January 2024

Annex IV Species Risk Assessment

Navigation Maintenance Dredging 2026 - 2033

On behalf of

Port of Waterford

MALONE O'REGAN ENVIRONMENTAL

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[redacted]

Title: Annex IV Species Risk Assessment, Navigation Maintenance Dredging 2026 - 2033, Port of Waterford

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Prepared By: [redacted] **Signed:** [redacted]

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Annex IV Species Risk Assessment

Navigation Maintenance Dredging 2026 - 2033

Port of Waterford

Contents

FIGURES

TABLES

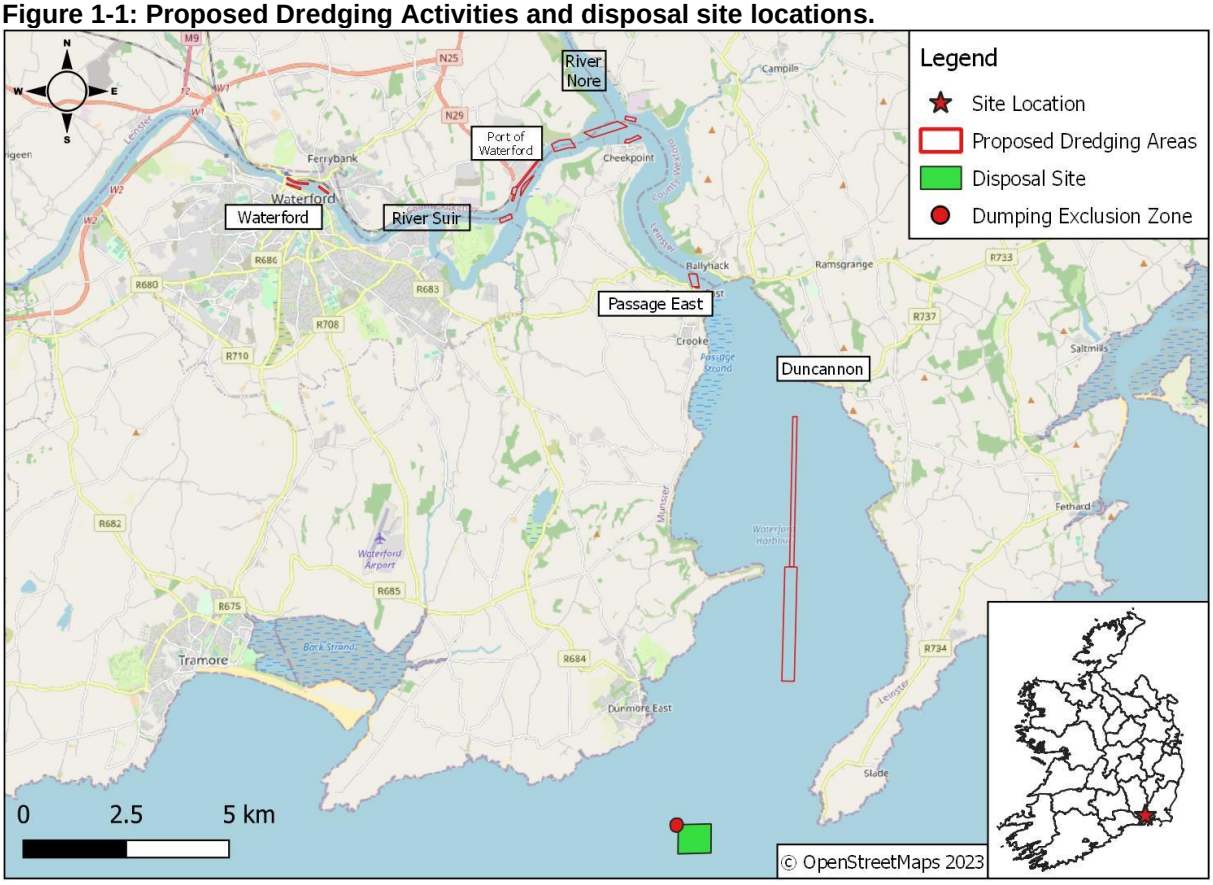
APPENDICES

1 INTRODUCTION

Malone O'Regan Environmental (MOR) have been commissioned by the Port of Waterford ('the Applicant') to undertake an Annex IV Species Risk Assessment to assess the likely significant effects, if any, in respect of ongoing maintenance dredging and disposal activities and for slightly extended areas of dredging at Cheekpoint Lower Bar, Cheekpoint Harbour and O'Brien's Quay ('the Proposed Dredging Activities') in the Middle Suir Estuary, Lower Suir Estuary, Barrow-Suir-Nore Estuary and Waterford Harbour ('the Waterford Estuary') (OS ITM 668819 612137) on any Annex IV species.

This report has been prepared in support of a Dumping at Sea (DaS) Permit application to be submitted to the Environmental Protection Agency (EPA) and a licence application to be submitted to the Maritime Area Regulatory Authority (MARA) for a Licence to Carry Out Specified Maritime Usages in the Maritime Area under the Maritime Area Planning Act (2021) ('Maritime Licence').

Figure 1-1: Proposed Dredging Activities and disposal site locations.



1.1 Statement of Authority

This report was prepared by Mr. [redacted], MOR Environmental Consultant. [redacted] holds an MSc. in Marine Biology from the University of College Cork. [redacted] is also a trained Marine Mammal Observer (MMO) and has experience in the supervision of dredging and piling work within the Waterford Estuary.

This report was reviewed by Mr. [redacted], Marine Consultant of Manada Environmental. [redacted] is a Chartered Marine Scientist at the Institute of Marine Engineering, Science and Technology (IMarEST) with over 15 years' experience working in the offshore industry and marine environmental regulation in Ireland and worldwide. [redacted] is highly experienced MMO

and acoustician with over a decade of experience working with Passive Acoustic Monitoring systems.

This report was approved by Mr. [redacted], MOR Associate Director - Ecologist. [redacted] is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). [redacted] has over 18 years' experience working in the ecological consultancy sector, including specialist protected species surveys and ecological appraisals.

1.2 Relevant Annex IV Species

All species listed under Annex IV of the Habitats Directive with the potential to be impacted by the Proposed Dredging activities will be fully assessed. The Annex IV species that occur in Ireland [1] that will have been identified as relevant to this risk assessment include:

- All Irish cetaceans (whales, dolphins, and porpoise);
- Eurasian otter; and,
- All marine turtles.

Other non-Annex IV species have also been included in this risk assessment to ensure no adverse effects occur to any protected species, which include basking sharks (*Cetorhinus maximus)* and phocids (seals).

The following Annex IV species that occur in Ireland have not been considered for the risk assessment due to their terrestrial nature:

- *Microchiroptera* – all species (all bat species present in Ireland);
- *Bufo calamita* - Natterjack Toad; and,
- *Geomalacus maculosus* – the Kerry Slug.

1.3 Regulatory Context

The Wildlife Act (1976) and its amendments – 2000, 2005, 2010 and 2012 – provide for the protection of all cetaceans as well as otter (*Lutra lutra*), grey seal (*Halichoerus grypus),* common seal (*Phoca vitulina)* and marine turtles*.* This act applies to the entire area of Irish territorial waters (12 nautical miles). In addition, both cetaceans and marine turtles are protected under a number of international agreements such as the Bonn Convention, CITES, OSPAR and ICRW Convention [2]. Cetaceans are also provided protection under the Whale Fisheries Act 1937.

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna better known as 'The Habitats Directive' provides the framework for legal protection for habitats and species of European importance.

Articles 12, 13 and 16 of the Habitats Directive (92/43/EEC) set out that Member States must establish strict systems of protection for flora and fauna that are considered particularly threatened and are listed as Annex IV of the Habitats Directive. Article 12, 13 and 16 of the Habitats Directive have been transposed into Irish law by Regulations 51, 52 and 54 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

These Regulations provide for the protection of Annex IV species and as such it is an offence to:

- Deliberately capture or kill any specimen of these species in the wild;
- Deliberately injure (except when hunting under such licence) a protected species;
- Deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration;

- Deliberately take or destroys eggs of those species from the wild;
- Damage or destroy a breeding site or resting place of such an animal; or,
- Keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive.

Under Article 16 of the Habitats Directive, a derogation licence may be granted by the Minister, which would allow otherwise illegal activities to go ahead provided that:

- There is no satisfactory alternative; and,
- The action authorised will not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status in their natural range.

According to the Habitats Directive, favourable conservation status 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 foreseeable future; and,
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

It should be noted that the granting of another statutory consent (i.e., a maritime usage licence or marine area consent) does not remove the obligation to obtain a derogation licence should one be required. If satisfied that an application meets the criteria for derogation, the Minister may grant a derogation licence, which may be subject to such conditions, restrictions, limitations, and requirements as the Minister considers appropriate, and these will be specified in the licence.

Additionally, the following guidance documents were adhered to for the preparation of this Risk Assessment:

- Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters' [3]; and,
- The protection of marine European Protected Species from injury and disturbance: Guidance for the marine area in England and Wales and the UK offshore marine area' was published in 2010 by the JNCC, Natural England and the Countryside Council for Wales (now Natural Resources Wales) [4].

The NPWS '*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters'* [5] states:

'*Following the initial identification and assessment of risk arising from a plan or project…, a menu of management options is available for consideration by Regulatory Authorities in their decision-making process…and it includes:*

> ***A1. Consent without mitigation*** *(e.g., where the risk of any adverse effects have been ruled out)*
>
> ***A2. No Consent given for the activity***
>
> ***A3. Avoid critical habitats for marine mammals*** *(e.g., designated sites or other locations identified as sensitive via the risk assessment process)****, and / or***
>
> ***A4. Avoid operations during key periods of the species' life cycle*** *(e.g., breeding/resting, migration)****, and / or***

A5. Avoid time periods when effective impact mitigation is not possible, and / or

A6. Risk minimisation measures where appropriate, namely

- ***A6.1.*** *Minimise the duration over which the sound-producing activity is intended to take place;*
- ***A6.2.*** *Minimise the individual and cumulative sound pressure and exposure levels delivered into the environment by the activity. If necessary, the use of alternative, lower impact equipment and methods could be explored (e.g., vibratory hammer, gravity base piles);*
- ***A6.3.*** *Incorporate the use of clear "ramp-up" (i.e., "soft-start") procedures, whereby sound energy input to the marine environment is gradually or incrementally increased from levels unlikely to cause significant behavioural impact on marine mammals to the full output necessary for completion of the activity;*
- ***A6.4.*** *Incorporate the use of fully enclosing or confined bubble curtains, encircling absorptive barriers (e.g., isolation casings, cofferdams) or other demonstrably effective noise reduction methods at the immediate works site, in order to reduce underwater sound propagation from on-site operations. Studies have shown that such methods can provide a significant reduction in sound input to the wider aquatic environment in the order of 10-30 dB;*
- ***A6.5.*** *Use trained and experienced marine mammal observers (MMOs) to provide effective means of detecting marine mammals in the vicinity of coastal and marine plans or projects. Associated operational considerations must also be taken into account (see section 4.2.).'*

Specific measures related to dredging are also included in the above-mentioned NPWS guidance document and recommend that dredging activities be subject to a risk assessment as a result of sound related impacts due to the anthropogenic activities of the ongoing dredging on marine species.

Following a review of the risk assessment, the regulatory authority may decide to grant consent without any mitigation (A1), to refuse consent (A2), to grant consent with risk avoidance (A3 – A5) or to grant consent with risk minimisation (A6) [6].

2 DESCRIPTION OF THE PROJECT

2.1 Project Location and Context

The Waterford Estuary, located in southeast Ireland, is a semi-enclosed coastal water body open to sea through an entrance ca. 4.25km wide between Hook Head and Dunmore East. Just north of the mouth of the estuary is Creadan Head, in which a series of beaches and tidal flats are located and extend north to Passage East. The water surface area covers approximately 80km², being for the most part relatively shallow riverine sections, however, a series of deep pockets occur within Waterford Estuary. Two major rivers join into the Waterford Estuary, the River Suir and the River Barrow. These rivers are both influenced by the tidal cycle within the estuary. The River Suir is tidal ca. 60km upstream from the entrance at Hook Head. The River Barrow and the River Nore, which is linked to the River Barrow, are both tidal for ca. 55km to St. Mullins on the River Barrow and to Inistioge on the River Nore.

The Port of Waterford's authority limits extends 6.5km south of a line between Hook Head and Falskirt Rock, encompassing the majority of the estuary. The Port's waterway consists of a primary navigational channel, to the main terminal at Belview, for the safe transit of trade vessel.

The estuary is extremely complex and dynamic in its sediment movement and because of this sedimentation is highly variable. However, ABPmer have undertaken extensive modelling of the sediment movement within the estuary and therefore, the general sediment movements are predicable within the estuary. Sedimentation in the upper estuary is dominated by the tides, with greater sedimentation during a spring tide, due to the greater amount of energy present. Flood tides transport sediment up the estuary in the water column or as bed load. However, the majority of the ebb tide flows are not strong enough to keep the material in suspension and push the sediment back down the estuary. Therefore, the sediment accumulates in the areas of lowest velocity. The outer estuary sedimentation is primarily storm driven and thus variable.

Overall, the navigation channel into Port of Waterford has good water depths. However, as a result of the sediment input from storm events, the Duncannon and Cheekpoint sand bars, and the ongoing maintenance of the berths at Belview, regular dredging is required to ensure of the navigation channel remains fit for purpose and safe to use.

2.2 Proposed Dredging Areas

In total there are 16No. areas that are included in these applications ('Proposed Dredging Areas'). This includes 3No. locations known as 'Primary Dredge Areas' that experience a high degree of sedimentation and therefore, over time, trigger the requirement for a maintenance dredging campaign to be undertaken. The Primary Dredge Areas therefore require dredging at least twice a year and these include Belview Berths, Cheekpoint Lower, and Duncannon Channel. There are also 13No. that require less frequent dredging (referred to as 'Secondary Dredge Areas'). The areas to be included in the forthcoming application may be broken down as presented below in Table 2-1 and Figure 2-1, and illustrated in Appendix A.

The Proposed Dredging Activities includes primarily areas directly related to trade vessels (berths) and access to the Port of Waterford (navigational channel); however, it also includes areas that are maintained for smaller harbour users, such as Cheekpoint Harbour, which is a community harbour facilitating local fishing and recreational vessels. It is considered unlikely that the responsible parties for each of these areas would have the resources required to seek a permit / licence individually. Whilst areas such as these are not the responsibility of the Port of Waterford, the Port recognises their importance to minor businesses and the general public and is happy to collaborate with them to ensure the licencing of the maintenance activities of the Waterford Estuary as a whole is streamlined.

It should be noted that 13No. of the areas included in this application are the same size and location as those previously authorised under previous permits held by the Port of Waterford. However, there are 3No. areas of slightly extended dredging and/or ploughing of ca. 9.97ha that the Port of Waterford are seeking, which will include:

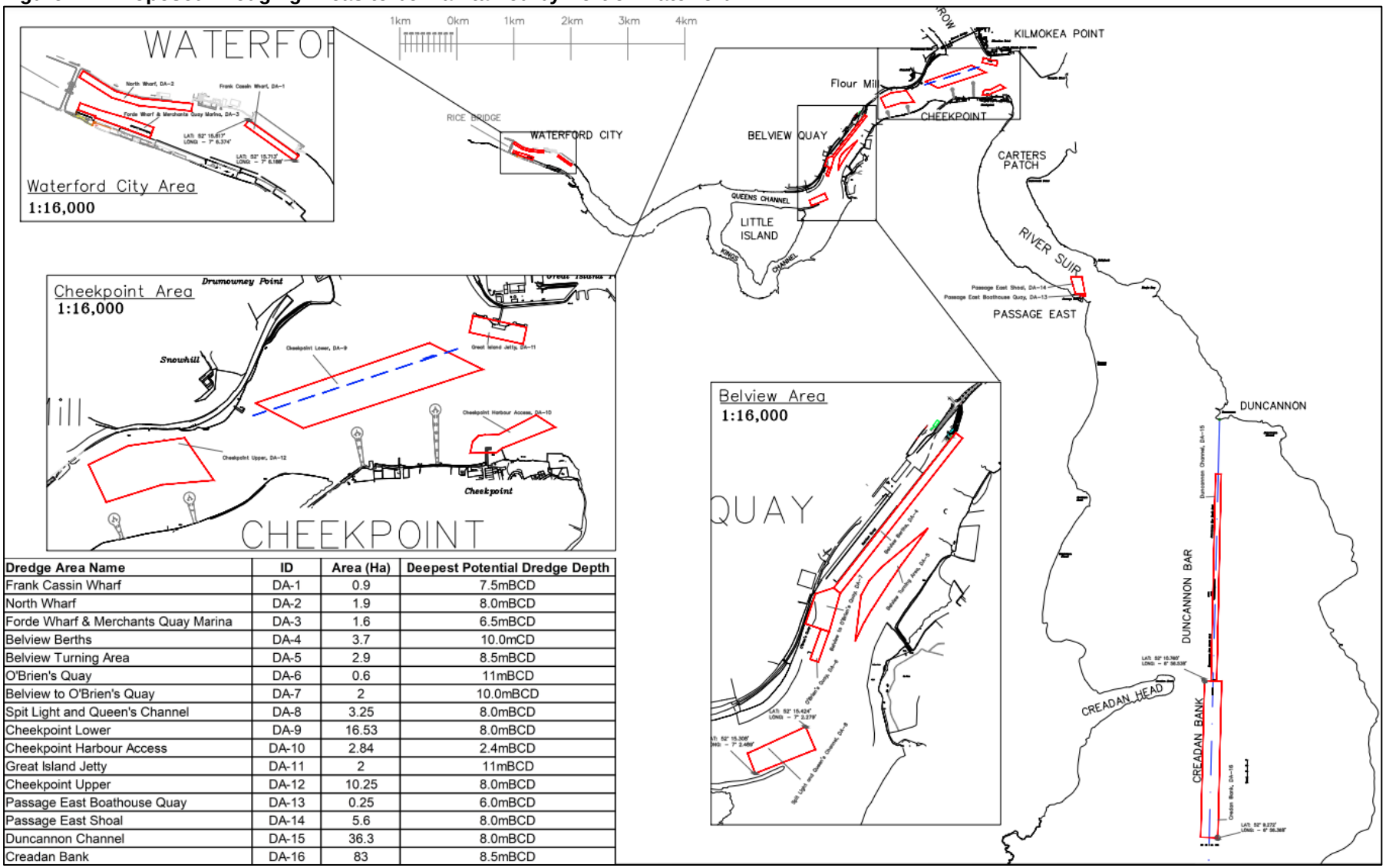
- Cheekpoint Lower Bar;
- Cheekpoint Harbour Access; and,
- O'Brien's Quay.

Further information on these extended areas for plough dredging is discussed below.

Table 2-1: Proposed Dredging Areas to be Maintained by Port of Waterford (Note: grey shaded rows indicate proposed extended areas)

Dredging Areas	Dredge Area Name	Current Permitted Area (ha)	2026-2033 Area (ha)
Primary Dredge Areas	Duncannon Channel	36.0	36.0
	Cheekpoint Lower	8.4	16.53
	Belview Berths	3.7	3.7
Secondary Dredge Areas	Belview Turning Area	2.9	2.9
	Belview to O'Brien's Quay	2.0	2.0
	Cheekpoint Harbour Access	0.8	2.84
	Cheekpoint Upper	10.3	10.3
	Creadan Bank	83.0	83.0
	Frank Cassin Wharf	0.9	0.9
	Forde Wharf & Merchants Quay Marina	1.6	1.6
	Great Island Jetty	2.0	2.0
	North Wharf	1.9	1.6
	O'Brien's Quay	0.5	0.6
	Passage East Boathouse Quay	0.3	0.3
	Passage East Shoal	5.6	5.6
	Spit Light and Queen's Channel	3.3	3.3
Total Area		**163.2**	**173.17**

Figure 2-1: Proposed Dredging Areas to be Maintained by Port of Waterford



Dredge Area Name	ID	Area (Ha)	Deepest Potential Dredge Depth
Frank Cassin Wharf	DA-1	0.9	7.5mBCD
North Wharf	DA-2	1.9	8.0mBCD
Forde Wharf & Merchants Quay Marina	DA-3	1.6	6.5mBCD
Belview Berths	DA-4	3.7	10.0mCD
Belview Turning Area	DA-5	2.9	8.5mBCD
O'Brien's Quay	DA-6	0.6	11mBCD
Belview to O'Brien's Quay	DA-7	2	10.0mBCD
Spit Light and Queen's Channel	DA-8	3.25	8.0mBCD
Cheekpoint Lower	DA-9	16.53	8.0mBCD
Cheekpoint Harbour Access	DA-10	2.84	2.4mBCD
Great Island Jetty	DA-11	2	11mBCD
Cheekpoint Upper	DA-12	10.25	8.0mBCD
Passage East Boathouse Quay	DA-13	0.25	6.0mBCD
Passage East Shoal	DA-14	5.6	8.0mBCD
Duncannon Channel	DA-15	36.3	8.0mBCD
Creadan Bank	DA-16	83	8.5mBCD

2.3 Description of the Proposed Dredging Activities

The Applicant intends to apply for an eight year DaS permit from the EPA and a Maritime Licence from MARA to dredge and dump at sea (2026-2033 inclusive). The maintenance dredging programme will consist of:

- Dredging of approximately 823,513 wet tonnes of spoil annually to maintain the Navigation Channel;
- Disposal of the dredged material at the existing licenced offsite disposal site; and,
- 3No. areas of extended dredging and/or ploughing at Cheekpoint Lower Bar, Cheekpoint Harbour, and O'Brien's Quay.

The proposed dredging methodologies are outlined below.

2.3.1 Dredging Methodologies

The dredging methodology utilised will vary depending on the following characteristics:

- Seabed / water depth;
- Access / manoeuvring within the area;
- Sediment type;
- Volume of sediment; and,
- Timeframe for the works.

The primary dredging method will be by Trailing Suction Hopper Dredger (TSHD), supported by a bed leveller. Allowances will also be made for the utilisation of Mechanical Dredging and Plough Dredging. In some areas, multiple strategies may be required to be engaged. Descriptions of each dredging activity are provided in the sections below and Table 2-2 outlines the dredging activity proposed at each location.

Table 2-2: Proposed Dredging Activity at each Location

Dredging Areas	Dredge Area Name	Dredging Activity		
		Loading		Plough
		TSHD	Mechanical	
Primary Dredge Areas	Duncannon Channel	✓		✓
	Cheekpoint Lower	✓		✓
	Belview Berths	✓	✓	✓
Secondary Dredge Areas	Belview Turning Area	✓	✓	✓
	Belview to O'Brien's Quay	✓	✓	✓
	Cheekpoint Harbour Access	✓	✓	✓
	Cheekpoint Upper	✓		✓
	Creadan Bank	✓		✓
	Frank Cassin Wharf			✓

Dredging Areas	Dredge Area Name	Dredging Activity		
		Loading		Plough
		TSHD	Mechanical	
	Forde Wharf & Merchants Quay Marina			✓
	Great Island Jetty	✓	✓	✓
	North Wharf			✓
	O'Brien's Quay	✓	✓	✓
	Passage East Boathouse Quay	✓	✓	✓
	Passage East Shoal	✓	✓	✓
	Spit Light and Queen's Channel			✓

2.3.1.1 Trailing Suction Hopper Dredging

Due to the specific characteristics of the Port of Waterford the TSHD is the primary dredging method used to maintain the design depth of the navigational channels, and the other accessible areas of the Port's berths. The areas to be dredged will be identified regularly by hydrographic survey.

To start the dredging operations, the TSHD will sail to the area to be dredged. Once in the vicinity of its dredging area, the TSHD will lower the draghead(s) to the seabed and dredging can commence. The centrifugal dredge pump, installed inside the dredger, takes up a mixture of water and soil through the draghead, and suction pipe, and pumps the mixture into its integral hopper. The sediment will settle in the hopper and, if advantageous, only the water is discharged through an adjustable overflow system. When the draught of the vessel reaches the dredging loading mark or when circumstances do not allow for further loading, dredging will cease, and the suction pipe hoisted on deck. The dredger will fill its hopper in each of the identified dredging areas as efficiently as possible.

Upon filling its hopper, the dredger will sail to the licensed disposal site and slows to approximately one to two knots. The dredger will then open bottom doors, or split along its hull, to allow the release of its contents over several minutes. During the disposal operation the dredger is travelling at between one to two knots within the disposal area. Due to this the material is spread over the disposal site and ensures against accumulation of material within an isolated area (i.e., the centre of the disposal site). This process is repeated for each disposal operation with the master of the vessel referring to the previous disposal locations used, within the on-board tracking system, and selecting a new disposal location within the licensed area. By using as much of the disposal site as possible any impacts of excessive accumulation in one location from the disposal activity will be minimised.

This process will be continued until interim hydrographic surveys show that the required safe navigation depths required have been achieved and dredging can cease.

2.3.1.2 Plough Dredging

A plough vessel generally uses, if available, a bulldozer type plough to relocate material, although a standard open box plough can suffice on occasion. Sediment movement is achieved by towing a bottomless rectangular box shaped fabricated steel implement behind a

powered vessel, usually a small workboat or tug. When used correctly, the plough is suspended at a controlled height from an A-frame mounted over the stern of the towing vessel. Height, or depth of submergence, is controlled by a deck mounted hoist winch. The cutting blade at the leading edge of the plough slices the surface sediment which is then contained within the sides and rear of the following plough until reaching an area where the bed level is lower than the suspended level of the plough, whereupon the contained sediment falls from the open bottom of the plough. The plough is then raised above the general seabed level and the towing vessel returns to the area from which sediment is to be moved and repeats the cycle.

Ploughing is also undertaken regularly at Cheekpoint Lower Bar. The Port of Waterford has invested considerable time and effort over the last number of years to study the sedimentation regime that occurs at Cheekpoint Lower Bar. This is because it is the primary dredging cost for the Port annually. From a variety of studies and observations, the Port have ascertained with confidence that sedimentation is significantly greater over spring tide periods. Sedimentation rates on the spring tide can commonly be 2 to 3 times greater than the neaps, and on occasion considerably more. Turbidity monitors in and around Cheekpoint have reflected this assertion as the spring tide energy mobilises significant amounts of sediment around the estuary generally. A hydrodynamic model developed by the Port has corroborated this hypothesis. Therefore, the decision was taken to undertake ploughing during spring tide periods to minimise the amount of sediment settling in the area while it was still fluid and unconsolidated. The premise of these operations is prevention rather than cure. Also, environmentally, ploughing on spring tides is also more attractive due to the naturally elevated background levels of suspended sediment that are present. The port has used this preventative technique over the past number of years in compliance with its current licence/permit. Furthermore, the Port is currently looking at long term solutions to try and minimise or negate the sedimentation and associated dredging requirement at Cheekpoint Lower Bar and is seeking to progress these options.

2.3.1.3 Mechanical Dredging

There is also the potential for utilisation of a mechanical dredger in some areas. These dredgers use a bucket lowered to the seabed to excavate the targeted sediment material which is then raised to the surface. However, these dredgers do not have any means of transporting the dredged sediment so ‘hopper barges’ are required to be filled and transit to the licensed disposal site. The areas that may require the use of a mechanical dredger are limited to quay walls and berths where material has been compressed and has consolidated to a degree that it cannot be removed by other methods of dredging. This option is not favoured by the Port as it is significantly more expensive that the use of a TSHD/plough and it is only utilised as a last resort when conditions dictate the standard processes are technically unfeasible.

2.3.2 Duration and Frequency

The current licence (S0012-03) expires on the 31st December 2025 and therefore the Port of Waterford is seeking an 8-year duration Dumping at Sea Permit and Maritime Licence under MAP to run inclusively from 2026 to 2033. It is requested that the maintenance dredging required be allowed to be undertaken at any time during this period as identified by regular hydrographic survey.

Any maintenance operations will be dictated by the extent of sedimentation that has occurred in each area of the harbour. These rates can fluctuate significantly, based on inclement weather resulting in storm conditions and high rainfall. Severe sedimentation has occurred in the past after a storm event and a contingency is included to ensure that the Port can act immediately to reduce the build-up and allow trade to continue.

The existing dumping at sea permit does not allow ploughing to occur between the start of March and the end of June, with the exception of those sites at Cheekpoint where ploughing is restricted to spring tides periods only. Bed levelling is permitted to be undertaken at all times of the year. No change to this is proposed.

No adjustment to this regime is requested.

2.3.3 Volume and Tonnage

The provisional volumes/tonnages of material to be dredged, and the anticipated schedule, are outlined in Appendix B.

Dredging will be carried out on an as required basis, with a degree of over dredging to provide sedimentation capacity and maintain minimum safe navigational depths.

Similar to the current permit, it is requested that 823,513 wet tonnes are permitted to be placed at the offshore site annually from 2026 to 2033 inclusive. There has been no increase in the permitted quantity of sediment disposed of at the offshore site since the inception of the site; however, it should be noted that the EPA currently uses wet tonnes as opposed to the historic unit dry tonnes.

The maximum volume of material disposed of per day at the designated disposal site has been variable over the past 20 years, with the figure selected dependent on the size of the dredger being utilised. The most recent permit granted stipulates a maximum disposal rate per day of 69,079 wet tonnes for the offshore disposal site. No change is proposed to these levels as no negative environmental impacts have been noted during the period when these limits has been in place.

Sedimentation rates can vary considerably depending on the severity of weather conditions, river flow and prevailing wind direction. Severe sedimentation has occurred in the past after a storm event and a contingency is included to ensure that the Port of Waterford can act immediately to reduce the build-up and allow trade to continue. Therefore, further to this regular disposal activity, it is also requested that an annual contingency tonnage of 175,000 dry tonnes (equivalent to 275,463 wet tonnes) be allocated to this disposal site should extreme weather events cause an inundation of sediment.

Th contingency allowance is included in the application, as per the current permit, due to the inclusion of Creadan Bank on this application, which is located in an extremely dynamic area and represents a significant risk in extreme events. As per previous permits this allocation would only be deposited if the dredging of this material is required to maintain navigable depths, as evidenced by pre-dredge and post-dredge bathymetric surveys. The use of the contingency allowance would be subject to the prior written agreement of the Agency. This contingency allowance is not requested as part of the regular annual tonnage as it is likely it will not be needed, and it would unnecessarily increase the annual permitted dumping tonnage. However, failure to include an allowance for inundation events would be irresponsible of the Port, considering the estuary's history of such events. The inclusion of the contingency figure means that an emergency application to the EPA would not being required for an extreme weather/inundation event when a quick response to the conditions may be required.

Under its current permit/licence, the port is permitted to plough dredge a maximum of 159,165 wet tonnes annually. No change to this tonnage is proposed.

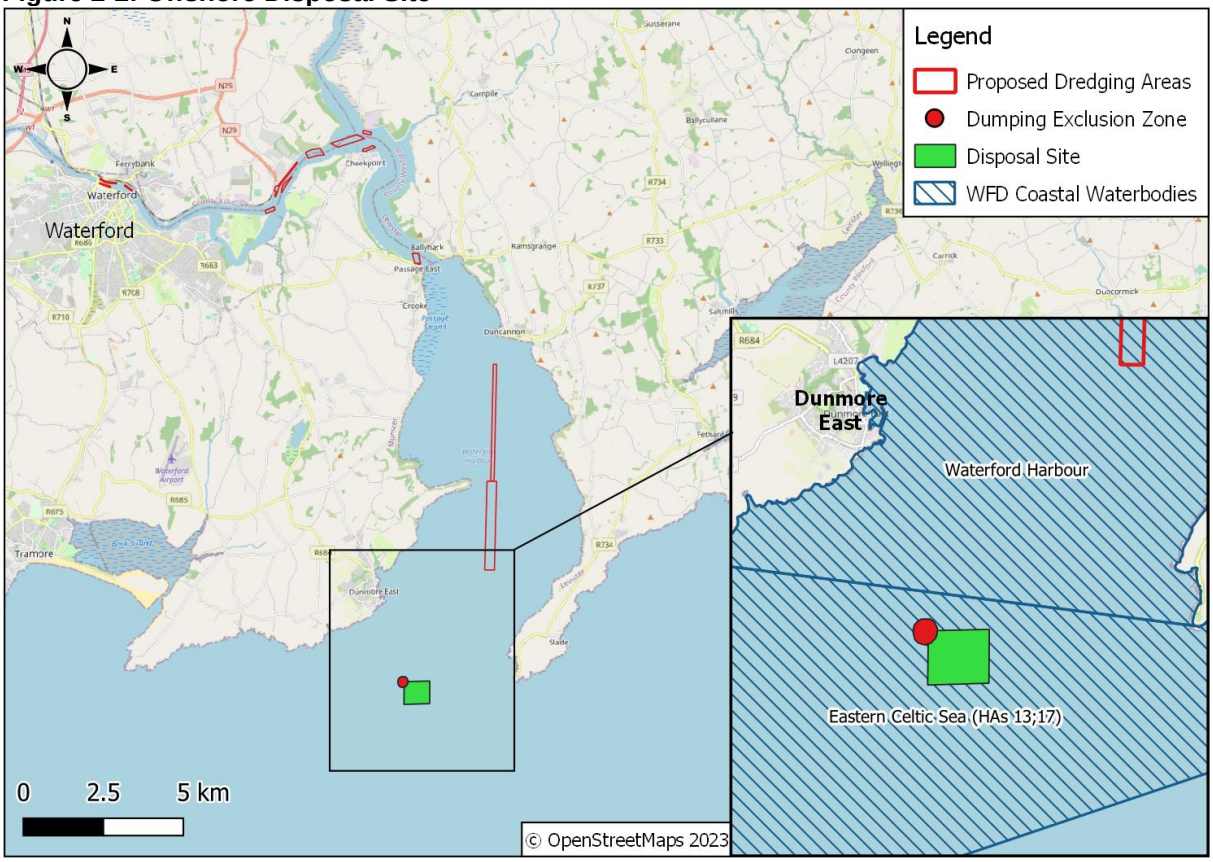
2.3.4 Offshore Disposal Site

The offshore disposal site proposed for this application has been in use since 1996. The dredging methodology, volume and local site characteristics have not changed in the intervening period, so all historical studies undertaken with respect to the disposal site and its impacts are deemed to be relevant.

The offshore disposal site is located ca. 22km south from the dredging area and ca. 2.6km southwest of Hook Head.

Figure 2-2 illustrated the location of the offshore disposal site and Appendix C.

Figure 2-2: Offshore Disposal Site



2.4 Watercourses within the Vicinity of the Proposed Dredging Areas

The dredging areas are located within four (4No.) watercourses the Middle Suir Estuary, Lower Suir Estuary, Barrow Suir Nore Estuary and Waterford Harbour. The disposal site is located within the Eastern Celtic Sea. Information on these watercourses / waterbodies are provided below:

1. Middle Suir Estuary

The Proposed Dredging Areas of North Wharf, Frank Cassin Wharf and Forde Wharf and Merchants Quay Marina are located within the River Suir known as the Middle Suir Estuary by the EPA. This river flows in a northeast direction for ca. 2.2km and then transitions into the Lower Suir Estuary. The watercourse is designated as part of the Lower River Suir SAC.

This watercourse then flows south into the Waterford Harbour ca. 20.5km downstream and then the Eastern Celtic Sea a further ca. 6.5km downstream. The Proposed Dredging Areas are 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. 8km downstream.

2. Lower Suir Estuary

The dredging sites Spit Light and Queen's Channel, O'Brien's Quay, Belview to O'Brien's Quay, Belview Berths, Belview Turning Area, Cheekpoint Upper, Cheekpoint Lower, Great Island Jetty and Cheekpoint Harbour Access are located within the River Suir known as the Lower Suir Estuary by the EPA [16]. This river flows in a northeast direction for ca. 3.6km and

then converges with the River Barrow and forms the Barrow Suir Nore Estuary according to the EPA. The watercourse is designated as part of the Lower River Suir SAC.

This watercourse then flows south into the Waterford Harbour ca. 15.2km downstream and then the Eastern Celtic Sea a further ca. 6.5km downstream. The Proposed Dredging Areas are located within a section of the River Suir that forms part of the Lower River Suir SAC and the River Barrow and River Nore SAC.

3. Barrow Suir Nore Estuary

The dredging sites Passage East Shoal, Passage East Boathouse Quay and Duncannon Channel are located within the Barrow Suir Nore Estuary. The watercourse flows in a south direction into the Waterford Harbour ca. 6.9km downstream and then the Eastern Celtic Sea a further ca 6.5km downstream. The Proposed Dredging Areas are located within the River Barrow and River Nore SAC.

4. Waterford Harbour

The Creadan Bank dredging area is located within the Waterford Harbour. The Waterford Harbour flows south into the Eastern Celtic Sea ca 6.5km downstream. The Proposed Dredging Area is located within the River Barrow and River Nore SAC.

5. The Eastern Celtic Sea

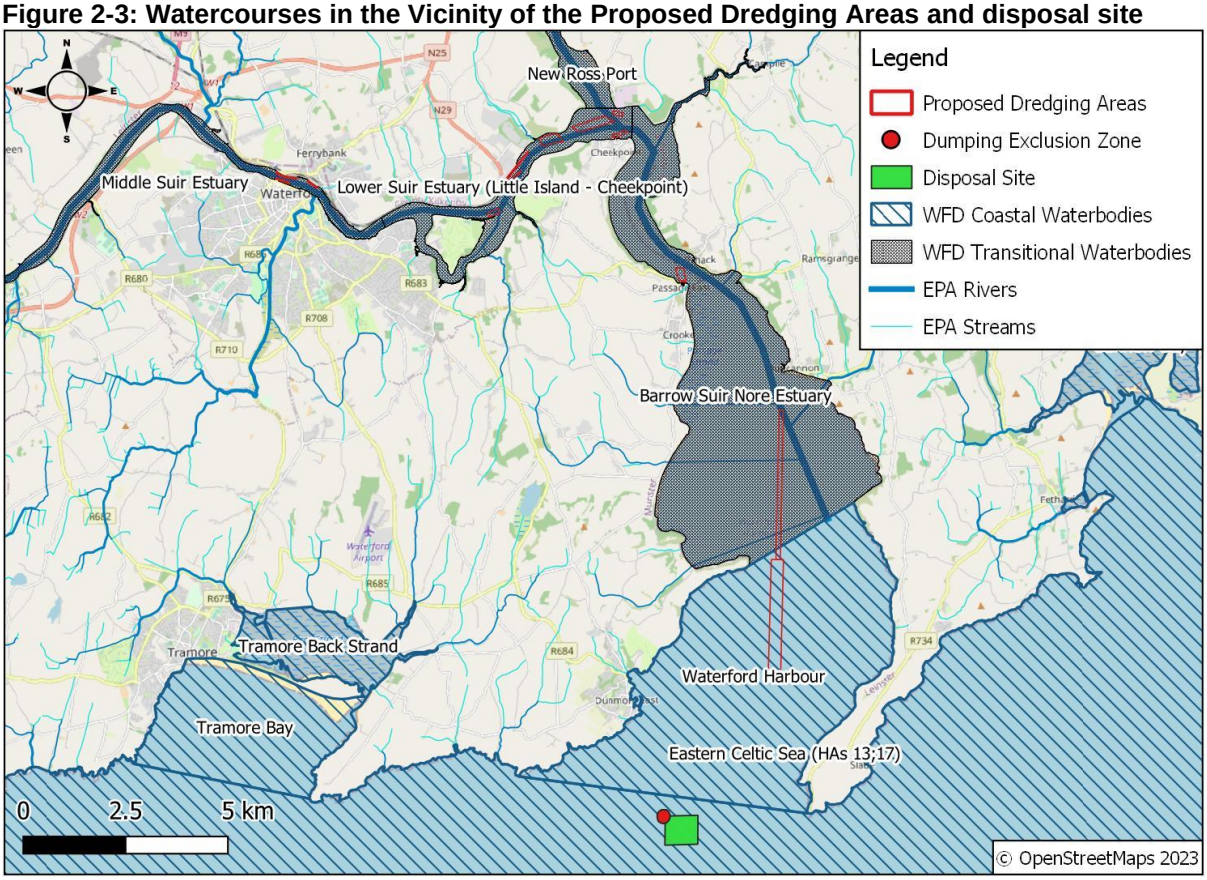
The disposal site is located within the Eastern Celtic Sea ca. 2.6km southwest from Hook Head.

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 [7]. 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 have '*moderate' water quality and to be considered 'at risk'* [7]*.* The Eastern Celtic Sea is considered to have '*high*' water quality and is considered '*not at risk*' [7].

The WFD surveillance monitoring survey carried out during 2016 and 2019 by the IFI, the competent authority in the Republic of Ireland, concluded that the ecological status of fish in Waterford Estuary was of '*good'* status [8, 9]. In addition, the Barrow-Nore-Suir Complex was designated by the IFI as having '*good*' status in 2022 [10].

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

Figure 2-3: Watercourses in the Vicinity of the Proposed Dredging Areas and disposal site



3 METHODOLOGY

3.1 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 Proposed Dredging Areas, disposal site and surrounding area;
- The National Parks and Wildlife Service (NPWS) website was consulted regarding the most up to date detail on conservation objectives for the Natura 2000 sites relevant to this assessment [11];
- The Kilkenny County Council Planning Portal to obtain details about existing / proposed plans in the vicinity of the Proposed Dredging Activities [12];
- The Waterford County Council Planning Portal to obtain details about existing / proposed plans in the vicinity of the Proposed Dredging Activities [13];
- The Wexford County Council Planning Portal to obtain details about existing / proposed plans in the vicinity of the Proposed Dredging Activities [14];
- The Department of Housing, Local Government and Heritage's planning portal – the National Planning Application Database to obtain details about existing / proposed plans in the vicinity of the Proposed Dredging Activities [15];
- The Irish Whale and Dolphin Group (IWDG) records of historical sightings within the vicinity of the Waterford Estuary from 2013 to 2022 [16];
- The IWDG sightings portal to obtain information about recent sightings in the vicinity of the Waterford Estuary from 2023 [17];
- The National Biodiversity Data Centre (NBDC) website was consulted regarding species distributions [18];
- The EPA Maps website was consulted to obtain details about watercourses in the vicinity of the Proposed Dredging Activities [7]; and,
- Malone O'Regan otter survey information compiled as part of ongoing studies for the Port of Waterford Masterplan Projects (unpublished).

3.2 Anecdotal Information

A local business owner, Mr. [redacted] of *'Dunmore Boat Trips,'* who operates an angling and ecotourism business within the River Suir and the Waterford Estuary provided anecdotal information on the state of health and wellbeing of the dolphin, harbour porpoise and otter populations in the estuary. Mr.[redacted] concluded:

> *"If there were any problem as regards the dredging impacting on the wildlife, I would be the first to demand action. I can report that all is well."*

Mr[redacted] also stated that:

> "*My angling and ecotourism business relies entirely on a vibrant and healthy river and harbour. I have not seen any negative impact the dredging operation have had on these populations of wildlife."*

A letter in support of the dredging operations not having any impact on the wildlife of the Waterford Estuary from Mr.[redacted] is attached as Appendix D.

4 RISK ASSESSMENT

4.1 Baseline Information

Irish waters are home to and refuge for a number of Annex IV species including at least 27No. species of cetaceans [19], 4No. out of the 7No. known species of sea turtles and the European otter (*Lutra lutra)*.

Ireland's location on the continental shelf and the North Atlantic Current offers these species a diverse range of suitable habitats to support their distribution and abundance. However, it should be noted that rare deep diving species are unlikely to be found within the vicinity of the Proposed Dredging Areas and the disposal site due to the shallow estuarine nature of the Waterford Estuary and this section of the Celtic Sea.

The following section provides baseline information on the relevant Annex IV species and non-Annex IV species included in this risk assessment.

4.1.1 Annex IV Species

The Annex IV species that occur in Ireland [4] that will have been identified as relevant to this risk assessment include:

- All Irish cetaceans (whales, dolphins, and porpoise);
- Eurasian otter; and,
- All marine turtles.

4.1.1.1 Cetaceans

There are at least 27No. species of cetaceans known to occur within Irish waters [19], some of which are commonly sighted, whereas others have only been recorded as strandings and were possibly vagrants to Irish waters [20].

It is estimated that between 10No. and 12No. cetacean species can be found in Ireland year-round, while a further 6No. species are considered to be seasonal visitors to Irish waters and 8No. species are classified as rare visitors or vagrants to Irish waters [21].

Table 4-1 provides a summary of the cetaceans that have been recorded in Irish waters, the frequency of their occurrence and the status of these species according to the IUCN Red List [22].

Table 4-1: Cetaceans recorded in Irish Waters

Common Name	Scientific Name	Occurrence	IUCN Red List Status
Dolphins & Porpoise			
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Year-round	Least Concern
Bottlenose dolphin	*Tursiops trunacatus*	Year-round	Least Concern
Common dolphin	*Delphinus delphis*	Year-round	Least Concern
Harbour porpoise	*Phocoena phocoena*	Year-round	Least Concern
White-beaked dolphin	*Lagenorhynchus albirostris*	Year-round	Least Concern
Risso's dolphin	*Grampus griseus*	March - July	Least Concern
Striped dolphin	*Stenella coeruleoalba*	May – September	Least Concern

Common Name	Scientific Name	Occurrence	IUCN Red List Status
Baleen Whales			
Fin whale	*Balaenoptera physalus*	Year-round	Vulnerable
Minke Whale	*Balaenoptera acutorostrata*	Year-round	Least Concern
Sei whale	*Balaenoptera borealis*	Year-round	Endangered
Blue whale	*Balaenoptera musculus*	July – March	Endangered
Humpback whale	*Megaptera novaeangliae*	May – August	Least Concern
Bowhead whale	*Balaena mysticetus*	Rare / vagrant	Least Concern
Northern right whale	*Eubalaena glacialis*	Rare / vagrant	Critical
Toothed Whales			
Killer whale	*Orcinus orca*	Year-round	Unknown / Data Deficient
Long-finned pilot whale	*Globicephala melas*	Year-round	Least Concern
Sowerby's beaked whale	*Mesoplodon bidens*	Year-round	Unknown / Data Deficient
Sperm whale	*Physeter macrocephalus*	Year-round	Vulnerable
True's beaked whale	*Mesoplodon mirus*	Year-round	Least Concern
Cuvier's beaked whale	*Ziphius cavirostris*	May – August	Vulnerable
False killer whale	*Pseudorca crassidens*	June – November	Near Threatened
Northern bottlenose whale	*Hyperoodon ampullatus*	May – August	Near Threatened
Beluga whale	*Delphinapterus leucas*	Rare / vagrant	Least Concern
Blainville's beaked whale	*Mesoplodon densirostris*	Rare – vagrant	Least Concern
Dwarf sperm whale	*Kogia sima*	Rare / vagrant	Least Concern
Gervais' beaked whale	*Mesoplodon europaeus*	Rare / Vagrant	Least Concern
Pygmy sperm whale	*Kogia breviceps*	Rare / vagrant	Least Concern

4.1.1.1.1 Irish Whale and Dolphin Group Sightings – 2013 to 2022

A data request was submitted to the Irish Whale and Dolphin Group (IWDG) on the 2nd October 2023 for all available records within the study area, which included Waterford Estuary, River Suir, River Barrow and River Nore and the Celtic Sea from Kilmore Quay to Bunmahon. The information provided by the IWDG included recordings from January 2013 to December 2022.

Following a review of the information received, during the 2013 to 2022 period, a total of 442No. sighting has been recorded, which amounted to a total of 4,164No. individual cetaceans.

Of these records, common dolphin made up the majority of recorded species, with ca. 66% of all individuals accounted for during the period. Additionally, 3No. other dolphin species, bottlenose dolphin, harbour porpoise and Risso's dolphin, were also recorded within the assessment area, along with 3No. baleen whale species – fin whale, humpback whale and minke whale. In addition, there were 103No. sightings that could not be identified to a species level (see Table 4-2).

Table 4-2: Species recorded by the IWDG from 2013 to 2022 in the Study Area

Species	No. of Sightings	No. of Individuals	% of Overall Individuals
Dolphins & Porpoise			
Common dolphin	75	2775	66.64%
Harbour porpoise	81	205	4.92%
Risso's dolphin	20	106	2.55%
Bottlenose dolphin	15	69	1.66%
Baleen Whales			
Fin whale	100	283	6.80%
Minke whale	22	42	1.01%
Humpback whale	10	12	0.29%
Non-Annex IV Species			
Basking shark	16	179	4.30%
Individuals not Identified to a Species Level			
Dolphin species	32	255	6.12%
Dolphin species possibly harbour porpoise	20	143	3.43%
Large whale species	28	54	1.30%
Whale species	13	20	0.48%
Cetacean species	8	15	0.36%
Large fin	1	5	0.12%
Medium whale species	1	1	0.02%
Total	**442**	**4164**	**-**

The following species were taken forward for further examination in terms of their usage of the assessment area due to their common occurrence within the Waterford Estuary:

- Common Dolphin;
- Fin Whale; and,

- Harbour Porpoise.

All other species were recorded in low numbers or considered to be seasonal / occasional visitors to the Waterford Estuary, see Table 4-1 and Table 4-2.

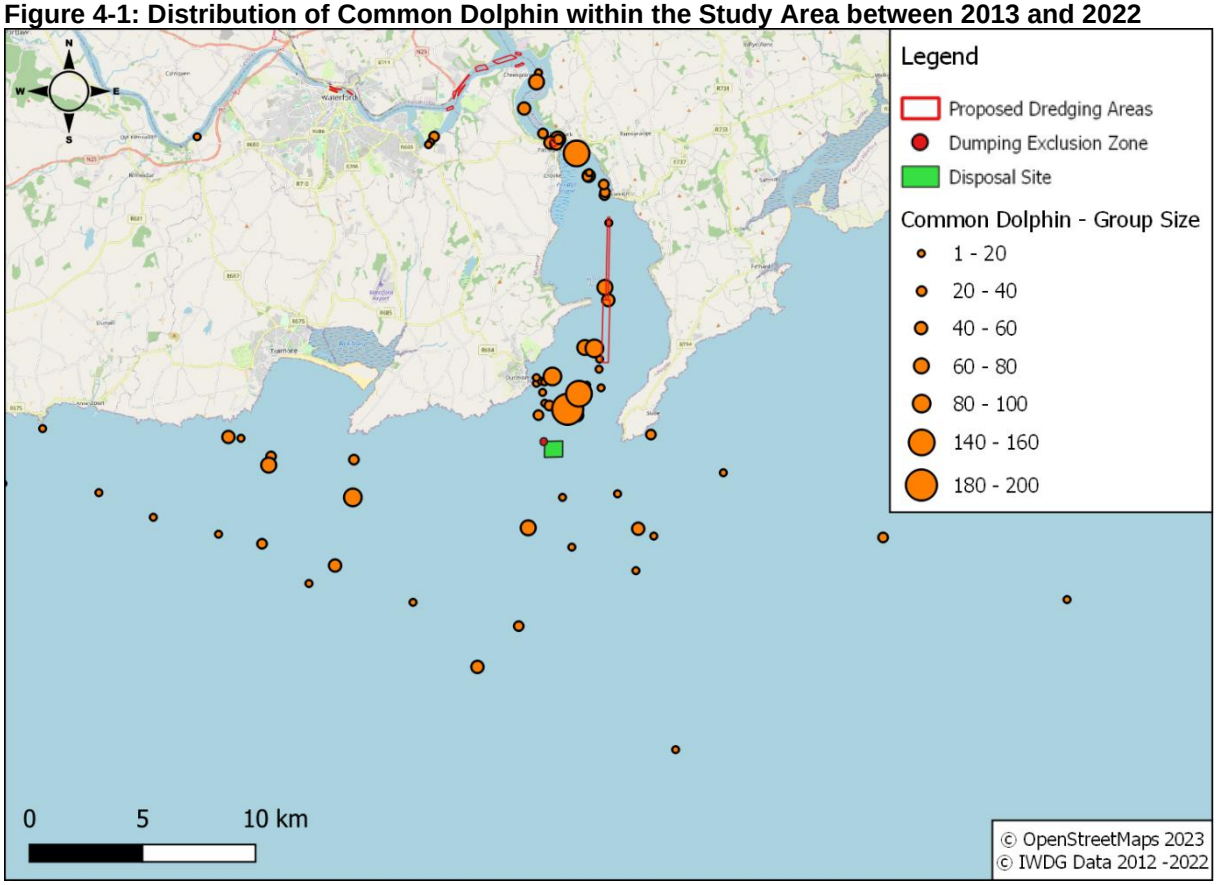
Common Dolphin

Common dolphin were the most commonly recorded species during the period from 2013 to 2022, accounting for 66.64% of all individuals recorded.

Based on the data provided by the IWDG, this species is most commonly found at the mouth of the Waterford Estuary and between Passage East, Co. Waterford and Arthurstown, Co. Wexford. There have been no records of common dolphin within the disposal site or within 1km of the disposal site. However, there are 2No. sightings of common dolphin within the Duncannon Bar and Creadan Bank dredging areas. Additionally, common dolphins have also been recorded within vicinity of these dredging areas, and common dolphin have also been recorded within the vicinity of the Passage East Boathouse Quay and Passage East Shoal dredging areas.

These reports were typically during the autumn and winter months, however, there are occasional records of this species occurring spring and summer.

Figure 4-1: Distribution of Common Dolphin within the Study Area between 2013 and 2022



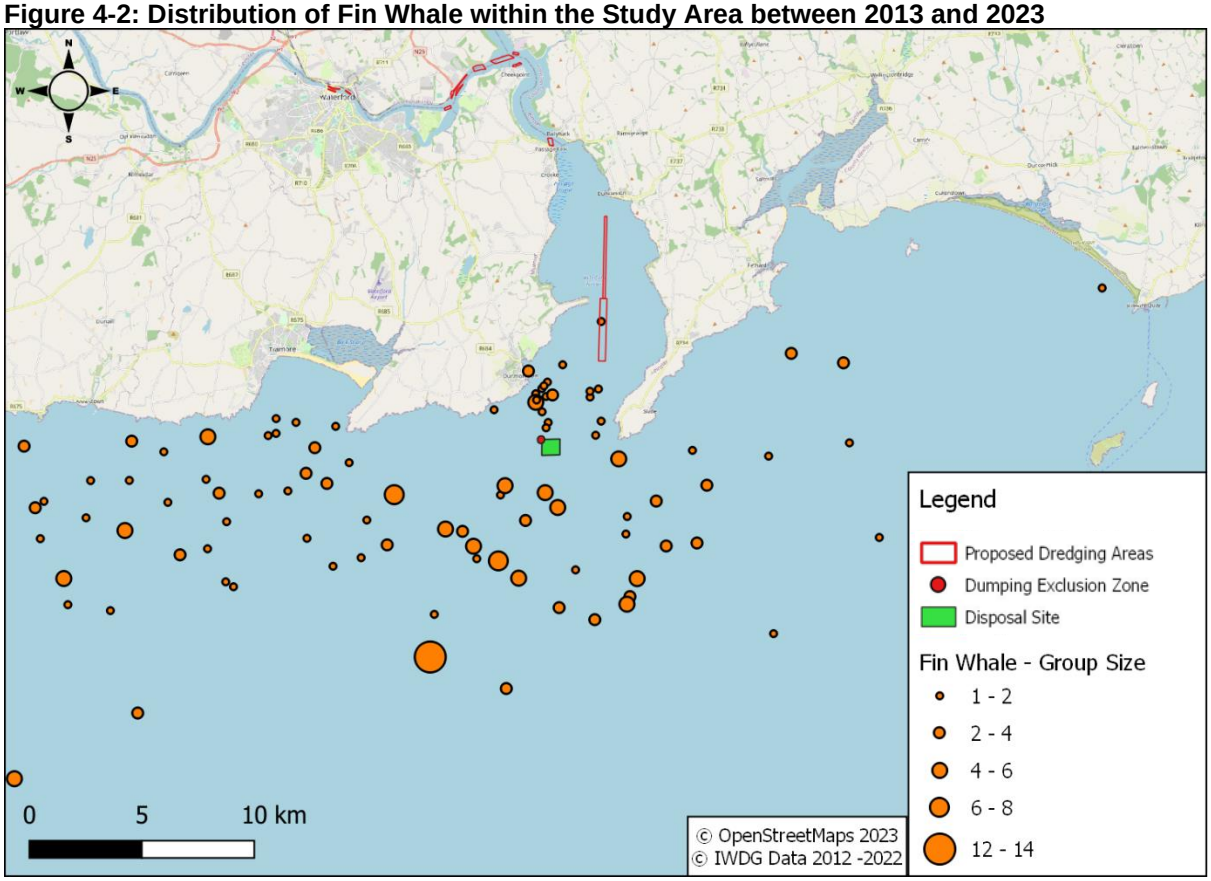
Fin Whale

Fin whales were the second most frequently recorded species within the vicinity of the Proposed Dredging Areas and the disposal site (6.8%).

Fin whales are predominantly found along the south and southwest coast of Ireland, however, there has been sightings of individuals off the west coast and east coast of Ireland.

There were no fin whales recorded within the disposal site, however, there were 2No. records of fin whales within 1km of the disposal site and 1No. record of a fin whale within the Creadan Bank dredging area. It should be noted that there were no other records of fin whales further up the Waterford Estuary.

Figure 4-2: Distribution of Fin Whale within the Study Area between 2013 and 2023



Harbour Porpoise

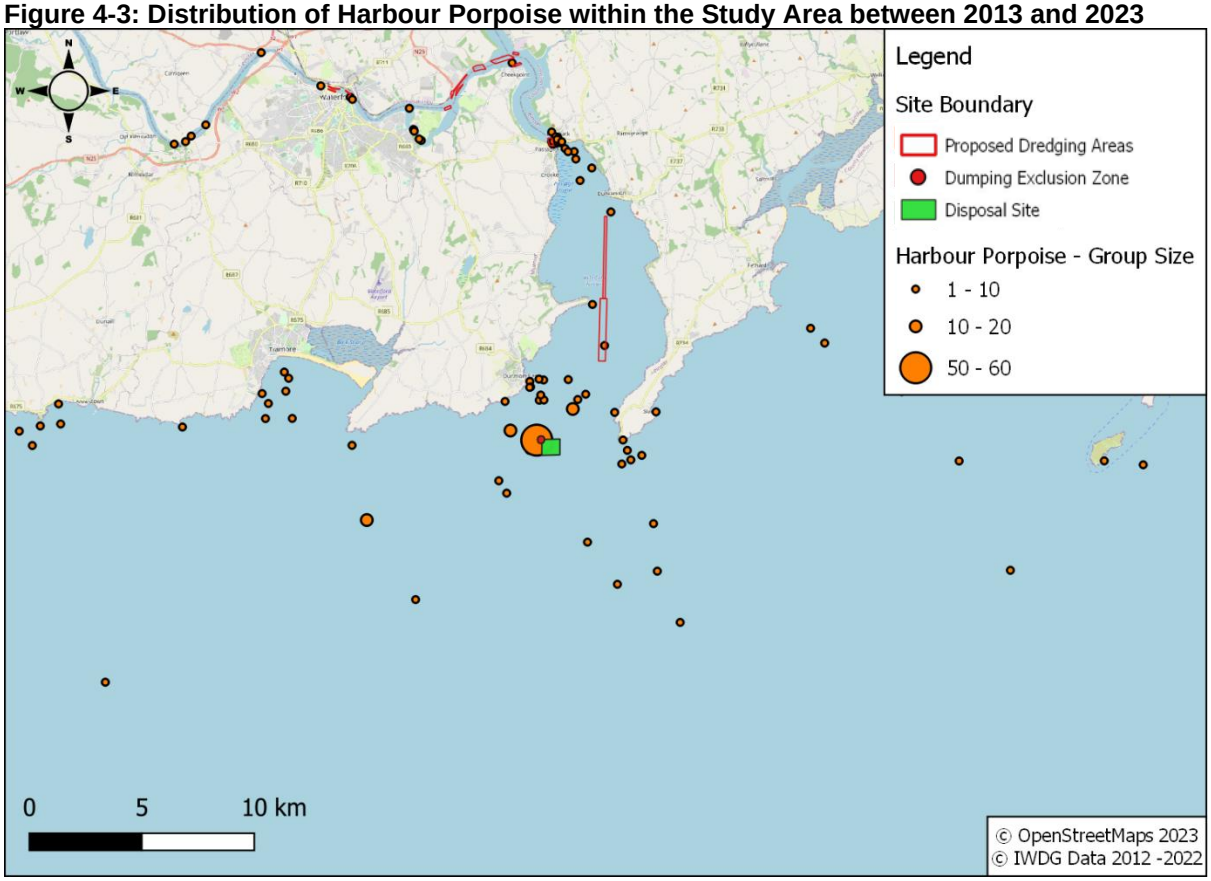
Harbour porpoise were the third most frequently recorded cetacean species within the assessment area (ca. 5%).

Harbour porpoises are commonly found on the continental shelf of Ireland and are widespread and commonly seen around the entire coast of Ireland, especially in waters that are less than 20m in depth (shallow bays, estuaries, and tidal channels).

During the 2013 to 2022 period, there was 1No. record of harbour porpoise within the disposal site and 5No. records of harbour porpoise within 1km of the disposal site, the largest being a group of 60No. individuals recorded in 2013. Additionally, there were 3No. sightings of harbour porpoise within the Creadan Bank and Passage East Shoal dredging areas.

The most frequent occurrence of this species is between Passage East, Co. Waterford and Ballyhack, Co. Wexford.

Figure 4-3: Distribution of Harbour Porpoise within the Study Area between 2013 and 2023



4.1.1.1.2 Irish Whale and Dolphin Group - 2023 Sightings

As previously mentioned, the information received from the IWGD in response to the data request provided sighting information from 2013 to 2022. Therefore, in order to ensure up-to-date information was utilised, the IWDG sighting database was also reviewed [17]. This databased allows members of the public to report sightings of marine mammals around Ireland and provides records of the sightings reported in the past 12No. months.

Following a review of this database, it was noted that between December 2022 and the 1st December 2023 there had been a total of 65No. sightings recorded within the vicinity of Waterford Estuary, which amounted to a total of 961No. individual cetaceans.

Of the species recorded, common dolphin made up ca. 86% of all individuals accounted for during this period. The other species that have been recorded during this period included 2No. other dolphin species, bottlenose dolphin and harbour porpoise, 2No. species of baleen whales, fin whale and pilot whale, and cetaceans that could not be identified to species level, as described in Table 4-3.

Table 4-3: Species recorded by the IWDG from December 2022 to December 2023 within the Study Area

Species	No. of Sightings	No. of Individuals	Percentage of Overall Individuals (%)
Dolphins & Porpoise			
Common Dolphin	30	826	85.95%
Bottlenose Dolphin	1	30	3.12%

Species	No. of Sightings	No. of Individuals	Percentage of Overall Individuals (%)
Harbour Porpoise	12	28	2.91%
Baleen Whales			
Pilot Whale	1	20	2.08%
Fin Whale	8	15	1.56%
Individuals not identified to a species level			
Dolphin Species	7	32	3.33%
Large Whale species	6	10	1.04%
Total	**65**	**961**	**-**

Due to the fact that common dolphin comprised the majority of the sightings recorded during the 2022-2023 period, this species has been taken forward for further examination on its usage within the Waterford Estuary. Similarly, other notable sightings of cetacean species will also be assessed below.

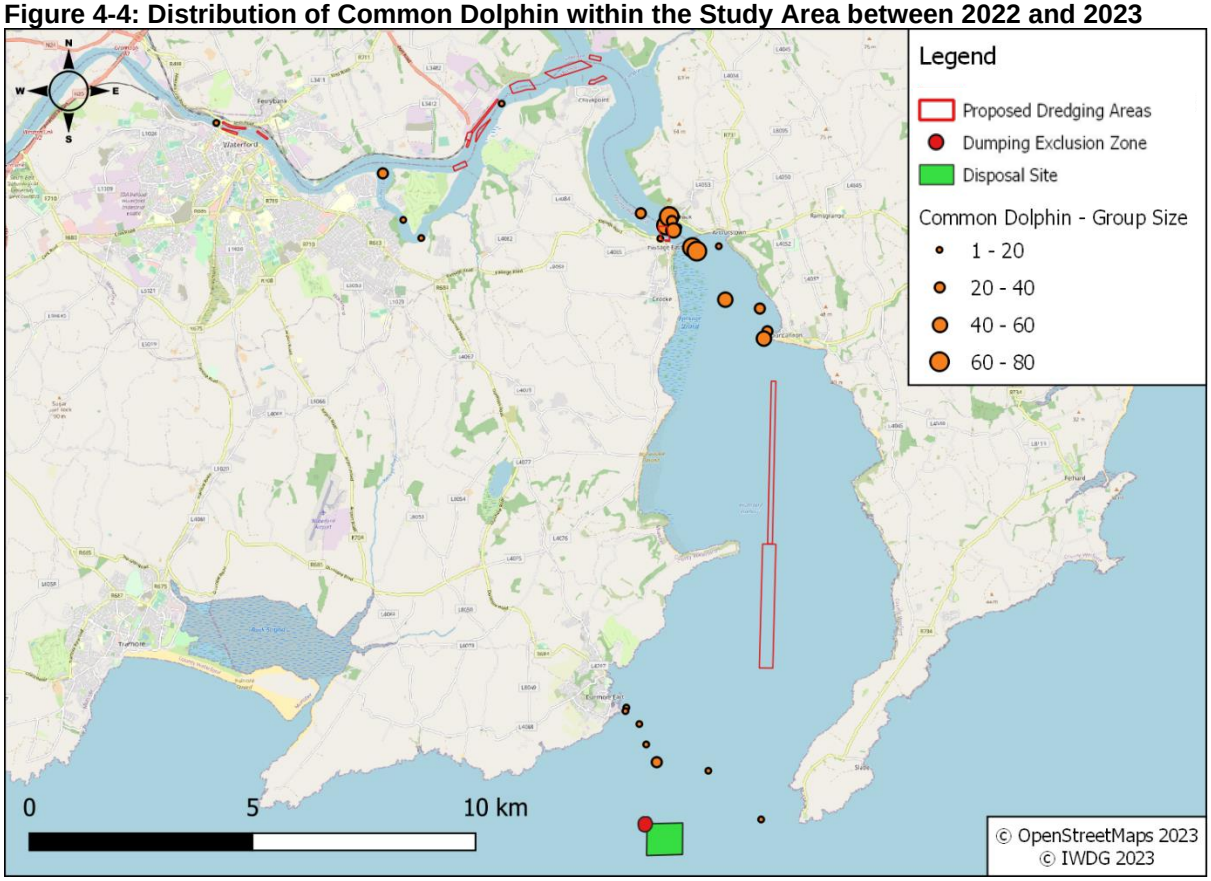
Common Dolphin

As previously mentioned, common dolphin were the most commonly recorded species between December 2022 and December 2023, accounting for ca. 86% of all individuals recorded.

During this period, as represented in Figure 4-1, the majority of these records occurred at the mouth of the Waterford Estuary and between Passage East, Co. Waterford and Arthurstown, Co. Wexford. None of these records were within the proposed dredging areas or within close proximity to the disposal site. However, there are records within close proximity to the Passage East Shoal and Passage East Boathouse dredging areas between Passage East and Arthurstown. Additionally, there is records of common dolphin during this period within close proximity to North Wharf, Forde Wharf & Merchants Quay Marina and Belview Berths dredging areas. The sightings recorded were typically during the autumn and winter months; however, there are occasional records of this species occurring spring and summer.

This species is known to typically occur in shallow inshore waters along the south coast of Ireland and large pods of this species is not uncommon in County Waterford.

Figure 4-4: Distribution of Common Dolphin within the Study Area between 2022 and 2023



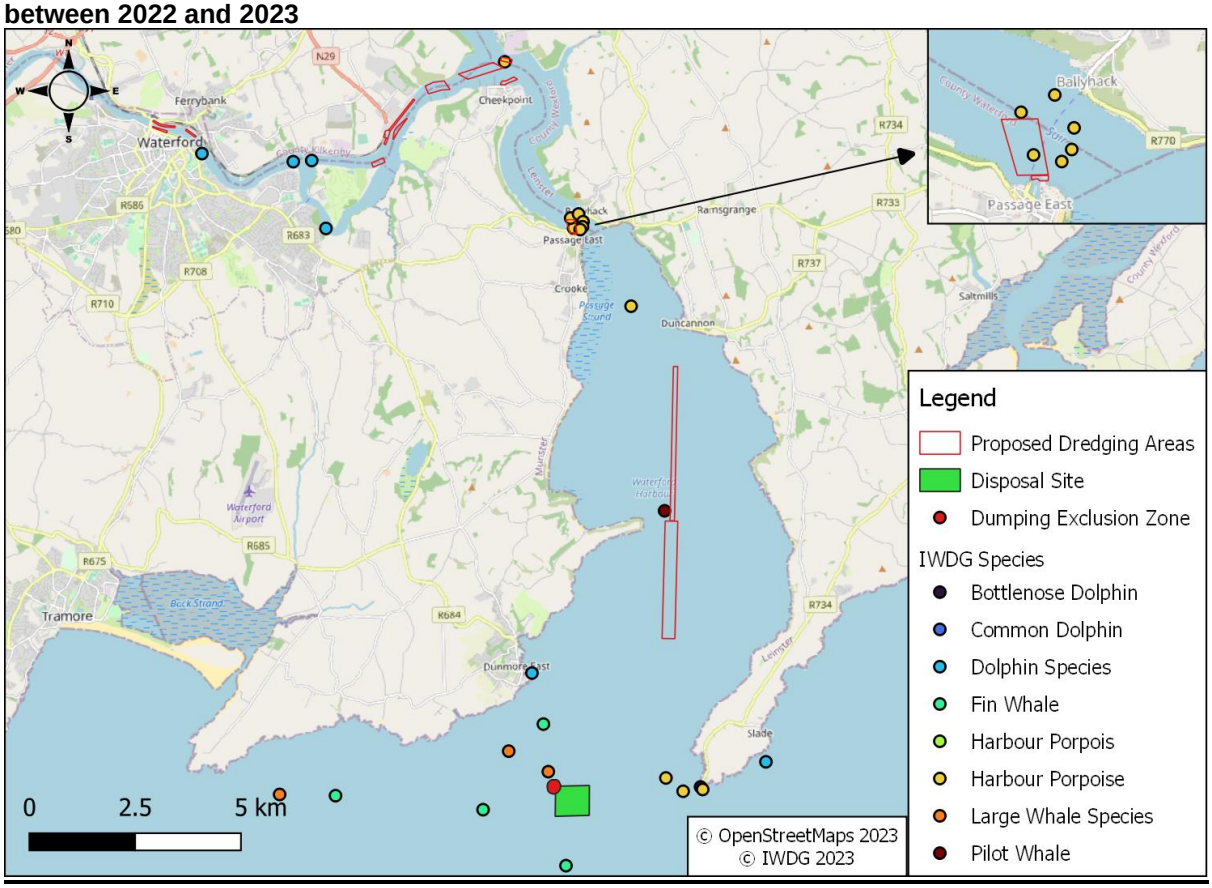
Other Cetacean Species

During this period there were a number of harbour porpoise sightings within the Waterford Estuary; however, these sightings recorded low numbers of individuals. Whereas, bottlenose dolphin and pilot whale were infrequently recorded, but the sightings of these species were of larger pod numbers.

It should be noted that a pod of ca. 20 long-finned pilot whales was observed travelling up the Waterford Estuary on the 19th June 2023. These individuals were recorded in a tight ball formation and were noted to be preforming what looked like a '*imminent live stranding situation'* [23]. However, the IWDG hold no records of any pods of long-finned pilot whales stranding within the Waterford Estuary and it was thought that this pod left the estuary safely as no further sightings of this pod were recorded within the Waterford Estuary [23]. This species is not commonly found in shallow waters like the Waterford Estuary and are more commonly found in deep-water habitats in areas around the Porcupine Seabight and along the continental shelf, occurrences of this species in inshore waters are linked with stranding events [24].

It was also noted that on the 19th June 2023, a minke whale stranded at Hook Head, Co. Wexford – east of the mouth of the Waterford Estuary [25]. There have been no other reported strandings within the vicinity of the Waterford Estuary [26].

Figure 4-5: Distribution of species (excluding common dolphin) reported within the Study Area between 2022 and 2023



4.1.1.2 Eurasian Otter

As part of the ongoing Port of Waterford Masterplan projects, MOR have been commissioned by the Port to undertaken otter surveys within the Belview Port area and its environs. The surveys undertaken by MOR have been ongoing since April 2021 and include bankside otter surveys, boat surveys and camera trap surveys.

During the surveys, areas of regular otter activity were identified, as these areas had the regular presence of otter footprints, spraints, foraging remains, couching areas and live sightings (see Figure 4-2). In addition, camera trap footage has shown otters regularly using these areas.

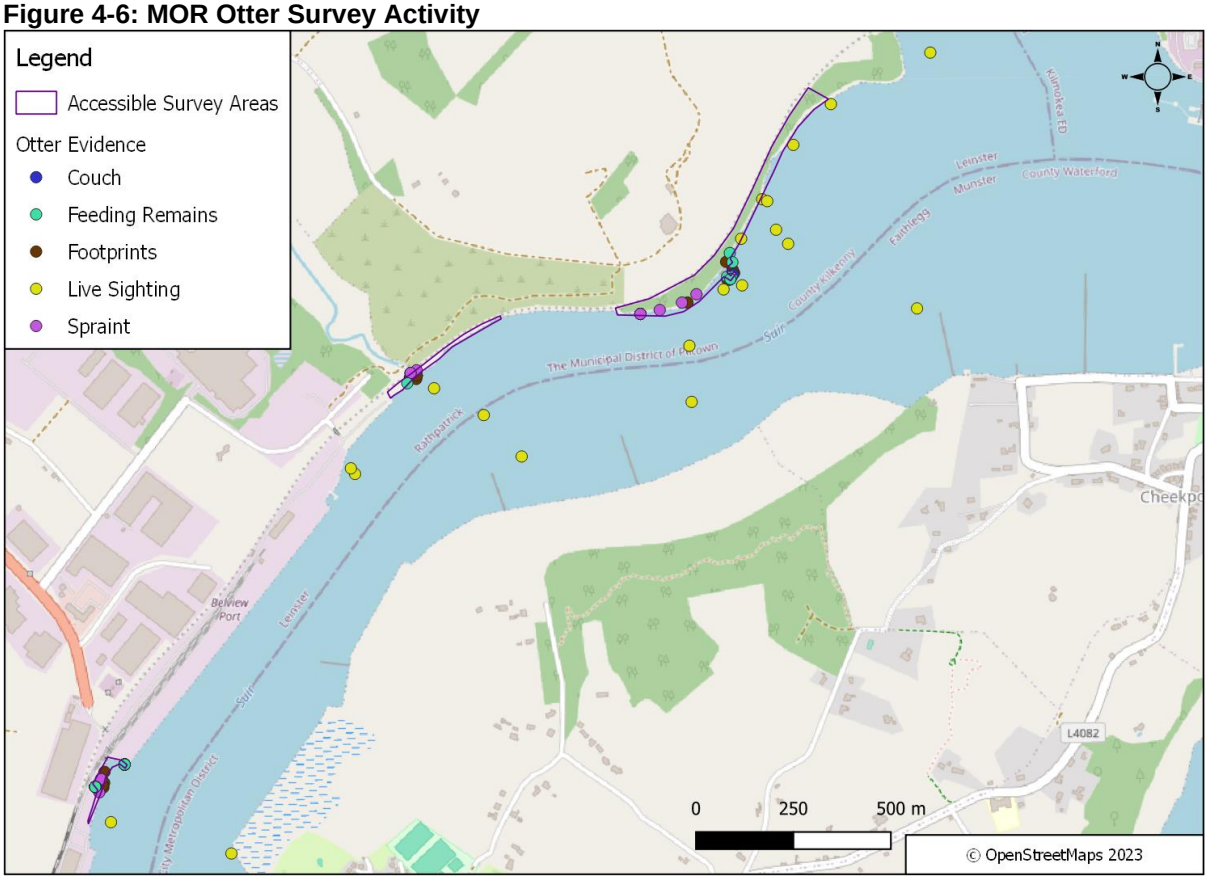
These areas shown on Figure 4-2 shows locations where otters activity has been recorded within the Belview-Faithlegg-Cheekpoint area during the surveys. However, it should be noted that while all the entirety of the coastline could not be regularly accessed, it is assumed that otter utilise the full coastline in this area. The full areas have been visually assessed by boat for the presence of otter activity / holts.

No otter holts have been identified within the surveyed areas.

It should be noted that otter tend to forage within 80m of the shoreline (high water mark) [27]. Therefore, given the fact that the Creadan Bank and Duncannon Channel dredging areas are located over 500m from the shoreline and the disposal site is ca. 2.3km from the shoreline, these areas are not considered suitable for otter. However, a number of the Proposed Dredging Areas are located within areas considered suitable for commuting and foraging otters.

As this species is known to occur within the Waterford Estuary, this species has been taken forward for further consideration in Section 4.2.

Figure 4-6: MOR Otter Survey Activity



4.1.1.3 Marine Turtles

Marine turtles are the only reptiles found in Irish waters, however, only 1No. marine turtle species is observed frequently enough to be considered a regular visitor to Irish waters – the leatherback turtle (*Dermochelys coriacea)*.

Leatherback turtles are known to have atypical migration patterns and breed in warm tropical climates and this species is known to occur occasionally around the southeast coast of Ireland to feed on jellyfish; however, this is generally during summer month when water temperatures are warmer [28].

The NBDC holds historical records of leatherback turtle sighting around the Irish coast, and these records show the nearest sighting of a leatherback was southwest of Duncannon, Co. Wexford in 1984 [18]. The most recent sighting of a leatherback turtle in the vicinity of the Waterford Estuary was located off the east coast of Hook Head, Co. Wexford, ca. 17km southwest, on 11th August 2012 [18]. The most recent stranding of this species around Ireland was at Curracloe Beach, Co. Wexford on the 28th October 2023 [29].

Loggerhead turtles have also been recorded in low abundances along the southeast coast of Ireland, the most recent recording of a loggerhead turtle in the southeast of Ireland was recorded on 20th December 2015 east of the Saltee Islands, Co. Wexford [18].

The NBDC holds no records of marine turtles within the vicinity of the Proposed Dredging Areas or the disposal site in the past 10 years [18]. Additionally, no marine turtles have been recorded by the IWDG in the past 12 months [17].

Therefore, this Annex IV species has not been taken forward for further consideration in Section 4.2.

4.1.2 Non-Annex IV species

As previously discussed, non-Annex IV species have also been included in this risk assessment to ensure no adverse effects occur to any protected species, which include:

- Basking sharks (*Cetorhinus maximus*); and,
- Phocids (seals).

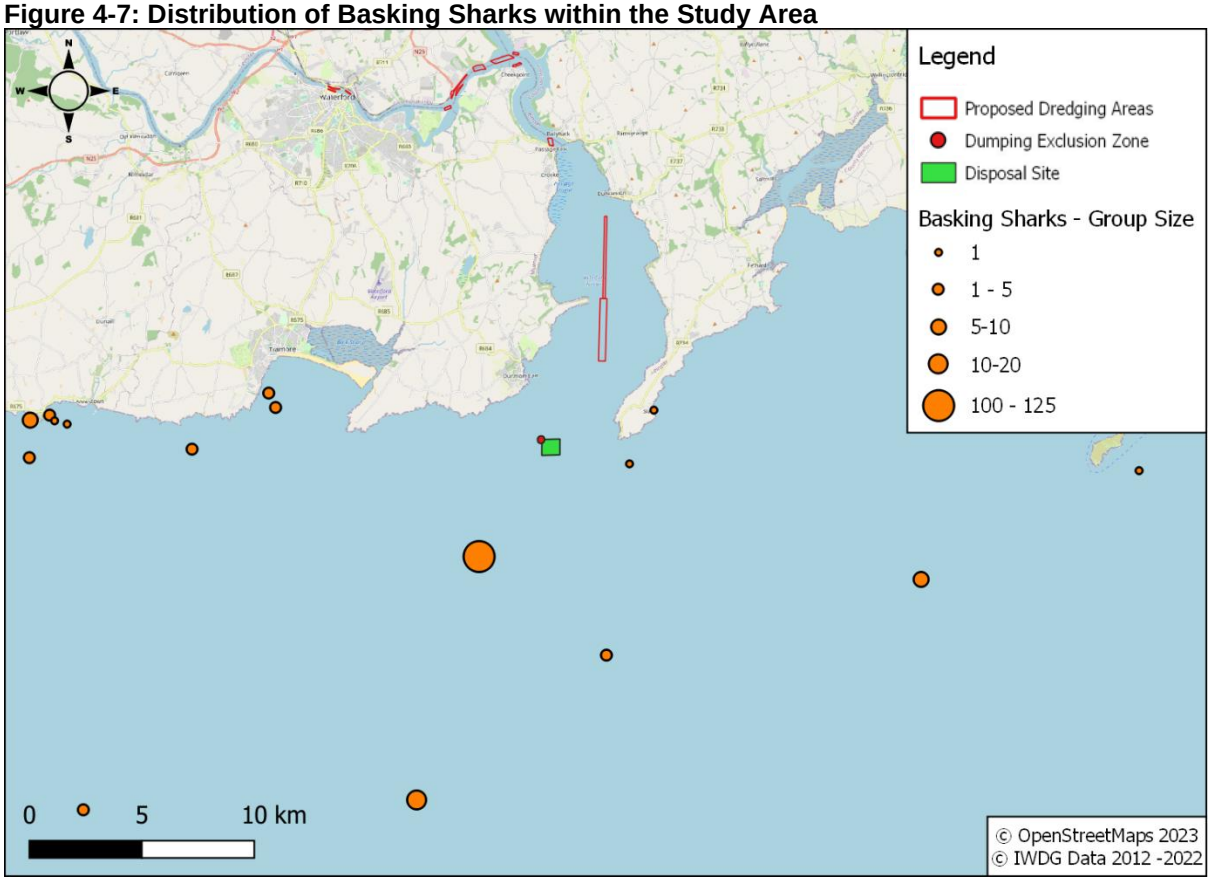
4.1.2.1 Basking Shark

Basking sharks are migratory species and frequently occur in shallow coastal areas of Ireland between the months of April and September. Basking sharks have previously been recorded within the Celtic Sea off the coast of Waterford and Wexford.

Between 2013 and 2023, the IWDG received sighting of a total of 179No. basking sharks within the study area. Most notably was a sighting of 125No. individuals in March of 2022 ca. 5.9km off the coast of Waterford.

It should be noted that there are no records held by the IWDG of basking shark within the Waterford Estuary, within the vicinity of the Proposed Dredging Areas nor within 1km of the disposal site. Therefore, this species has not been given further consideration in Section 4.2.

Figure 4-7: Distribution of Basking Sharks within the Study Area



4.1.2.2 Phocids

There are 2No. species of seal native to Irish waters – common seal (*Phoca vitulina)* and grey seal (*Halichoerus grypus).* Both species of seal are known to have colonies located around

the southeast coast of Ireland including in the Slaney River Valley SAC and the Saltee Islands SAC [11].

The NBDC holds no records of common seals within the Waterford Estuary within the last 10No. years, however, there are records of common seals at Hook Head Lighthouse, Co. Wexford and Tramore Backstrand, Co. Waterford [18]. There are no known haul-out sites or breeding site for this species located within the Waterford Estuary.

The NBDC holds records of grey seals within the Waterford Estuary and upstream of the Proposed Dredging Areas [18]. However, there are no haul-out / breeding sites of grey seals within the Waterford Estuary.

Due to the fact that grey seal are known to occur within the Waterford Estuary, this species has been taken forward for further consideration in Section 4.2.

4.2 Assessment of Potential Impacts and Mitigation Measures

4.2.1 Identification of Potential Impacts

As discussed in Section 2, the maintenance dredging programme within the Waterford Estuary will be maintained primarily with the TSHD, supported by a bed leveller, and allowances will also be made for the utilisation of mechanical dredging and plough dredging within in 16No. areas. The maintenance dredging will involve the annual disposal at sea of ca. 823,513 wet tonnes of spoil to maintain the navigation channel.

The potential impacts that could arise from the maintenance dredging and disposal operations are considered to be as described below:

- Noise impacts;
- Increased levels of turbidity; and,
- Ship-strikes.

Therefore, these potential impacts will be taken forward for further consideration and appropriate mitigation measures will be implemented, as required.

4.2.1.1 Potential Noise Impacts

TSHD vessels can emit varying underwater sound levels dependant on the aggregate, with coarse gravel generating higher levels of noise than sand and silt [30]. Sound levels associated with TSHD vessels found that frequencies were generally below 500Hz, similar to that of a cargo vessel travelling between 8 and 16 knots [30]. Dredging operations have been recorded to produce omnidirectional sounds during TSHD, with source levels between 186dB -188dB re 1 µPa rms [31].

It should also be noted that the ambient acoustic environment within the Waterford Harbour is influenced by a mixture of sounds sources, including natural sources, such as tidal movement of water and sediment and wind, and anthropogenic sources, such as commercial and recreational movements of vessels from Waterford City to the Celtic Sea. The Port of Waterford is an established Tier 2 Port and is located within a zoned port and industrial setting. Due to the setting the local ambient sound within the Proposed Dredging Areas are expected to be typically higher than those for areas not zoned for port and industrial operations. However, it should be noted that noise emissions are predominantly anticipated to be similar in nature to those arising from existing shipping.

4.2.1.2 Potential Increased Levels of Turbidity

Levels of turbidity are expected to increase within the immediate vicinity of the dredger during both the dredging phase and dispersal phase of the Proposed Dredging Activities. These increased levels of turbidity are a result of seabed disturbance during the dredging and the

disposal of sediment at the disposal site. Increased levels of sediment in the water column may result in the indirect impact on the abundance and disturbance to favoured prey species of the aforementioned species.

However, extensive modelling has been undertaken at the Waterford Estuary to assess the dredging and disposal activities undertaken by the Port of Waterford during the maintenance dredging operations [32, 33, 34, 35], and water quality assessments have been undertaken to assess any potential impacts from dredging on the water quality within the Waterford Estuary [36, 37].

A recent review and analysis of water monitoring and turbidity data within the Waterford Estuary before and during the plough dredging campaign was carried out between January to June 2023 concluded that the rise in suspended solids/turbidity, due to ploughing, was of no practical significance as it was hidden within the natural variability of the turbidity within the estuarine system. In addition, the strategy of dredging during spring tides appears to be robust as it occurred when levels of suspended sediments are already naturally elevated, and during the daytime, when more sediment will be mobilised and when mid tide flow rates are higher than at night [36].

In addition, a previous water quality assessment undertaken in 2017 during plough dredging campaigns and a TSHD campaign at Cheekpoint concluded that there was no significant change in the turbidity levels at the upstream and downstream monitoring stations during any of the dredging campaigns at Cheekpoint, turbidity variance between plough dredging campaigns and TSHD dredging was not discernible and any differences observed during dredging were not greater than what was seen when comparing data from different periods without dredging and are accounted for as natural temporal variation and are caused by the strong tidal and fluvial flows [37].

Furthermore, in the context of the Proposed Dredging Activities and with particular reference to plough dredging, which may result in higher suspended solids levels in the water column than TSHD and backhoe dredging, the 2021 turbidity assessment has shown that low mean levels of suspended solids (ca. 30-40 mg/L) occur in the vicinity of operations during periods of active dredging and during periods when dredging is not taking place [38]. Also, the duration of individual dredging events in Waterford Estuary (particularly TSHD dredging) average less than one hour.

Therefore, the short duration coupled with relatively low suspended solids levels indicate that the Proposed Dredging Activities are very unlikely to cause problems for fish or other prey species, either in the vicinity of operations or in the greater Waterford Estuary area.

4.2.1.3 Potential Ship-strikes

The Proposed Dredging Activities presents an added risk of ship-strike / collision of vessels with species due to the increase shipping activity associated with the Proposed Dredging Activities (i.e., the dredgers). However, due to the slow speed of the dredgers, it is unlikely that ship-strike would occur as marine mammals would have sufficient time to move away from the dredgers. Additionally, some marine mammals are known to avoid vessels [6].

4.2.1.4 Summary of Potential Impacts

Based on the above, it can be concluded that the potential impacts that could arise from the Proposed Dredging Activities would be potential noise impacts associated with the dredging and transport to / from the disposal site which can affect the species ability to detect important acoustic cues over ambient noise and potentially effecting the behaviour of individuals.

Therefore, a further assessment and evaluation on the likelihood of the Annex IV species and other species (discussed in Section 4.1) being exposed to / interacting with the activities will be undertaken and mitigation measures, as required, will be implemented.

4.2.2 Assessment of Potential Impacts

4.2.2.1 Annex IV Species

4.2.2.1.1 Cetaceans

Cetaceans are known to reply heavily on sound as a form of communication, navigation, defensive mechanism and for foraging, while helping the marine mammal to comprehend surroundings and social structures. Cetaceans emit a series of short impulsive sounds (e.g., clicks) and examine the reflected echoes to map their surrounding environment (echolocation). Echolocation is an important method for predator avoidance, navigation, foraging and communication.

Anthropogenic sound has the ability to reduce the efficiency and range of echolocation and can affect cetaceans in a various way, depending on a host of factors including age of the individual, intensity of the sound, distance from source and frequency of the sound emitted [3]. High sound pressure levels also have the ability to cause behavioural changes, auditory injuries, physical injuries and even death.

Individual cetaceans can experience identical sounds in different ways, hearing ability tends to decline with both age and exposure to harmful sound sources [3]. The most significant impacts on cetaceans have been studied by Southall et al., under 2No. different criteria [39]:

1) Temporary Threshold Shift (TTS) – may result in a reduction in hearing sensitivity but is not permanent; and,
2) Permanent Threshold Shift (PTS) – may result in auditory injuries and in some cases can lead to death.

Marine mammals in Ireland can be grouped into six categories based on audiometric data, comparative anatomy, and the scientific studies [3, 40, 41, 39]. Table 4-4 shows the hearing range of 5No. marine mammals hearing groups that have the potential to occur within the within the vicinity of the Waterford Estuary based data collected from the IWDG sighting portal and NBDC.

Table 4-4: Cetacean hearing groups [3, 40, 41, 39]

Marine Mammal Hearing Groups	Estimate Hearing Range	Examples (see Southall, et al., for full list)
Low frequency cetaceans	7 Hz to 35 kHz	Minke whale, Fin whale
High frequency cetaceans	150 Hz to 160 kHz	Dolphin species
Very High frequency	275 Hz to 160/180 kHz	Harbour porpoise
Phocid carnivores in water	50 Hz to 86 kHz	Common seal, harbour seal
Other marine carnivores in water (e.g., otters)[1]	125 Hz to 32kHz	Otters

Table 4-5 outlines the potential noise levels that would cause either Temporary Threshold Shift (TTS) and / or Permanent Threshold Shift (PTS) to individuals exposed to non-pulse sources (single or multiple discrete sound event within 24hrs – i.e., dredging) for the above-mentioned groups.

[1] Based on Ghoul and Reiichmuth (2014) [46]
https://bpb-us-e1.wpmucdn.com/sites.ucsc.edu/dist/d/804/files/2019/06/pub_163_2014.pdf

Table 4-5: Sound Exposure Level Criteria [39]

Marine Mammal Groups	Injury Criteria (non-pulse)	
	Temporary Threshold Shift (weighted)	Permanent Threshold Shift
Low frequency cetaceans	179 dB	199 dB
High frequency cetaceans	178 dB	298 dB
Very high frequency cetaceans	153 dB	173 dB
Phocid carnivores in water	181 dB	201 dB
Other marine carnivores in water (e.g. otters)[2]	199 dB	219 dB

The frequency levels that are generally expected from dredging activities are below 500Hz which are similar to that of a cargo ship travelling at ca. 8-10 knots. These levels would be expected to be common as the Port of Waterford is designated as a Port of National Significance (Tier 2).

As discussed in Section 4.2.2, the sound pressure levels from the dredging activities are estimated to be a maximum of ca. 186 dB re 1µPa within the immediate vicinity of the vessel [31]. However, these sound pressure levels would be expected to drop by at least 30 dB over 1km away from the vessel.

Although the sound pressure levels within the immediate vicinity of the dredger is within the TTS threshold for cetaceans and phocids, however, as previously stated, most marine mammals typically move away from vessels, therefore at a distance of 1km it is expected that only harbour porpoise are realistically impacted at these levels suggested. Furthermore, these levels would be below the TTS threshold ca. 1km from the activities. Additionally, the sound pressure levels of the Proposed Dredging Activities are only considered to be within the PTS threshold of harbour porpoise and within a within very close proximity to the vessel. Therefore, it is expected that if marine mammals were within the vicinity of the dredger, they would move away in order to avoid the dredging activities.

Overall, underwater noise generated during the dredging activities are generally less from the suction dredging and more from the propeller and the underwater noise is not significantly higher than a commercial vessel [42].

Furthermore, as stated in Section 2.3.1.1, the TSHD will not start up until the vessel is in position and until the draghead is lowered into the seabed. Once the dredger is full, the operation will stop, and the vessel will leave the area to the disposal site. Cetaceans are highly mobile species, and it would be expected that any species within the vicinity of the Proposed Dredging Activities and disposal site would leave the area of the proposed works [43].

Therefore, the impacts of the Proposed Dredging Activities would be considered to be negligible on cetacean species given the short-term nature, highly localised area of the works and the expected sound levels to be largely below the PTS threshold and below the TTS threshold within a hundred metres away from the vessel. It is not considered that further mitigation measures will be required for the Proposed Dredging Activities other than the measures currently in place under the current permit (Permit Reg. No. S0012-03 for 2020 – 2025).

4.2.2.2 Eurasian Otter

As previously mentioned, otter have previously been recorded within the immediate vicinity of the Proposed Dredging Areas, and therefore it is considered that there is potential for otter to be present within the vicinity of the Proposed Dredging Activities during the proposed works.

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 [44]. Potential impacts that are likely to occur to this species are not as well studied as cetaceans and phocids which also have been recorded within the vicinity of the Proposed Dredging Activities and disposal site. Levels of TTS and PTS for this species are not known and there is yet to be a hearing sensitivity assessment of the Eurasian otter. Therefore, as a conservative approach the limits for other marine carnivores in water will be used for this assessment [39].

The proposed noise levels that would cause either TTS and / or PTS to individuals exposed to non-pulse sources (single or multiple discrete sound event within 24hrs – i.e., dredging) are outlined below in Table 4-6.

Table 4-6: Sound Exposure Level Injury Criteria for Other Marine Carnivores (OCW) [39]

OCW Groups	Injury Criteria (non-pulse)	
	TTS	PTS
OCW in Water	192 dB	219 dB
OCW in Air	157 dB	177 dB

As discussed in Section 4.2.2, the underwater sound pressure levels from the dredging activities are estimated to be a maximum of ca. 186 dB re 1µPa within the immediate vicinity of the vessel [31]. However, these sound pressure levels would be expected to drop by at least 30 dB over 1km away from the vessel.

Therefore, given the fact that the underwater sound pressure levels for dredging will not breach to TTS or PTS thresholds, it is not anticipated that the Proposed Dredging Activities will have any impact on otters within the vicinity of the Proposed Dredging Activities. Furthermore, otter would need to be within the water column to be impacted by the dredging activity.

Additionally, the Proposed Dredging Activities will not directly impact on any breeding or resting sites for this species as the Proposed Dredging Activities will be solely marine-based and focused on the seabed in targeted areas.

Also, the duration of the proposed works is intermittent and will occur only as required (refer to Section 2.3.2). Therefore, any disturbances that occur to species within the immediate vicinity of the Site will be short-term and temporary. Furthermore, otters within the Waterford Estuary are subject to anthropogenic noise sources from port related activities, and therefore, it can be concluded that these otters are habituated to anthropogenic noise. Furthermore, given the availability of suitable habitats within the wider area it can be concluded that should these species be temporarily disrupted, they will move to a suitable area elsewhere. It is therefore concluded that any potential increases in noise as a result of the Proposed Dredging Activities will not adversely affect this species.

Therefore, it can be concluded that the impacts of the Proposed Dredging Activities would be considered to be negligible on otter given the short-term nature, highly localised area of the works and the expected sound levels to be below the PTS threshold and below the TTS threshold. It is not considered that further mitigation measures will be required for the

Proposed Dredging Activities other than the measures currently in place under the current permit (Permit Reg. No. S0012-03 for 2020 – 2025).

4.2.2.3 Non-Annex IV Species

4.2.2.3.1 Phocids

Both the grey seal and the harbour seal can be found across all coastal Irish waters, from estuarine waters that are close to human activity to undisturbed islands and the continental shelf [45]. Like cetaceans, phocids have evolved to produce a variety of sounds which are critical for both social and reproductive interactions [40]. Unlike cetaceans, phocids spend their time either at sea and on land, and thus produce sounds in both water and air.

Phocids, like cetaceans, are sensitive to sound and can be affected by high sound pressure levels. However, phocids are affected by both in water sound and in air sound at different levels, as shown in Table 4-7.

Table 4-7: Phocids Hearing Groups [39]

Phocids Groups	Estimate Hearing Range	Examples (see Southall, et al., for full list)
Phocids in Water	50 Hz to 86 kHz	Grey Seal and Harbour Seal
Phocids in Air	75 Hz to 30 kHz	

The proposed noise levels that would cause either TTS and / or PTS to individuals exposed to non-pulse sources (single or multiple discrete sound event within 24hrs – i.e., dredging) in water and air are outlined below in Table 4-8.

Table 4-8: Sound Pressure Level Injury Criteria for Phocids [39]

Phocids Groups	Injury Criteria (non-pulse)	
	TTS	PTS
Phocids in Water	181 dB	201 dB
Phocids in Air	134 dB	154 dB

As previously mentioned, the underwater sound pressure levels from the dredging activities are estimated to be a maximum of ca. 186 dB re 1µPa within the immediate vicinity of the vessel [31]. However, these sound pressure levels would be expected to drop by at least 30 dB over 1km away from the vessel.

It is not anticipated that the phocids will be severely impacted as a result of the Proposed Dredging Activities given the fact that PTS threshold levels in water will not be breached. Furthermore, phocids are highly mobile species, and it would be expected that any species within the vicinity of the Proposed Dredging Activities would leave the area [43]. Additionally, records of phocids within the vicinity of the Proposed Dredging Areas have been limited to grey seals as not common seals have not been recorded within the Waterford Estuary in the past 10 years. Additionally, there are currently no records of phocids within or within the vicinity of the disposal site [18].

Therefore, the impacts of the Proposed Dredging Activities would be considered to be negligible on phocids given the short-term nature, highly localised area of the works and the expected sound levels to be below the PTS threshold and below the TTS threshold a few hundred metres or less away from the vessel. It is not considered that further mitigation measures will be required for the Proposed Dredging Activities other than the measures currently in place under the current permit (Permit Reg. No. S0012-03 for 2020 – 2025).

4.2.3 Mitigation Measures

The potential effects to the screened in Annex IV and non-Annex IV species assessed in this risk assessment are considered to be limited based on the short-term nature of the dredging activities at each site, the highly localised nature of the works and the expected sound levels of the activities.

Therefore, it is not considered that specific mitigation measures would be required. However, it is recommended that that the current mitigation measures under the granted permit (Permit Reg. No. S0012-03 for 2020 – 2025) should remain place.

These mitigation measures include:

- **Condition 4.10.1** – The permit holder shall implement clear 'soft-start' or 'ramp up' procedures during loading and plough dredging activities, whereby sound energy input to the marine environment is gradually or incrementally increased from levels unlikely to cause significant behavioural impact on marine mammals to the full output necessary for completion of the activities; and,
- **Condition 4.10.2** – The implementation of the risk control measure for marine mammals specified in Condition 4.10.1 shall be to the satisfaction of the Agency.

Full details of the conditions are outlined in the EPA Permit Reg. No. S0012-03 and Foreshore Licence Reg. No. FS006684.

5 NPWS ASSESSMENT CRITERIA

In addition to the above risk assessment, the following assessment criteria as outlined in the '*Guidance to Manage the Risk to Marine Mammal from Man-made Sound Sources in Irish Waters'* has been completed [5].

1. Do individuals or populations of marine mammal species occur within the proposed area?

The likelihood of cetaceans being within the Proposed Dredging Activities and disposal site is low, given the shallow water depth and close proximity of the Proposed Dredging Activities and disposal site to the active Belview Port and navigational channel. Common dolphin, harbour porpoise and fin whale are the most frequently recorded marine mammal species within the Waterford Estuary.

Otter are known to occur within the vicinity of the Proposed Dredging Activities and disposal site. However, these otter are subject to anthropogenic noise sources from port-related activities, and therefore, it can be concluded that these otters are habituated to anthropogenic noise.

There are no important haul-out sites for harbour or grey seals located within or within close proximity the Proposed Dredging Activities and disposal site. However, it is considered possible that seals foraging within the River Suir within the vicinity of the Proposed Dredging Activities and the disposal site.

It should be noted that cetaceans, otter and phocids are all highly mobile species.

2. Is the plan or project likely to result in death, injury, or disturbance of individuals?

For the Proposed Dredging Activities, the estimated sound pressure levels have been generally reported up to 186 dB re 1µPa rms [39].

These levels are only within the PTS threshold for harbour porpoise that may occur within the vicinity of the Proposed Dredging Activities and disposal site. Although the sound pressure levels within the immediate vicinity of the dredger is within the TTS threshold for cetaceans and phocids, however, as previously stated, most marine mammals typically move away from vessels, therefore at a distance of 1km it is expected that only harbour porpoise are realistically impacted at these levels suggested. Additionally, the nature of these works will be short-term and highly localised. Therefore, it is considered that the Proposed Dredging Activities will not result in death or injury to any individuals and any disturbance to individuals would not be significant as these are highly mobile species that will move away from the works during the short duration of operations.

3. Is it possible to estimate the number of individuals of each species that are likely to be affected?

No abundance estimates for cetaceans, otter or phocids in the Belview Port, or the adjacent waters are available. The records provided in Section 4.1 are based on public sightings and no targeted study of the area has been conducted. The presence of these species within the Waterford Estuary are considered to be relatively low; however, common dolphin and harbour porpoise have been recorded within the vicinity of the Proposed Dredging Areas and upstream of the Proposed Dredging Activities.

4. Will individuals be disturbed at a sensitive location or sensitive time during their life cycle?

There are no known seal pupping sites or calving areas for cetaceans located within the vicinity of the Proposed Dredging Activities and disposal site. In addition, no known otter holts have been recorded within the vicinity of the Proposed Dredging Activities and the disposal

site is located ca. 2.3km from shore and therefore would not be considered suitable for otter holts or seal pupping sites.

Furthermore, these species are all highly mobile and are likely to forage over a wide area. Therefore it is considered likely that should these species be disturbed by the proposed works; these species will move to suitable habitat in the wider area. In addition, the proposed works will be short-term and localised in nature. Therefore, it is considered that any disturbances to species will be short term and negligible.

5. Are the impacts likely to focus on a particular section of the species' population, e.g., adults vs. juveniles, males vs. females?

There is no data to suggest that any particular gender or age group of cetacean, otter or phocid are more likely to occur within the vicinity of the Proposed Dredging Activities and disposal site compared to other genders or ages. Therefore, all genders and age groups must be expected to occur.

6. Will the plan or project cause displacement from key functional areas, e.g., for breeding, foraging, resting or migration?

Although there are records of harbour porpoise, common dolphin, otter and grey seal within the vicinity of Proposed Dredging Activities, there are no known breeding, resting or migration areas for these species within the vicinity of the Proposed Dredging Activities.

The Proposed Dredging Activities may displace some species during operations; however, these works will be short-term and localised in nature, and these areas are not considered to be important breeding areas for cetaceans and phocids. Some of the Proposed Dredging Areas are located within the Lower River Suir SAC and the River Barrow and River Nore SAC, which are designated for otter, however, these areas are also within the vicinity of the existing and active Belview Port. Therefore, it is concluded that otter within these areas are subject to anthropogenic noise sources from port-related activities and are habituated to anthropogenic noise. As such, it is assumed that the proposed works will not displaces otter from any key functional areas.

7. How quickly is the affected population likely to recover once the plan or project has ceased?

Any disturbance to species, if it occurs, will be short term and highly localised. Any affected species would be expected to recover very quickly once the dredging activities stop at an individual location or once the dredgers are commuting to the disposal site.

6 CONCLUSIONS

This assessment was undertaken for the ongoing maintenance dredging and disposal activities and for slightly extended areas of dredging at Cheekpoint Lower Bar, Cheekpoint Harbour and O'Brien's Quay.

This assessment reviewed the potentials to impact on both Annex IV species and other non-Annex IV species within the vicinity of the Proposed Dredging Activities and disposal site based on a worst-case scenario and concluded that the proposed works will not have a long-term effect on any Annex IV species and other non-Annex IV species based on:

- The implementation of the mitigation measures related to 'soft starts' and 'ramp up' listed in Section 4.4 would reduce any potential effects (physical or auditory) on marine mammals within the vicinity of the Proposed Dredging Activities and disposal site and allow marine mammals to vacate the area;
- The proposed works being short-term, highly localised and within an area of existing high marine traffic; and,
- Marine mammals recorded within the vicinity of the Proposed Dredging Activities and disposal site are highly mobile and would likely leave the vicinity of a dredging location during the commencement of works.

Overall, the maintenance dredging programme within the Waterford Estuary has been ongoing for decades and the licensed disposal site has been in use since 1996. The records held by the IWDG and the NBDC illustrate that cetaceans, otter and phocids have continued to utilise the Waterford Estuary during the years that maintenance dredging has been ongoing. In addition, anecdotal evidence from Dunmore Boat Trips provided information on the state of health and wellbeing of the dolphin, harbour porpoise and otter populations in the estuary and stated that there have not been negative impacts on wildlife populations as a result of dredging operations.

Therefore, it can be concluded that the continuation of the maintenance dredging project and the slight extension to 3No. areas will not significantly affect any Annex IV species or other non-Annex IV species within the vicinity of the Waterford Estuary or disposal site, and it is considered that a derogation licence would not be required for the proposed works.

7 REFERENCES

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

[2] DoEHLG, “Conservation Plan for Cetaceans in Irish Waters,” Department of Environment, Heritage and Local Government, Dublin, 2009.

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

[4] JNCC, Natural England and Countryside Council for Wales, “The protection of marine European Protected Species from injury and disturbance: Guidance for the marine area in England and Wales and the UK offshore marine area,” JNCC, Peterborough, 2010.

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

[6] NPWS, “Underwater sound guidance January 2014,” National Parks and Wildlife Service, 2014.

[7] EPA, “EPA Map Viewer,” 2024. [Online]. Available: https://gis.epa.ie/EPAMaps/.

[8] D. Ryan, J. Coyne, D. Putharee and W. Roche, “Fish Stock Survey of Transitional Waters in the Southern River Basin District – Barrow, Nore, Suir Estuary 2016,” Inland Fisheries Ireland, 2017.

[9] D. Ryan, J. Cooney, E. Leonard, K. Nolan and W. Roche, “Fish Stock Survey of Transitional Waters in the Southern River Basin District – Barrow, Nore, Suir Estuary 2019,” Inland Fisheries Ireland, 2020.

[10] W. Corcoran, R. Matson, P. McLoone, A. Bateman, D. Cierpial, A. Gavin, P. Gordon, E. McCarthy, K. Kelly, S. Robson, G. Wightman, W. Roche and F. Kelly, “Sampling Fish for the Water Framework Directive - Summary Report 2022,” Inland Fisheries Ireland, 2023.

[11] NPWS, “National Parks and Wildlife Service,” 2024. [Online]. Available: https://www.npws.ie.

[12] Kilkenny County Council, “Planning Portal,” 2024. [Online]. Available: https://kilkennycoco.ie/eng/services/planning/planning-applications/.

[13] Waterford City and County Council, “Online Planning Enquiries,” 2024. [Online]. Available: https://www.waterfordcouncil.ie/departments/planning/planning-enquiries/online-planning-enquiries.htm.

[14] Wexford County Council, “Search Planning Applications,” 2024. [Online]. Available: https://www.wexfordcoco.ie/planning/search-planning-applications.

[15] Department of Housing, Local Government and Heritage, "National Planning Application Database," 2024. [Online]. Available: https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de.

[16] Irish Whale and Dolphin Group, "Access to IWDG Sighting and Stranding Data," Irish Whale and Dolphin Group, [Online]. Available: https://iwdg.ie/access-to-iwdg-sighting-and-stranding-data/. [Accessed October 2023].

[17] IWDG, "Recent Sightings Portal," Irish Whale and Dolphin Group, 2024. [Online]. Available: https://iwdg.ie/browsers/sightings.php.

[18] NBDC, "National Biodiveristy Live Maps," 2024. [Online]. Available: http://maps.biodiversityireland.ie/.

[19] IWDG, "IWDG - Species," Irish Whale and Dolphin Group, 2024. [Online]. Available: https://iwdg.ie/species/.

[20] NPWS, "NPWS - Marine Species," National Parks & Wildlife Service, 2024. [Online]. Available: https://www.npws.ie/marine/marine-species#:~:text=In%20Ireland%2C%20there%20are%20two,marine%20environment%2C%20cetaceans%20and%20seals..

[21] NPWS, "NPWS - Cetaceans," National Parks & Wildlife Service, 2024. [Online]. Available: https://www.npws.ie/marine/marine-species/cetaceans.

[22] IUCN, "The IUCN Red List of Threatened Species," 2024. [Online]. Available: https://www.iucnredlist.org/.

[23] IWDG Sightings, "Sighting Record #43755," Irish Whale and Dolphin Group, 19 June 2023. [Online]. Available: https://iwdg.ie/browsers/showdetails.php?t=si&id=43755. [Accessed November 2023].

[24] IWDG, "Long-finned Pilote Whale," Irish Whale and Dolphin Group, [Online]. Available: https://iwdg.ie/long-finned-pilot-whale/. [Accessed 2024].

[25] IWDG, "Stranding Record #7222," Irish Whale and Dolphin Group, 19 June 2023. [Online]. Available: https://iwdg.ie/browsers/showdetails.php?t=st&id=7222. [Accessed November 2023].

[26] IWDG, "Strandings," Irish Whale and Dolphin Group, 2024. [Online]. Available: https://iwdg.ie/browsers/strandings.php?loc=0&pho=Any&stra=&flo=&sdfrom=&sdto=&latfrom=&latto=&longfrom=&longto=&sfilter=Filter#.

[27] H. Kruuk, Otters: Ecology, behaviour and conservation, Oxford University Press, 2006.

[28] T. K. Doyle, "Leatherback Sea Turtles (Dermochelys coriacea) in Irish waters," *Irish Wildlife Manuals, No.32,* 2007.

[29] IWDG, “Stranding Record #7337,” Irish Whale and Dolphin Group, 28 October 2023. [Online]. Available: https://iwdg.ie/browsers/showdetails.php?t=st&id=7337. [Accessed November 2023].

[30] P. D. Theobald, S. P. Robinson, P. A. Lepper, G. Hayman, V. Humphrey and M. Samantha, “The measurement of underwater noise radiated by dredging vessels during aggregate extraction operations,” 2019.

[31] CEDA, “CEDA Position Paper: Underwater Sound in Relation to Dredging,” CEDA Environment Commission Working Group, 2011.

[32] ABPmer, “Port of Waterford: Dredge Disposal Numerical modelling of disposal plumes,” 2023.

[33] ABPmer, “Waterford Estuary - Plough Assessment,” 2017.

[34] Delft Hydraulics, “Dredging of Duncannon Bar: Environmental impact of dredging and spoil dumping,” 2000.

[35] Delft Hydraulics, “Dredging of Suit and Barrow Rivers: Environmental Impact of annual spoil dumping at sea off Hook Head,” 2001.

[36] M. Cunningham, “Review and analysis of the turbidity data before & during the plough dredging campaign of early 2023,” LCF Marine, 2023.

[37] IDS Monitoring Envrionmental Data Acquisition and Telemetry, “A review of dredge related monitoring data at Cheek Point, Waterford for a period covering three campaigns between January and March 2017,” 2017.

[38] M. Cunningham, “A review and analysis of water quality monitoring data from the Port of Waterford before, during and after the plough dredging campaigns of July 2020 to Feb 2021,” 2021.

[39] B. L. Southall, J. J. Finneran, C. Reichmuth, P. E. Nachtigall, D. R. Ketten, A. E. Bowles, W. T. Ellison, D. P. Nowacek and P. L. Tyack, “Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects,” *Aquatic Mammals 2019,* pp. 125-232, 2019.

[40] e. a. Southall, “Marine Mammal Noise Exposure Criteria: Hearing, Weighting Function & TTS/PTS Onset,” *Aquatic Mammals,* vol. Volume 33, 2007.

[41] NOAA, “Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing,” National Oceanix and Atmospheric Administration, 2018.

[42] R. Bray, Environmental Aspects of Dredging, Leiden: Taylor & Francis, 2008.

[43] BOEM, “Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore Massachusetts,” U.S. Department of the Interior Bureau of Ocean Energy Management, 2012.

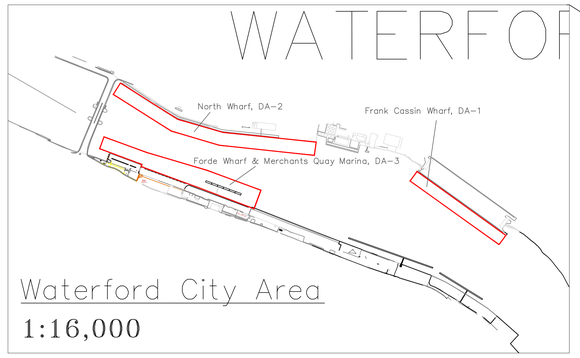
[44] Vincent Wildlife Trust, “Species: Otter,” 2024. [Online]. Available: https://www.vincentwildlife.ie/species/otter.

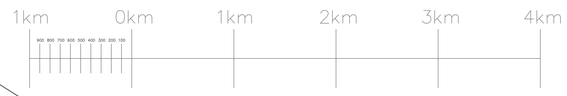
[45] IUCN, “Grey Seal - Halichoerus grypus,” 2024. [Online]. Available: https://www.iucnredlist.org/species/9660/45226042#taxonomy.

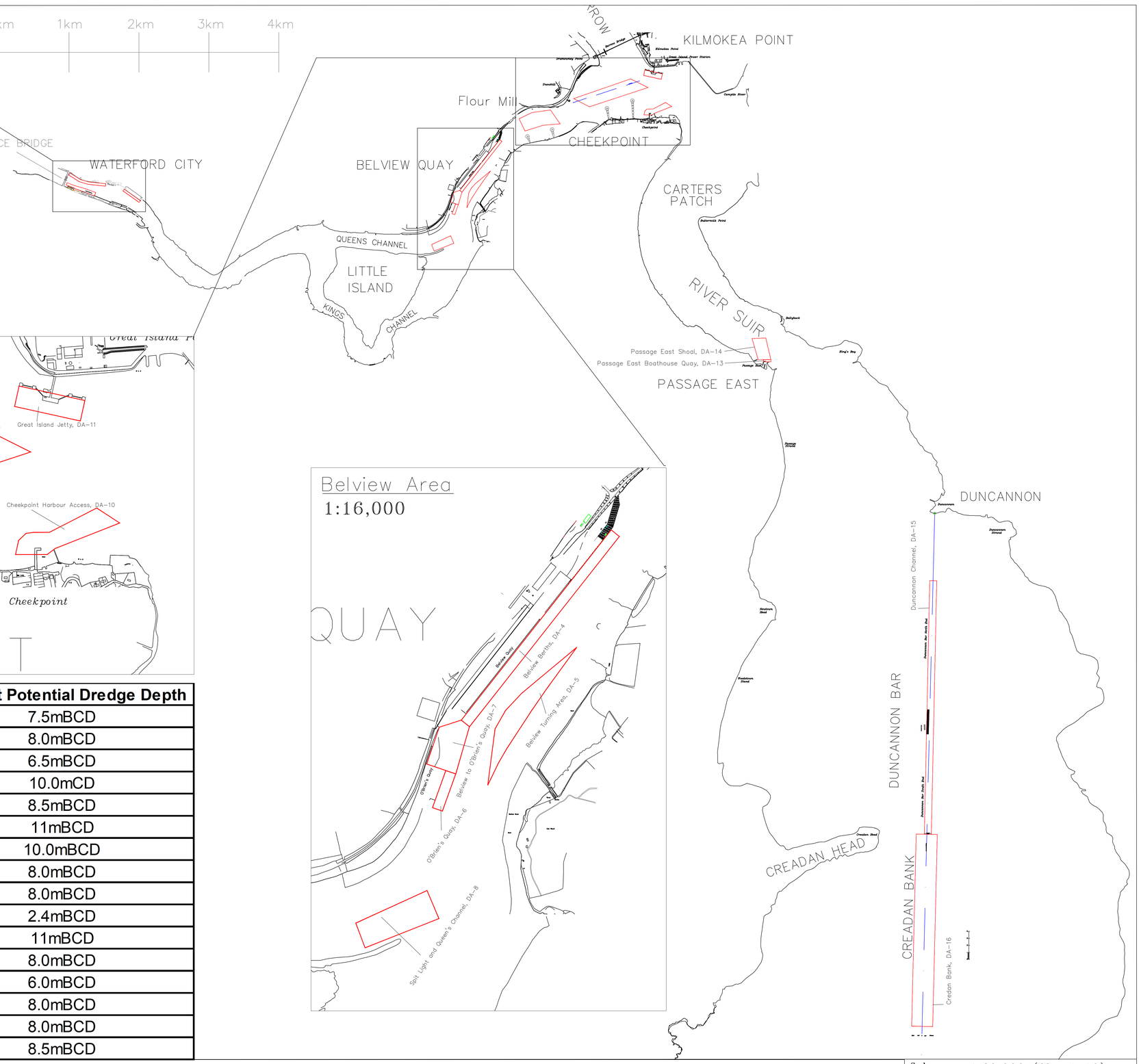
[46] A. Ghoul and R. Colleen, “Hearing in Sea Otters (Enhydra lutris): Audible Frequencies Determined from a Controlled Exposure Approach,” *Aquatic Mammals 2014,* pp. 243-251, 2014.

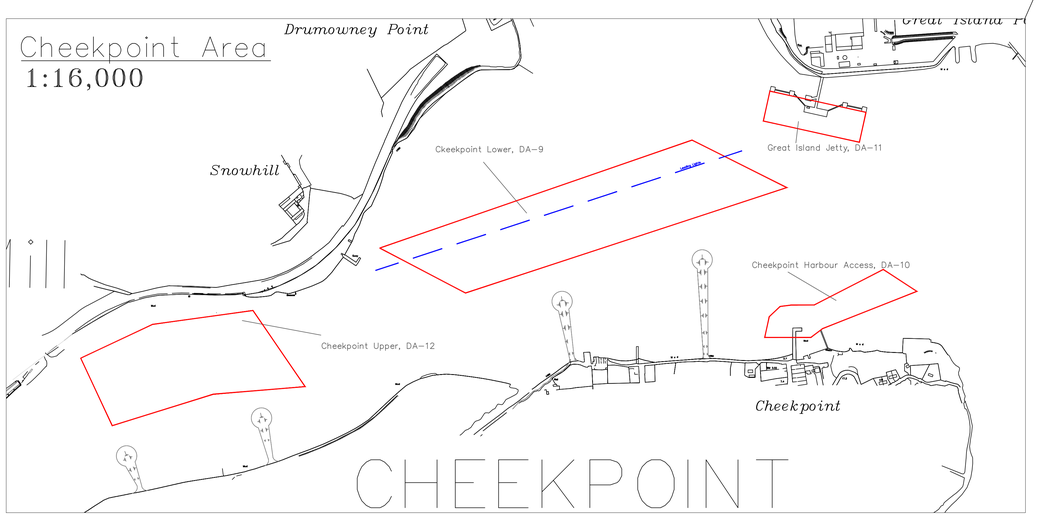
APPENDICES

APPENDIX A









Dredge Area Name	ID	Area (Ha)	Deepest Potential Dredge Depth
Frank Cassin Wharf	DA-1	0.9	7.5mBCD
North Wharf	DA-2	1.9	8.0mBCD
Forde Wharf & Merchants Quay Marina	DA-3	1.9	6.5mBCD
Belview Berths	DA-4	3.7	10.0mCD
Belview Turning Area	DA-5	2.9	8.5mBCD
O'Brien's Quay	DA-6	0.6	11mBCD
Belview to O'Brien's Quay	DA-7	2	10.0mBCD
Spit Light and Queen's Channel	DA-8	3.25	8.0mBCD
Cheekpoint Lower	DA-9	16.53	8.0mBCD
Cheekpoint Harbour Access	DA-10	2.84	2.4mBCD
Great Island Jetty	DA-11	2	11mBCD
Cheekpoint Upper	DA-12	10.25	8.0mBCD
Passage East Boathouse Quay	DA-13	0.3	6.0mBCD
Passage East Shoal	DA-14	5.8	8.0mBCD
Duncannon Channel	DA-15	36	8.0mBCD
Creadan Bank	DA-16	83	8.5mBCD

Consultant

[redacted]

Client

PORT OF WATERFORD – MAINTENANCE DREDGING

Title

FIGURE 1 – DREDGE AREA OVERVIEW

Scale : 1:60,000 (Sheet A0)

Dwg Date : January 2024

DECLG FILE NUMBER: N/A

Drg.No. 636_D@S_Application_01

Certified By: [redacted] PhD CEng FIEI

[redacted] 11/01/2024

APPENDIX B

Proposed Maintenance Dredging Tonnage 2026-2033

Conversion Rates	Insitu Density (wet t/m^3)	Conversion Rate to Dry Tonnes	Offshore Disposal Rate per day		
			Dry Tonnes	Insitu Cubic Metres	Wet Tonnes
Creadan Bank	1.7	1.08	35,000	32,407	55,093
Duncannon	1.6	0.92	35,000	38,043	60,870
Cheekpoint Lower	1.5	0.76	35,000	46,053	69,079
Belview Berths	1.5	0.76	35,000	46,053	69,079
Passage East Boathouse Quay	1.6	0.92	35,000	38,043	60,870
Passage East Shoal	1.6	0.92	35,000	38,043	60,870
Cheekpoint Harbour Access	1.5	0.76	35,000	46,053	69,079
Great Island Jetty	1.5	0.76	35,000	46,053	69,079
Cheekpoint Upper	1.5	0.76	35,000	46,053	69,079
Belview Turning Area	1.5	0.76	35,000	46,053	69,079
O'Brien's Quay	1.5	0.76	35,000	46,053	69,079
Belview to O'Brien's Quay	1.5	0.76	35,000	46,053	69,079
Spit Light and Queen's Channel	1.5	0.76	N/A	N/A	N/A
Frank Cassin Wharf	1.5	0.76	N/A	N/A	N/A
North Wharf	1.5	0.76	N/A	N/A	N/A
Forde Wharf & Merchants Quay Marina	1.5	0.76	N/A	N/A	N/A

Particle Density	2.65	t/m^3			
Water Density	1.025	t/m^3			

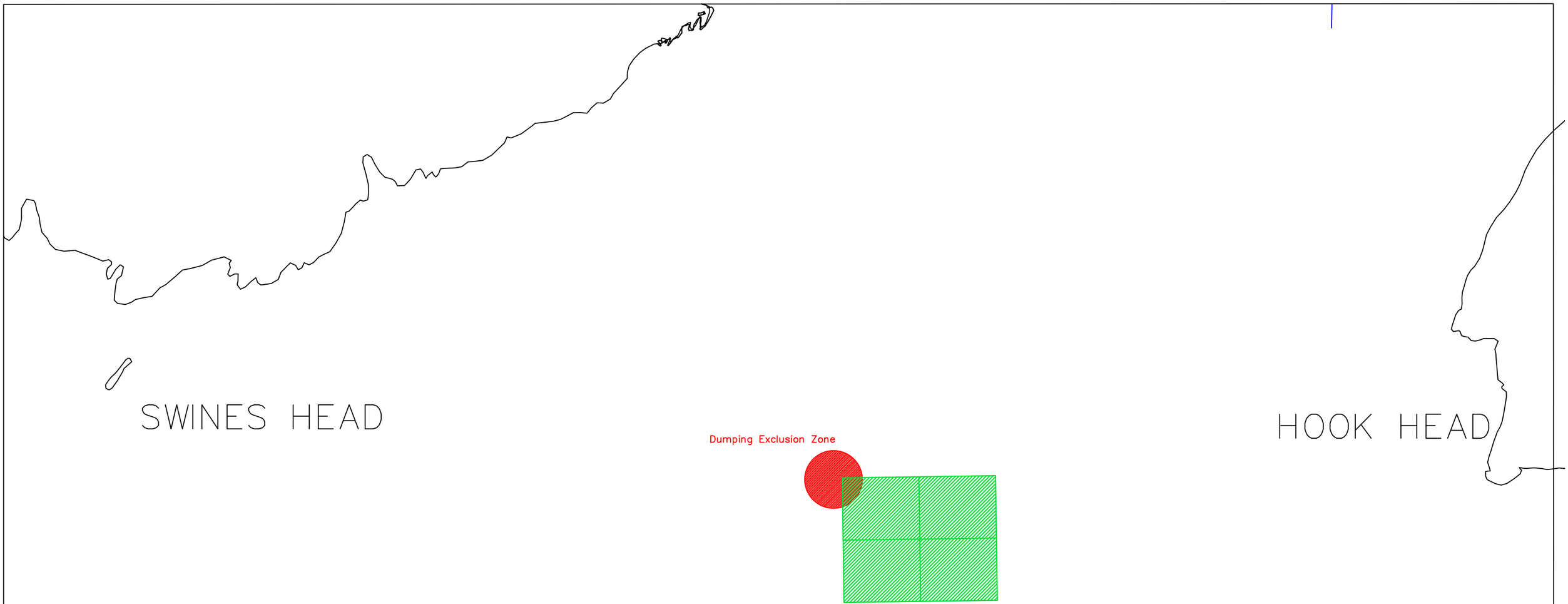
Dry Tonnage

Dredge Area Name	Method of Dredging	2026	2027	2028	2029	2030	2031	2032	2033	Total	Contingency
		(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes/year)
Creadan Bank	TSHD	0	0	0	0	0	0	0	0	**0**	175,000
	Plough	0	0	0	0	0	0	0	0	**0**	5,000
Duncannon	TSHD	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	**1,600,000**	150,000
	Plough	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	**8,000**	0
Cheekpoint Lower	TSHD	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	**1,200,000**	80,000
	Plough	52,500	52,500	52,500	52,500	52,500	52,500	52,500	52,500	**420,000**	27,500
Belview Berths	TSHD/Mechanical	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	**240,000**	17,500
	Plough	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	**80,000**	5,000
Passage East Boathouse Quay	TSHD/Mechanical	5,000	0	5000	0	5000	0	5000	0	**20,000**	0
	Plough	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	**8,000**	0
Passage East Shoal	TSHD/Mechanical	7,500	0	7,500	0	7,500	0	7,500	0	**30,000**	0
	Plough	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	**8,000**	0
Cheekpoint Harbour Access	TSHD/Mechanical	0	11,000	0	11,000	0	11,000	0	11,000	**44,000**	0
	Plough	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	**20,000**	2,500
Great Island Jetty	TSHD/Mechanical	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	**40,000**	5,000
	Plough	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	**16,000**	0
Cheekpoint Upper	TSHD	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	**40,000**	50,000
	Plough	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	**8,000**	0
Belview Turning Area	TSHD/Mechanical	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	**160,000**	10,000
	Plough	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	**16,000**	2,500
O'Brien's Quay	TSHD/Mechanical	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	**80,000**	5,000
	Plough	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	**8,000**	1,000
Belview to O'Brien's Quay	TSHD/Mechanical	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	**80,000**	20,000
	Plough	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	**12,000**	2,500
Spit Light and Queen's Channel	Plough	750	750	750	750	750	750	750	750	**6,000**	0
Frank Cassin Wharf	Plough	750	750	750	750	750	750	750	750	**6,000**	0
North Wharf	Plough	500	500	500	500	500	500	500	500	**4,000**	0
Forde Wharf & Merchants Quay Marina	Plough	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	**28,000**	0
Total Disposed at offshore dumping site (excl. contingency)		**442,500**	**441,000**	**442,500**	**441,000**	**442,500**	**441,000**	**442,500**	**441,000**	**3,534,000**	
Total Disposed at offshore dumping site (incl. max contingency)		**617,500**	**616,000**	**617,500**	**616,000**	**617,500**	**616,000**	**617,500**	**616,000**	**4,934,000**	
Total Dumped by Plough Dredging		**81,000**	**81,000**	**81,000**	**81,000**	**81,000**	**81,000**	**81,000**	**81,000**	**648,000**	

Wet Tonnage

Dredge Area Name	Method of Dredging	2026	2027	2028	2029	2030	2031	2032	2033	Total	Contingency
		(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes/year)
Creadan Bank	TSHD	0	0	0	0	0	0	0	0	**0**	275,463
	Plough	0	0	0	0	0	0	0	0	**0**	7,870
Duncannon	TSHD	347,826	347,826	347,826	347,826	347,826	347,826	347,826	347,826	**2,782,609**	260,870
	Plough	1,739	1,739	1,739	1,739	1,739	1,739	1,739	1,739	**13,913**	0
Cheekpoint Lower	TSHD	296,053	296,053	296,053	296,053	296,053	296,053	296,053	296,053	**2,368,421**	157,895
	Plough	103,618	103,618	103,618	103,618	103,618	103,618	103,618	103,618	**828,947**	54,276
Belview Berths	TSHD/Mechanical	59,211	59,211	59,211	59,211	59,211	59,211	59,211	59,211	**473,684**	34,539
	Plough	19,737	19,737	19,737	19,737	19,737	19,737	19,737	19,737	**157,895**	9,868
Passage East Boathouse Quay	TSHD/Mechanical	8,696	0	8,696	0	8,696	0	8,696	0	**34,783**	0
	Plough	1,739	1,739	1,739	1,739	1,739	1,739	1,739	1,739	**13,913**	0
Passage East Shoal	TSHD/Mechanical	13,043	0	13,043	0	13,043	0	13,043	0	**52,174**	0
	Plough	1,739	1,739	1,739	1,739	1,739	1,739	1,739	1,739	**13,913**	0
Cheekpoint Harbour Access	TSHD/Mechanical	0	21,711	0	21,711	0	21,711	0	21,711	**86,842**	0
	Plough	4,934	4,934	4,934	4,934	4,934	4,934	4,934	4,934	**39,474**	4,934
Great Island Jetty	TSHD/Mechanical	9,868	9,868	9,868	9,868	9,868	9,868	9,868	9,868	**78,947**	9,868
	Plough	3,947	3,947	3,947	3,947	3,947	3,947	3,947	3,947	**31,579**	0
Cheekpoint Upper	TSHD	9,868	9,868	9,868	9,868	9,868	9,868	9,868	9,868	**78,947**	98,684
	Plough	1,974	1,974	1,974	1,974	1,974	1,974	1,974	1,974	**15,789**	0
Belview Turning Area	TSHD/Mechanical	39,474	39,474	39,474	39,474	39,474	39,474	39,474	39,474	**315,789**	19,737
	Plough	3,947	3,947	3,947	3,947	3,947	3,947	3,947	3,947	**31,579**	4,934
O'Brien's Quay	TSHD/Mechanical	19,737	19,737	19,737	19,737	19,737	19,737	19,737	19,737	**157,895**	9,868
	Plough	1,974	1,974	1,974	1,974	1,974	1,974	1,974	1,974	**15,789**	1,974
Belview to O'Brien's Quay	TSHD/Mechanical	19,737	19,737	19,737	19,737	19,737	19,737	19,737	19,737	**157,895**	39,474
	Plough	2,961	2,961	2,961	2,961	2,961	2,961	2,961	2,961	**23,684**	4,934
Spit Light and Queen's Channel	Plough	1,480	1,480	1,480	1,480	1,480	1,480	1,480	1,480	**11,842**	0
Frank Cassin Wharf	Plough	1,480	1,480	1,480	1,480	1,480	1,480	1,480	1,480	**11,842**	0
North Wharf	Plough	987	987	987	987	987	987	987	987	**7,895**	0
Forde Wharf & Merchants Quay Marina	Plough	6,908	6,908	6,908	6,908	6,908	6,908	6,908	6,908	**55,263**	0
Total Disposed at offshore dumping site (excl. contingency)		**823,513**	**823,484**	**823,513**	**823,484**	**823,513**	**823,484**	**823,513**	**823,484**	**6,587,986**	
Total Disposed at offshore dumping site (incl. max contingency)		**1,098,976**	**1,098,947**	**1,098,976**	**1,098,947**	**1,098,976**	**1,098,947**	**1,098,976**	**1,098,947**	**8,791,690**	
Total Dumped by Plough Dredging		**159,165**	**159,165**	**159,165**	**159,165**	**159,165**	**159,165**	**159,165**	**159,165**	**1,273,318**	

APPENDIX C



	WGS84 Coordinates		Irish Transverse Mercator (ITM)		Area (Ha)
	Latitude	Longitude	Eastings (m)	Northings (m)	
Disposal Site	52° 07.45' N	06° 58.80' W	669785.25	597454.29	52 Hectares
	52° 07.10' N	06° 58.80' W	669794.37	596805.42	
	52° 07.10' N	06° 58.10' W	670593.21	596816.54	
	52° 07.45' N	06° 58.10' W	670583.99	597465.57	

Consultant [redacted]

Client

PORT OF WATERFORD – MAINTENANCE DREDGING

Title

FIGURE 8 – DISPOSAL AREA

Scale : 1:20000

Dwg Date : January 2024

DECLG FILE NUMBER: N/A

Drg.No. 636_D@S_Application_08

Certified By: [redacted] 'hD CEng FIEI

[redacted] 11/01/2024

APPENDIX D

[redacted]

22/9/23

DEAR SIR

THE FOLLOWING ARE MY OBSERVATIONS ON THE STATE OF HEALTH, AND WELLBEING OF THE DOLPHIN, PORPOISE, AND OTTER POPULATION IN THE RIVER SUIR AND WATERFORD ESTUARY AND HARBOUR AREAS.

THERE ARE THREE TO FOUR PODS OF PORPOISES WHO LIVE IN THE RIVER AND HARBOUR. IN THE WINTER HUNDREDS OF DOLPHINS AND SEALS. COME TO FEAST ON THE SPRATS.

THERE ARE ALSO A LARGE NUMBER OF OTTERS LIVING ON THE BANKS OF THE RIVER.

MY ANGLING AND ECO TOURISM BUSINESS RELIES ENTIRELY ON A VIBRANT AND HEALTHY RIVER AND HARBOUR. I HAVE NOT SEEN ANY NEGATIVE IMPACT THE DREDGING OPERATIONS HAVE HAD ON THESE POPULATIONS OF WILDLIFE.

IF THERE WERE ANY PROBLEMS AS REGARDS THE DREDGING IMPACTING ON THE WILDLIFE I WOULD BE THE FIRST TO DEMAND ACTION. I CAN REPORT THAT ALL IS WELL.

YOURS SINCERLY

[redacted]

[redacted]