidal benthic species; potential minor disturbance to foraging waterbirds/waders

Intertidal walkover surveys (ecological and archaeological)	Human presence causing disturbance/displacement of foraging/roosting birds and otter; trampling of sensitive vegetation	Direct (visual and noise disturbance; physical contact with substrate)	Waterbirds/waders and wildfowl, otter (shoreline use), saltmarsh and upper intertidal habitats
Seabed imagery and drop-down video (ecological / geotechnical)	Camera frame contact with seabed; very small-scale disturbance	Direct	Subtidal benthic habitats and associated species within immediate touchdown area only
ROV surveys (including CCTV of outfall)	Localised physical presence and thruster wash; very small-scale sediment resuspension	Direct	Subtidal benthic habitats and associated species adjacent to outfall; migratory fish/otter using channel (negligible)

6.2 Assessment of Likely significant effects

6.2.1 Seabirds

The MUL is not within an SPA and the Lower Suir Estuary, in the area of the MUL, does not support breeding or foraging seabirds, associated with marine SPAs. Seabird activity within the footprint is confined to occasional passage and opportunistic foraging by gull species. No SPA-listed seabird features have a functional pathway to the proposed survey works.

The nearest SPA designated for seabirds is the Mid-Waterford Coast SPA (Site code: 004193) which is 15 km distant (as the Crow flies) distant from the MUL area at its nearest point.

Conclusion: No Likely significant effects. SPAs designated for seabirds are screened out; no extended ZoI for seabird foraging is required.

6.2.2 Wintering waterbirds and their associated habitat

The MUL is not within an SPA and the Lower Suir Estuary, in the area of the MUL, does not provide suitable foraging habitat for wintering waterbirds.

Intertidal walkover and coring may result in temporary displacement of foraging waterbirds for short periods (up to a working day). However, the intertidal area within the MUL is extremely narrow (approximately 15 m wide) and does not represent optimal foraging habitat for waterbirds. Should individuals be present, any disturbance would be localised, reversible and non-injurious, and birds are expected to resume foraging immediately upon surveyor departure. No pathway exists for population-level effects on SCI waterbirds or their wetland habitat.

The nearest SPA designated for waterbirds Tramore Back Strand SPA (Site code: 004027) which is 10 km distant (as the Crow flies) distant from the MUL area at its nearest point.

Conclusion: No Likely significant effects; wintering waterbirds are screened out.

6.2.3 Pinnipeds

The foraging ranges for Grey seal can be large, travelling up to several hundred kilometres from their breeding areas (Kiely *et al*, 2000), while the foraging distance travelled by Harbour seals is generally less, it can also extend for 100s of kilometres (Vance *et al,* 2021, Carter, *et al*, 2022). Grey and Harbour Seals have large foraging ranges (up to 448 km and 273 km, respectively). However, the Lower Suir Estuary does not provide suitable habitat for Grey or harbour seals:

Grey Seal (*Halichoerus grypus*)

- The MUL area is not within any SAC designated for Grey Seal. The nearest SAC for this species is *Saltee Islands SAC* (Site code: 000707) which is 36 km distant to the MUL area at its nearest point (hydrologically).

Harbour Seal (*Phoca vitulina*)

- The MUL area is not within any SAC designated for Harbour Seal. The nearest SAC for this species is *Slaney River Valley SAC* (Site code: 000781) which is 75 km distant to the MUL area at its nearest point (hydrologically).

There are no haul-out locations occur within or adjacent to the MUL area, tidal currents are strong, and only rare transient individuals are recorded within the vicinity of the MUL area near to Waterford Port.

Acoustic emissions from survey equipment attenuate rapidly in shallow, sediment-rich waters, and no resting, breeding or moulting sites exist within acoustic range.

Conclusion: No Likely significant effects; No meaningful source–pathway–receptor link exists. Therefore, seals are screened out.

6.2.4 Cetaceans

Marine mammal sensory systems are adapted to life in the water or, in the case of seals, both in water and on land. Marine mammals rely on sound to navigate, to communicate with one another and to sense and interpret their surroundings. Behavioural responses of marine mammals to a sound are known to be strongly influenced by the context of the event and individual factors such as the animal's experience, motivation, conditioning and activity (Nowacek *et al*, 2007, Southall *et a*l, 2007 and Wartzok, *et al* 2004). Healthy new-born and younger animals may have the greatest hearing sensitivity

while individual hearing ability declines progressively with age and prior exposure to harmful sound levels, disease, etc. Such features and variability may also require consideration in the case-specific assessment of impact on marine mammals from introduced sound sources (NPWS 2014). Sound waves dissipate through the water with distance from the source. While local oceanographic conditions affect the path of the sound and its transmission.

Borehole drilling has the potential to produce a continuous noise source with a sound pressure level in the region of 145-190 db re 1µ in water @ 1m from source. This is below the level expected to cause injury to either Harbour Porpoise or Bottlenose Dolphin but could cause behavioural change should they be within a couple of meters of the transducer. Bathymetric surveys have the potential to produce a pulsed noise source with a sound pressure level, depending on the equipment type being used, within the range region of 200-232 db re 1µ in water @ 1m from source. This is within the range where significant adverse effects (Permanent Threshold Shift or Temporary Threshold Shift) in either Harbour Porpoise or Bottlenose Dolphin could occur should they be within a couple of meters of the transducer.

Harbour Porpoise and Bottlenose Dolphin are wide-ranging and mobile species, and AA screening for underwater noise follows SACs selected for cetacean species together with the Management Unit (MU) approach recommended by JNCC (2015):

Harbour Porpoise (*Phocoena Phocoena*)

- The MUL area is not within any MU designated for Harbour Porpoise. The nearest MU for this species is the *Celtic and Irish Seas MU* which is 8 km distant to the MUL area at its nearest point (hydrologically).
- The MUL area is not within any SAC designated for Harbour Porpoise. The nearest SAC for this species is *Hook Head SAC* (Site code: 000764) which is 18 km distant to the MUL area at its nearest point (hydrologically).

Bottlenose Dolphin (*Tursiops truncatus*)

- The MUL area is not within any MU designated for Bottlenose Dolphin. The nearest MU for this species is the Irish Sea MU which is 3 km distant to the MUL area at its nearest point (hydrologically).
- The MUL area is not within any SAC designated for Bottlenose Dolphin. The nearest SAC for this species is *Hook Head SAC* (Site code: 000764) which is 18 km distant to the MUL area at its nearest point (hydrologically).

The Lower Suir Estuary is not a typical cetacean habitat, owing to strong tidal currents, low and variable salinity, and restricted channel width. Records show only occasional, transient Bottlenose Dolphin sightings upstream to Grannagh, with most cetacean activity confined to Waterford Harbour. Harbour Porpoise records within the inner estuary are rare.

Acoustic sources proposed for the surveys are temporary, intermittent, and will attenuate rapidly in the shallow estuarine waters confined by riverbanks and a convoluted path to the more open waters of Waterford Harbour. The realistic acoustic footprint is therefore limited to the survey area and its immediate surroundings.

Given the low magnitude of the works, the brief duration of acoustic activity, the proximity to Bellview port and its associated shipping activity, the absence of European sites or MUs for cetacean species and the very limited cetacean use of the estuary, no likely significant effects on Harbour Porpoise or Bottlenose Dolphin are anticipated.

Conclusion: No Likely significant effects; No meaningful source–pathway–receptor link exists. Therefore, Harbour Porpoise and Bottlenose Dolphin are screened out.

6.2.5 Migratory fish

The Lower Suir Estuary lies within the migration corridor for Atlantic Salmon, Twaite Shad and Lamprey (Sea and River). Brook Lamprey are non-migratory and confined to smaller streams upstream of the MUL area and outside of its ZoI.

While exposure to very intense sounds (e.g., seismic guns) may result in mortal injuries, less intense sounds that are detectable by fishes may affect their behaviour, causing them to move away from their migration routes or leave favoured habitats (Normandeau Associates, Inc., 2012).

Hearing range and sensitivity varies considerably among fish species depending on the hearing mechanism of the species e.g., whether a swim bladder is involved in the hearing mechanism or not. Furthermore, within that class, some species with a swim bladder are sound pressure-sensitive at higher frequencies while others having a swim bladder are not e.g., Atlantic salmon (Hawkins, 1978). Lamprey are known to be able to detect sound at low frequencies and behavioural responses from sound, in sea lamprey, at the low frequency range are known from limited studies (Mickle *et al,* 2018). Twaite Shad are known to be able to detect sound at frequencies greater than 1.8Mhz, typically moving away from the sound source (Gregory *et al*, 2007)

The U.S. National Marine Fisheries Service (NMFS), as well as other agencies, currently uses 150 dB re 1 µPa (rms) as the sound pressure level that may result in onset of behavioural effects (Caltrans, 2015). Sound pressure above the 150 dB_{rms} level are expected to cause temporary changes in behaviour and these might include startle responses, feeding disruption, area avoidance, etc. Popper *et al* (2014).

Most vessels, and especially large ships, produce predominately low frequency sound (i.e., <1 kHz) Popper *et al* (2014). The estimated noise level from the site investigation vessel is below 145dB. However, the noise levels associated with some of the proposed site investigations are above 150dB (maximum of 228dB).

Both bore hole drilling and bathymetric surveys could lead to the introduction of noise in the range of 145-232 db re 1µ in water @ 1m from source which is within the range level that may lead to temporary changes in behaviour of these fish species. Therefore, there is the potential for temporary changes in the behaviour of the fish species which form a qualifying interest for the Lower River Suir SAC and which may transit through the project site.

Conclusion: The Lower River Suir SAC is designated for Salmon (*Salmo salar*), River Lamprey (*River Lamprey*), Sea Lamprey (*Petromyzon marinus*) and Twaite Shad (*Alosa fallax fallax*). All have the potential to migrate through the MUL area and with which there is a direct SPL link. Therefore, these species have been screened in.

6.2.6 Otters

Otters use freshwater, estuarine and coastal habitats for foraging, commuting, drinking and bathing, with resting and holt sites typically located in vegetated banks well above tidal influence. They favour marine areas where freshwater inflow is available. In Ireland, typical female territories extend approximately 7.5 +/- 1.5 km along mesotrophic rivers and ~6.5 +/- 1.0 km in coastal systems, whereas males may hold territories of ~13.2 +/- 5.3 km in riverine environments, with substantial variation depending on social dynamics (Reid et al., 2013).

Within this estuarine system, otters forage along the intertidal margin, but holt and couch sites occur inland along undisturbed riparian cover. The mapped EPA WFD River waterbody dataset indicates suitable otter habitat and a commuting/foraging corridor, but no formal NPWS otter survey has been undertaken at this location. No holts or resting structures are recorded at or near the proposed borehole locations.

The survey footprint is limited to small, discrete boreholes, undertaken during daylight hours, with only short-term human presence and no vegetation clearance required. As a result, disturbance pathways are weak and short-range, confined to brief, localised noise or activity during drilling. No meaningful pathway exists for water-quality deterioration.

For screening purposes, the Zone of Influence (ZoI) is conservatively defined as the shoreline and nearshore waters within ~300 m of the works, extending ~15 km along the estuary (7.5 km on either side of the site), reflecting typical territory lengths and potential commuting routes.

Conclusion: Otters may pass or forage along this shoreline, but the works will not affect holts, resting sites, or habitat connectivity. Any disturbance will be temporary, localised, and below a level likely to cause displacement. However, with due regard to the precautionary principle, otters are screened in.

6.2.7 Freshwater Pearl Mussel

Although salmon serve as glochidia hosts, this interaction occurs far upstream in freshwater.

Conclusion: No plausible source–pathway–receptor link exists. Species screened out.

6.2.8 White-clawed Crayfish

White-clawed crayfish (*Austropotamobius pallipes*) occurs extensively on the River Suir and on many of its tributaries. On the River Suir main channel, the species has been recorded on almost the entire length of non-tidal river from the most upstream point at Cabragh, near Thurles, to downstream of Kilsheelan. The nearest recorded location for this species is >40 km upstream of the MUL area. The habitat within the MUL area, bring brackish, does not support suitable habitat for the species and No SPR link exists.

Conclusion: No plausible source–pathway–receptor link exists. Species screened out.

6.2.9 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

This habitat occurs along the margins of the MUL area. While no survey activity is proposed to be conducted within this habitat it has been screened in on a precautionary basis as it is bordering on the MUL area.

Conclusion: Habitat within MUL. Atlantic salt meadows screened in.

6.2.10 Additional terrestrial and freshwater habitats

There is no SPR link to any of the terrestrial habitats or freshwater habitats, which are upstream of a hydrological gradient, within the Lower River Suir SAC and therefore these habitats are screened out.

Conclusion: No plausible source–pathway–receptor link exists. Habitats screened out.

7. Assessment of European sites

Table 5 provides a list of all European sites and their Qualifying Interests within the ZoI of the proposed project where source-pathway links have been identified.

Table 5. Summary of assessment

European site	Site code	Distance from proposed MUL (KM)	Qualifying interests	SPR Link	Assessment (Screened in/out
Lower River Suir SAC	002137	Within MUL area	Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	**Yes** Possible physical damage related to jack-up barge positioning	**Screened in**
			Petromyzon marinus (Sea Lamprey) [1095] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106]	**Yes** Possible disturbance and displacement from underwater noise from bathymetry and borehole drilling	**Screened in**
			Lutra lutra (Otter) [1355	**Yes** Possible disturbance and displacement due personnel conducting intertidal surveys and borehole drilling	**Screened in**
			Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	No No SPR link identified	Screened out

			Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] *Taxus baccata* woods of the British Isles [91J0] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Lampetra planeri* (Brook Lamprey) [1096]		
River Barrow and River Nore SAC	002162	2.2	*Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	**Yes** Possible disturbance and displacement from underwater noise from bathymetry and borehole drilling	**Screened in**
			Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170]	No SPR link too weak for any Likely Significant effects related to sediment mobilisation	Screened out
			Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	No No SPR link identified	Screened out

			Mediterranean salt meadows (Juncetalia maritimi) [1410] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Lampetra planeri* (Brook Lamprey) [1096]		
Slaney River Valley SAC	000781	>75 (Hydrologically)	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Old sessile oak woods with Ilex and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] *Lutra lutra* (Otter) [1355]	No No SPR link identified	Screened out

			Phoca vitulina (Harbour Seal) [1365] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Lampetra planeri* (Brook Lamprey) [1096]		
			Petromyzon marinus (Sea Lamprey) [1095] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106]	**Yes** Possible disturbance and displacement from underwater noise from bathymetry and borehole drilling	**Screened in**
Blackwater River (Cork Waterford) SAC	002170		Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]	No No SPR link identified	Screened out

			Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Lutra lutra* (Otter) [1355] *Vandenboschia speciosa* (Killarney Fern) [6985] *Lampetra planeri* (Brook Lamprey) [1096]		
			Petromyzon marinus (Sea Lamprey) [1095] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106]	**Yes** Possible disturbance and displacement from underwater noise from bathymetry and borehole drilling	**Screened in**

7. Assessment Summary

The screening assessment has identified four Special Areas of Conservation (SACs) within the ZoI of the proposed marine site investigation works (Figure 6). Screening has been undertaken based on hydrological connectivity, plausible source–pathway–receptor linkages, and the scale, duration, and nature of the proposed activities.

Lower River Suir SAC: The proposed Marine Usage Licence (MUL) area lies wholly within the Lower River Suir SAC and is therefore screened in on a direct pathway basis. Relevant qualifying interests considered in the context of the proposed works include Annex II migratory fish species, Atlantic salt meadows and Otter. While the survey activities are temporary, localised, a direct source–pathway–receptor linkage exists by virtue of the project footprint being located within the SAC and the potential for underwater noise related effects, potential physical damage to salt marsh habitat and disturbance from survey activities. Accordingly, the Lower River Suir SAC is screened in for Appropriate Assessment.

River Barrow and River Nore SAC: This SAC is downstream and hydrologically connected via the shared estuarine waters of Waterford Harbour. It has been screened in for Annex II migratory fish and Otter, reflecting an indirect but plausible connectivity pathway.

Slaney River Valley SAC: This SAC is hydrologically connected via the shared estuarine waters of Waterford Harbour and open waters of the south coast of Ireland. It has been screened in on a precautionary basis for Annex II migratory fish, reflecting an indirect but plausible connectivity pathway.

Blackwater River (Cork/Waterford) SAC: This SAC is hydrologically connected via the shared estuarine waters of Waterford Harbour and open waters of the south coast of Ireland. It has been screened in on a precautionary basis for Annex II migratory fish, reflecting an indirect but plausible connectivity pathway.

Based on the assessment of LSEs given in section 6 it is considered that the project as proposed has the potential to lead to Likely Significant Effects on the Conservation Objectives (COs) of the Lower River Suir SAC, the River barrow and River Nore SAC, Slaney River Valley SAC and Blackwater River (Cork/Waterford) SAC.

8. In-combination impacts

Approach to identification of in-combination effects

While a single project or plan may not in itself result a significant effect on the conservation objectives of a site, a combination of projects within a localised area may cause a significant effect on a site. Therefore, the cumulative impacts must be taken into consideration when assessing the possible impacts of a project.

Potential project related impacts were identified in section 6 of this SISAA, and included potential pressures resulting from: vessel presence, acoustic surveys and benthic surveys. Additional projects identified as having potential to act in-combination with the proposed project are considered to be those projects most likely to contribute to these pressures and generate additional underwater noise, vessel disturbance and impacts on benthic habitats.

MARA has developed a stepwise approach for identifying in-combination plans and projects, as such, using professional and scientific judgement, the key steps for assessing cumulative effects employed were as follows:

- Defining the Cumulative Effects Spatial Scope (CESS)
- Defining the Cumulative Effects Temporal Scope (CETS)
- Impact identification
- Pathway identification
- Prediction
- Identification of Plans or Projects that could act in combination
- Screening Stage Cumulative Effects Assessment conclusion
- Managing cumulative impacts identified - to be carried out as part of Stage 2 AA process

For the proposed project the CESS has been defined as 5 km and the CETS as 5 years. The definition of the CESS is based on acoustic survey equipment effective deterrence ranges as per JNCC Guidance on Assessing the Significance of Noise Disturbance against Harbour Porpoise SACs Conservation Objectives (JNCC, 2020) and the CETS is the Maritime Usage Licence period.

Using the above 8 step approach, and following a search of relevant databases undertaken on the 12th December 2025, two projects have been identified as being within the CESS of the MUL area as detailed in Table 9.

A review of relevant plans, projects and activities within and adjacent to the River Suir estuary was undertaken, including MARA licence applications, EPA licensed activities and dumping at sea permits, foreshore licensing records, Uisce Éireann and EPA operational activities, aquaculture and fisheries

registers, Marine Institute datasets, and planning registers for Waterford City & County Council and Kilkenny County Council. Activities identified comprise regulated port maintenance dredging, historic geotechnical site investigations, licensed wastewater discharges, routine inspections and modelling within the catchment, and non-intrusive ecological monitoring and data collection, all of which are either ongoing background pressures, completed prior to the proposed survey period, or spatially, temporally or functionally distinct from the proposed works. No live foreshore applications, aquaculture or fisheries licences, or permitted planning developments involving in-river or foreshore construction were identified that would introduce additional pressure pathways or interact with the proposed survey. Having regard to the limited scale, short duration and non-intrusive nature of the proposed survey works, no pathways for significant in-combination effects have been identified, and the proposed development, alone or in combination with other plans or projects, is not likely to result in significant effects on the qualifying interests or conservation objectives of the Lower River Suir SAC.

Table 6. Search for additional projects within or adjacent to ZoI.

Application licence no.	Applicant	Approximate Distance from the MUL Area	Proposed Activity	Project Status	Potential for cumulative effect
LIC230025	Port of Waterford	Within 5 km (estuary)	Maintenance dredging; vessel activity; seabed disturbance	Recurring / cyclical	Minor potential due to shared receptor (estuarine sediments); not significant due to non-intrusive, temporally independent survey
LIC230013	Port of Waterford	Within 5 km (Belview)	Geotechnical site investigation; vessel use; localised seabed disturbance	Completed (Dec 2023)	Minor historical overlap only; no temporal interaction with proposed survey
—	NPWS	Within estuary	Benthic biotope survey (Kennedy, 2008)	Historical	No cumulative effect; baseline ecological data only
—	NPWS	Adjacent SAC	Saltmarsh walkover monitoring (McCorry & Ryle, 2009)	Historical	No cumulative effect; non-disturbing monitoring
—	NPWS	SAC-wide	Conservation objectives for Lower River Suir SAC	Ongoing	No cumulative effect; context-setting document only
WwDL D0022-01	Uisce Éireann	Downstream estuary	Treated effluent discharge; storm overflows (Waterford City WWTP)	Ongoing licensed	Background pressure only; no interaction with survey works
S0012-05	Port of Waterford	Estuary and offshore	Maintenance dredging and sediment disposal	Proposed (2026–2033)	Potential pathway only; survey does not involve sediment removal or disposal
—	DHLGH	n/a	Foreshore licensing – no live applications identified	n/a	No cumulative effect identified
—	Port of Waterford	Estuary	Maintenance dredging programmes; vessel activity	Cyclical	Minor; regulated port operations with no temporal overlap
—	Uisce Éireann / EPA	Within catchment	Pipeline inspections, monitoring and hydraulic modelling; no seabed works	Planned / routine	No cumulative effect; routine, non-intrusive activities

—	Aquaculture & Fisheries Registers	Survey footprint	Aquaculture and fisheries licensing	n/a	No active licences; no cumulative effects
—	Marine Institute / INFOMAR	River Suir / Waterford Harbour	Hydrographic and seabed mapping datasets	Ongoing data availability	Data-only activities; no cumulative effects
—	Waterford City & County Council / Kilkenny County Council	Estuary and adjacent areas	Review of planning applications for in-river or foreshore works	Current registers	No relevant live or permitted developments introducing additional pressure pathways
MAC240016	Open Eir	Wexford / Waterford	Fibre optic cable and auxiliary works	Applied (2025)	Spatially and functionally distinct; no interaction pathway identified
MAC20230001	Port of Waterford	Waterford	ORE operations and maintenance facility (quay extension, pontoons, armour)	Determined (2024)	Assessed under separate consent; no interaction with proposed survey

The following plans, related to the development of the maritime environment, were also identified:

- Climate Action Plan 2023
- The Climate Action Plan 2024
- Designated Maritime Area Plans (DMAPs)

It is considered that likely significant in-combination effects between the identified projects and plans on the conservation objectives of Natura 2000 sites considered in this report cannot be excluded at this stage.

9. Transboundary effect

Transboundary effects refer to significant effects that a proposed development in one country may have on the environment of another. The United Nations Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment in a Transboundary Context, (referred to as the 'Espoo Convention') adopted in 1991 documents the requirement to consider transboundary impacts. The Espoo Convention requires that assessments are extended across borders between Parties of the Convention when a planned activity may cause significant adverse transboundary impacts.

Since 1 January 2021 nature conservation areas in the UK (including Northern Ireland) are no longer part of the Natura 2000 network. On this basis, the nearest European sites outside of Ireland's national boundaries are on mainland Europe.

10. Conclusion

Following a review of the proposed project, information to support a screening assessment, following the guidelines of *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 has been prepared.

It cannot be excluded on the basis of objective scientific information, following the preparation of this SISAA, that the proposed project, individually or in combination with other projects, will have a significant effect on a European Site.

The assessment concludes that, the project as proposed may give rise to adverse Likely Significant Effects on the Conservation Objectives European sites listed below. Accordingly, it is concluded that Appropriate Assessment of the proposed project is required.

- Lower River Suir SAC (002137)
- River Barrow and River Nore SAC (002162)
- Slaney River Valley SAC (000781)
- Blackwater River (Cork/Waterford) SAC (002170)

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