## Eve O'Sullivan

**From:** Licensing Staff
**Subject:** CM1123 Ballycotton Harbour DaS Application S0032-01
**Attachments:** CM1123.MA.LT.3003 Letter to EPA re Additional Information.pdf

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**From:** Paul Murphy <PMurphy@ByrneLooby.com>
**Sent:** Wednesday 6 April 2022 14:05
**To:** Licensing Staff <licensing@epa.ie>
**Subject:** CM1123 Ballycotton Harbour DaS Application S0032-01

To whom it may concern,

Further to your email dated 09/03/2022 and 19/01/2022, please see attached additional documentation in support of the application.

Trusting there is sufficient information available to proceed with the application, however, should you require any additional information do not hesitate to contact me.

Kind Regards,

**Paul Murphy**
Senior Marine Engineer

BYRNELOOBY
AN ayesa COMPANY

Email: PMurphy@ByrneLooby.com
Tel: +353 (0)21 481 5441
Direct: +353 (0)21 206 6323
Mobile: +353 (0)87 719 1987
Office: Building 2100, Cork Airport Business Park, Kinsale Road
Cork, T12 KV8R, Ireland

byrnelooby.com | ayesa.com/en

BYRNELOOBY

Building 2100
Cork Airport Business Park
Kinsale Road, Cork
T12 KV8R, Ireland

+353 (0) 21 2407988
cork@byrnelooby.com
www.byrnelooby.com

Wednesday 6 April 2022
Ref: CM1123/MA/LT/3003

Environmental Protection Agency,
PO Box 3000,
Johnstown Castle Estate,
Co. Wexford.

Re: Dumping at Sea Application on behalf of Cork County Council at Ballycotton Harbour, Co. Cork - Reference Number S0032-01

Dear Sir/Madam,

I refer to your letter dated 19th January 2022 which has looked for clarifications in relation to the above application. I have addressed each query from your letter in chronological order below.



**Clarification No.1 – Total Dredge Volume**
The total volume of material which is to be dredged from Ballycotton Harbour is 19,500m$^3$ or 35,743 tonnes.
It is estimated that 18,000m$^3$ of material will be suitable to be disposed of at sea.
It is estimated that the quantity of material within the contaminated area / exclusion zone will be approximately 1,500m$^3$. This material will be disposed of in a suitably licenced landside facility to be determined following the procurement of a works Contractor.

The bulk density of the sands & gravels is 1.83 Mg/m$^3$.

**Clarification No.2 – Total Dredge Volume per Dumping Trip**
The total volume which is estimated to be loaded and disposed on each trip is approximately 1,000m$^3$. This is subject to the plant available to the Contractor who will be appointed to the works.

**Clarification No.3 – Attachment B1**
Section B1 has been updated and is attached in Appendix 1 of this letter.

**Clarification No.4 – Exclusion Zone**
Grid co-ordinates of the proposed exclusion zone in the harbour is attached in Appendix 2 of this letter.

**Clarification No.5 - Attachment F1**
Section F.1 has been updated and is attached in Appendix 3 of this letter.

**Clarification No.6 - Sediment Dispersion Modelling**

With regards to the requirement to undertake sediment dispersion modelling on the receiving environment, ByrneLooby would request that the EPA reconsiders this requirement, given the proposed location of the loading site.
The dredge site is located within the confines of Ballycotton Harbour (which is sheltered by means of a concrete breakwater, pier and pier head). While the pier and breakwater provide shelter to berthing vessels, it is believed that the pier and breakwater will also provide an element of containment of suspended solids in the water. It is likely that some of the suspended solids in the water within the harbour will settle on the seabed within the harbour itself. Suspended sediment which will be washed out of the mouth of the harbour is likely to be dispersed due to the exposed nature of the site with wind and wave generated currents and deep seabed bathymetry.
ByrneLooby have included a Screening for Appropriate Assessment report which was undertaken by an independent consultant as part of the Foreshore application process on behalf of the Department of Housing, Local Government and Heritage. This report agrees with the findings of the AAS & NIS which has been submitted as part of this application in so far that the sediment load over the zone of influence would not be considered to be significant given the exposed coastal conditions.

This report is attached to Appendix 4 of this letter.



**Clarification No.7 – Updated Appropriate Assessment Screening Report and Natura Impact Assessment**
An addendum to the Appropriate Assessment Screening Report and Natura Impact Assessment is attached to Appendix 5 of this letter.

**Clarification No.8 – Updated Marine Mammal Risk Assessment (MMRA)**
An updated MMRA is attached to Appendix 6 of this letter.

Trusting the information provided satisfies all queries raised in your letter dated 19th January 2022, however, should you require any further information do not hesitate to contact me.

Yours sincerely
For ByrneLooby,

Paul Murphy

Paul Murphy B.Eng., MIEI
Senior Marine Engineer

# Appendix 1

## Attachment B.1 – Sediment Chemistry Results

### B.1 (I):
Refer to Excel File in the accompanying email / 4Projects link.

### B.1 (II):
Copies of the laboratory results have been appended to this report.

### B.1 (III):
The results of the sediment chemistry are shown below in Table 1 & Table 2.

Table 1 Sediment Samples December 2020

| Parameter | Units (dry wt) Note 2 | Sampling Points | | | | |
|---|---|---|---|---|---|---|
| | | MAR00747.001 (MI SAP 2019 Pt 1) | MAR00747.002 (MI SAP 2019 Pt 2) | MAR00747.003 (MI SAP 2019 Pt 3) | MAR00747.005 (MI SAP 2019 Pt 4) | MAR00747.004 (MI SAP 2019 Pt 5) |
| Arsenic | mg kg | 13 | 9.7 | 14.4 | 13.7 | 11.3 |
| Cadmium | mg $kg^{-1}$ | 0.2 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium | mg $kg^{-1}$ | 56.3 | 43.1 | 43.4 | 45.9 | 57.2 |
| Copper | mg $kg^{-1}$ | 21.2 | 217 | 89.3 | 72.4 | 32.8 |
| Lead | mg $kg^{-1}$ | 214 | 71.8 | 45.1 | 66.8 | 36.4 |
| Mercury | mg $kg^{-1}$ | 0.04 | 0.07 | 0.07 | 0.12 | 0.07 |
| Nickel | mg $kg^{-1}$ | 27.8 | 24 | 36.4 | 30.5 | 26.8 |
| Zinc | mg $kg^{-1}$ | 111 | 144 | 122 | 124 | 119 |
| Σ TBT & DBT Note 3 | mg $kg^{-1}$ | 0.033 | 1.541 | 0.138 | 0.2876 | 0.0235 |
| γ-HCH (Lindane) Note 4 | µg $kg^{-1}$ | - | - | 0.16 | - | <0.1 |
| HCB Note 5 | µg $kg^{-1}$ | - | - | <0.1 | - | <0.1 |
| PCB 028 | µg $kg^{-1}$ | 0.19 | 0.08 | 0.09 | 0.22 | 0.11 |
| PCB 052 | µg $kg^{-1}$ | 0.25 | 0.17 | 0.17 | 0.54 | 0.22 |
| PCB 101 | µg $kg^{-1}$ | 0.13 | 0.11 | 0.11 | 0.66 | 0.13 |

| | | | | | | |
|---|---|---|---|---|---|---|
| PCB 138 | µg $kg^{-1}$ | 0.19 | 0.18 | 0.18 | 1.18 | 0.29 |
| PCB 153 | µg $kg^{-1}$ | 0.19 | 0.22 | 0.22 | 0.82 | 0.25 |
| PCB 180 | µg $kg^{-1}$ | 0.08 | 0.1 | 0.23 | 0.3 | 0.1 |
| PCB 118 | µg $kg^{-1}$ | 0.19 | 0.17 | 0.1 | 0.85 | 0.22 |
| PCB (Σ ICES 7) | µg $kg^{-1}$ | 1.22 | 1.03 | 1.1 | 4.57 | 1.32 |
| PAH (Σ 16) Note 7 | µg $kg^{-1}$ | - | - | 4738.2 | - | 660.46 |
| Total Extractable Hydrocarbons | g $kg^{-1}$ | - | - | 0.0862 | - | 0.597 |

*Green* < *Lower Level*

*Lower Level* < *Orange* < *Upper Level*

*Red* = > *Upper Level*

**Note 2:** Total sediment <2 mm
**Note 3:** Sum of tributyl tin and dibutyl tin
**Note 4:** 1α,2α,3β,4α,5α,6β-hexachlorocyclohexane
**Note 5:** Hexachlorobenzene
**Note 7:** Polyaromatic hydrocarbons (measured as individual compounds): Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Dibenzo(ah)anthracene, Benzo(ghi)perylene, Indeno(123-cd)pyrene.

| Parameter | Units (dry wt) Note 2 | Sampling Points | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MAR00901.001 (MI SAP 2020 Pt 1) | MAR00901.002 (MI SAP 2020 Pt 2) | MAR00901.003 (MI SAP 2020 Pt 3) | MAR00901.004 (MI SAP 2020 Pt 4) | MAR00901.005 (MI SAP 2020 Pt 5) | MAR00901.006 (MI SAP 2020 Pt 6) | MAR00901.007 (MI SAP 2020 Pt 7) | MAR00901.008 (MI SAP 2020 Pt 8) | MAR00901.009 (MI SAP 2020 Pt 9) | MAR00901.010 (MI SAP 2020 Pt 10) |
| Arsenic | mg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| Cadmium | mg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| Chromium | mg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| Copper | mg $kg^{-1}$ | 61.6 | 28 | 57.7 | 28.4 | 21.1 | 129 | 24 | 27 | 27.4 | 28 |
| Lead | mg $kg^{-1}$ | 107 | 36.9 | 47.4 | 33.8 | 26.9 | 50 | 28.2 | 32.3 | 40.3 | 32.9 |
| Mercury | mg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| Nickel | mg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| Zinc | mg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| Σ TBT & DBT Note 3 | mg $kg^{-1}$ | 0.0289 | 0.0175 | 0.01 | 0.0375 | 0.0464 | 1.193 | 0.01 | 0.0567 | 0.1815 | 0.0777 |
| γ-HCH (Lindane) Note 4 | µg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| HCB Note 5 | µg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| PCB 028 | µg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| PCB 052 | µg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| PCB 101 | µg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| PCB 138 | µg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| PCB 153 | µg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| PCB 180 | µg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| PCB 118 | µg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| PCB (Σ ICES 7) | µg $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |
| PAH (Σ 16) Note 7 | µg $kg^{-1}$ | 9098.3 | - | - | 893.17 | - | - | 596.51 | - | 1253 | 384.73 |

| Parameter | Units (dry wt) Note 2 | Sampling Points | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MAR00901 .001 (MI SAP 2020 Pt 1) | MAR00901 .002 (MI SAP 2020 Pt 2) | MAR00901 .003 (MI SAP 2020 Pt 3) | MAR00901 .004 (MI SAP 2020 Pt 4) | MAR00901 .005 (MI SAP 2020 Pt 5) | MAR00901 .006 (MI SAP 2020 Pt 6) | MAR00901 .007 (MI SAP 2020 Pt 7) | MAR00901 .008 (MI SAP 2020 Pt 8) | MAR00901 .009 (MI SAP 2020 Pt 9) | MAR00901 .010 (MI SAP 2020 Pt 10) |
| Total Extractable Hydrocarbons | g $kg^{-1}$ | - | - | - | - | - | - | - | - | - | - |

*Green* < *Lower Level*

*Lower Level* < *Orange* < *Upper Level*

*Red* = > *Upper Level*

**Note 2:** Total sediment <2 mm
**Note 3:** Sum of tributyl tin and dibutyl tin
**Note 4:** 1α,2α,3β,4α,5α,6β-hexachlorocyclohexane
**Note 5:** Hexachlorobenzene
**Note 7:** Polyaromatic hydrocarbons (measured as individual compounds): Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Dibenzo(ah)anthracene, Benzo(ghi)perylene, Indeno(123-cd)pyrene.



Table 2 Sediment Samples January 2021

# Appendix 2

| BYRNELOOBY | Project | Ballycotton Harbour Dredging | Job No. | CM1123 | | |
|---|---|---|---|---|---|---|
| | | | Made By | JF | Date | 10.03.22 |
| Document Number | Calc Title | Contaminated Area Exclusion Zone | Chkd By | PM | Date | 15.03.22 |
| | | | Rev | 0 | Sheet No. | 0 |

| Reference | Calculations | Output |
|---|---|---|

**Exlusion Zone in the Inner Harbour**

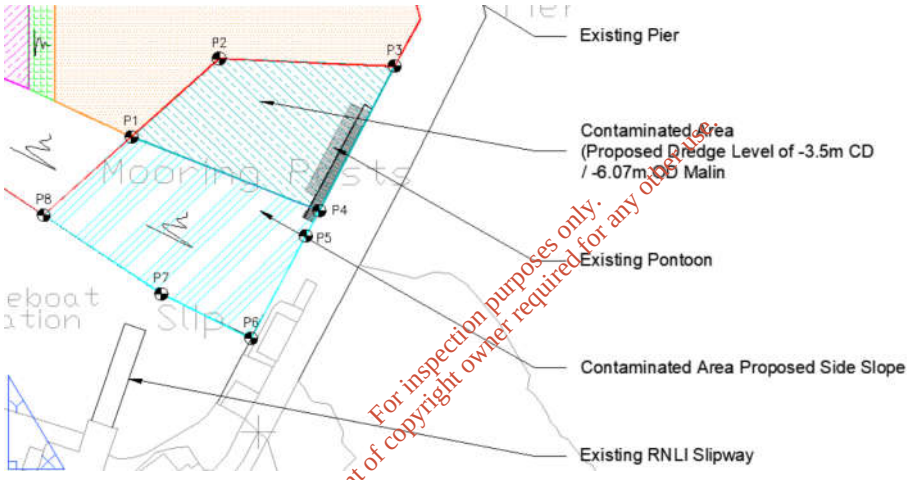
**Co-ordinates for the Contaminated Area**

Proposed Dredge Level of -3.5m CD

Side Slope

| | ITM | |
|---|---|---|
| | Eastings | Northings |
| P1 | 599897.35 | 563929.26 |
| P2 | 599914.56 | 563945.24 |
| P3 | 599949.01 | 563943.73 |
| P4 | 599934.21 | 563914.19 |
| P5 | 599931.6 | 563909.05 |
| P6 | 599920.86 | 563888.1 |
| P7 | 599903.2 | 563897.19 |
| P8 | 599880.14 | 563913.27 |

| | WGS84 | |
|---|---|---|
| | Lat (N) | Long (W) |
| P1 | 51.827602 | -8.001489 |
| P2 | 51.827746 | -8.001239 |
| P3 | 51.827733 | -8.00074 |
| P4 | 51.827467 | -8.000954 |
| P5 | 51.827421 | -8.000992 |
| P6 | 51.827233 | -8.001148 |
| P7 | 51.827314 | -8.001404 |
| P8 | 51.827459 | -8.001739 |



# Appendix 3

## Attachment F.1 – Assessment of the Impact on the Environment

### 1. Provide an assessment of the predicted impact on the receiving environment

The impact of the dredging operations on the receiving environment has been documented in various reports submitted as part of this application. Reference should be made to the following sections/documents which elaborate on the potential impact that the proposed works will have on the receiving environment;

- Attachment A.2 (Screening for Appropriate Assessments and Natura Impact Statement)
  - Section 5 - Receiving Environment
  - Section 6 - Screening for Appropriate Assessment
  - Appendix II - Bird Survey Report
  - Appendix III - Subtidal Benthic Habitat
  - Appendix IV - Intertidal Benthic Habitat
- The characteristics and composition of the material to be disposed of has been investigated and documented in Attachment B of the DAS application.
- Details of the loading and dumping operations are provided in Attachment D and E of the DAS application, respectively.

Additional impacts which have been considered are outlined below;

**i. Methods of packaging any containment**

A long reach excavator, located on the dredge barge and/or pier deck, will use a dig control system to determine dredge level achieved. The excavated material will be placed in a hopper barge. This material will be transferred to tipper trucks, appropriately modified for the transportation of contaminated materials. The contaminated material will be transported to a suitably licenced facility for disposal.

The contaminated material will be dredged independently of the main dredging within the harbour. The barge will be cleaned of all sands & silts on completion of the dredging of contaminated material to ensure there is no cross contamination of dredge spoil.

**ii. Existence and impact of current and/or previous dumping in the area**

No previous applications have been made in respect to the loading site. Details of the dump site are outlined in Attachment E.2.

**iii. Sea bottom characteristics, including topography, geochemical and geological characteristics and benthic micro-fauna and macro-fauna**

Reference should be made to the following sections/documents which relate to these issues.

- Attachment A.2 (Screening for Appropriate Assessments and Natura Impact Statement – Section 6)

- The characteristics and composition of the material to be disposed of has been investigated and documented in Attachment B of the DAS application.

### iv. Interference with legitimate use of the sea

Reference should be made to the following sections/documents which relate to these issues.

- Attachment A.2 (Screening for Appropriate Assessments and Natura Impact Statement)
  - Section 5 - Receiving Environment
  - Section 6 - Screening for Appropriate Assessment
- Attachment A.6 (Underwater Archaeological Impact Assessment of dredging works at Ballycotton)

### Summary of interface with the sea

#### a. Fishing

It is not anticipated that the proposed loading or dumping of dredge spoil will negatively impact on fishing / aquaculture operations in the area.

#### b. Navigational safety implications

The dredging of the harbour will improve safe navigation at Ballycotton Harbour. It will allow for safe berthing at the pier for large fishing vessels and safe access to the harbour for the RNLI vessel.

Existing fore and aft moorings within the harbour will be required to be removed during the dredging operations, however, these will be reinstated following the completion of the works.

Where and when required advance warning will be promulgated to harbour users prior to works commencing. Marine Notices will be issued by the Harbour Office. Radio Navigation Warnings will be issued by Irish Coastguard. The work vessel will display the appropriate international lights and shapes for a vessel restricted in her ability to manoeuvre, involved in underwater operations.

#### c. Pleasure boating and sailing

The greater depths in the harbour and in the vicinity of the pontoon will provide safer berthing facilities for all harbour users.

### 2. Submit an Underwater Archaeological Impact Assessment

An Underwater Archaeological Impact Assessment has been appended to Attachment F.1 and attachment A.6.

### 3. Details of any previous sampling at the loading area and dumping site

No record of previous sampling at loading areas. Sampling was conducted during 2019 and 2020 as part of this application. Refer to Attachment B.2 for more information regarding sampling at the loading area.

Details of the loading and dumping operations are provided in Section D and E of the DAS application, respectively.

The dump site is the main dump site used for all dredging operations in Cork Harbour. Characteristics of the dump site can be found in Attachment E.2 of the DAS application.

### 4. Water quality in the loading site

No data available.

### 5. Undertake a Screening for Appropriate Assessment

Refer to Attachment A.2 (Screening for Appropriate Assessments and Natura Impact Statement)

- Section 6 - Screening for Appropriate Assessment



### 6. Marine Mammal Risk Assessment

No sites within the zone of influence of the proposed project are designated for marine mammals. However, with due regard to the Marine Mammal Risk Assessment carried out in support of this project and the highly mobile nature of marine mammals it is considered that the potential for impacts as a result of hydrocarbon spillage and behaviour changes as a result of underwater noise may occur if marine mammals are present with the zone of influence during dredging.

Reference should be made to the following sections/documents which relate to these issues;

- MARINE MAMMAL RISK ASSESSMENT OF PROPOSED DREDGING AT BALLYCOTTON, CO CORK AND DISPOSAL AT SEA Revised 21 March 2022

### 7. Directives

- The bathing water directive 76/160/EEC

The EPA GIS (https://gis.epa.ie/EPAMaps/, March 2022) indicates that Garryvoe is the nearest bathing water to the loading site. Garryvoe is located approximately 2.3km North of the Ballycotton Habour and is located within the Ballycotton, Ballynamona and Shanagarry proposed Natural Heritage Area (pNHA 000076). It is

also located within Ballycotton Bay Special Protection Area (SPA 004022). The beach is used to some extent by anglers, walkers, surfers and windsurfers. The current Water Quality has been rated as Sufficient (2018 – 2021).

Due to the limited duration of the works which will largely be confined within the walls of the sheltered harbour (breakwater and pier wall), the distance from the nearest bathing water, the dynamic coastline outside the harbour which has strong currents as well as any mitigation actions which will be implemented during the works, the loading operations are not expected to have a significant impact on the quality of the bathing water at Garryvoe.

The dumping site is located south of Roche's Point, which is a well-established dump site and the main dump site for all dredging activities in the vicinity of Cork Harbour and is not envisaged to have an impact on water quality in the area.

- The Water Framework Directive 2000/60/EC

Ballycotton Harbour is located within Ballycotton Bay (IE_SW_040_0000) and adjacent to the Western Celtic Sea (Has 18;19;20), both are classified as 'not a risk' of failing to meet their Water Framework Directive (WFD) objectives by 2027.

According to the EPA GIS (https://gis.epa.ie/EPAMaps/, March 2022) Ballycotton Bay has an unassigned Coastal Waterbody status for the 2013-2018 assessment.

The main environmental impacts associated with loading and dumping at sea is increased suspended solids and turbidity in the receiving waters. The proposed operations are unlikely to impact on the WFD objectives for the affected coastal waters considering the following:



- The naturally high turbidity of the water at the loading site;
- The scale, duration and intermittent nature of the dredging operations;
- Characteristics of the material to be dumped;
- Characteristics of the receiving environment, and;

- EU Habitats Directive (92/43/EEC)

Refer to the Appropriate Assessment (AA) report and subsequent NIS wherein the potential impacts of the project have been investigated and documented in view of a European site's conservation objectives.

Refer to Attachment A.2 (Screening for Appropriate Assessments and Natura Impact Statement)

- Section 6 - Screening for Appropriate Assessment
- Section 7 – Natura Impact Statement

PROJECT

# Underwater Archaeological Impact Assessment of dredging works at Ballycotton, Co. Cork.

PREPARED BY

Caitlyn Haskins



LICENCE NO.

19D0095 & 19R0200

CLIENT

Byrne Looby

DATE

March 2021

# Contents

# Figures

# Acknowledgements

Mizen Archaeology would like thank Byrne Looby to for their co-operation and assistance throughout the project. We would also like to acknowledge the assistance of Hugh Power of Hydrographic Surveys who undertook the geophysics.

# 1. Introduction

## 1.1 General

*Mizen Archaeology* was contracted by *Cork County Council* to undertake an underwater archaeological impact assessment (UAIA) as part of Ballycotton dredging project, Ballycotton, Co. Cork. The assessment included a geophysical survey. It was planned to dive truth any identified anomalies of potential archaeological significance, however nonesuch were identified in the survey results.

# 2. Receiving environment

## 2.1 Location

Situated on the south coast of Co. Cork, Ballycotton Bay is an east-facing inlet, stretching from Ballycotton Island to Knockadoon Head. A small island lies between Ballycotton Island and the mainland. On the SW approach to Ballycotton Bay lie the Smiths and Wheat Rocks which have posed a significant hazard to shipping in the past. Several streams issue into the bay. The foreshore includes areas of sand/shingle, and exposed bedrock.

The harbour and village of Ballycotton are situated at the southern limits of the bay. The harbour is sheltered from the north and northwest by a breakwater while a pier provides protection from the east.

Ballycotton's coastline experiences severe erosion and sections of the cliff face are reinforced with stone and concrete.




*Figure 1 Site location map.*

## 3. Scope of works

Cork County Council propose to dredge the area outlined in navy (Figure 1 below) to bedrock level or -3.5m Chart Datum. A geophysical survey formed a component of the underwater archaeological assessment (UAIA). It was planned to dive truth geophysical anomalies of potential archaeological significance, but none were identified from the survey results.



*Figure 2 Scope of works in dark blue.*

## 4. Methodology

A range of methodologies were utilised to assess the potential impacts of the works on the cultural heritage, including; a desktop study, geophysical and dive truthing.

### 4.1 Desktop study

- The Record of Monuments and Places (RMP) compiled by the Archaeological Survey of Ireland comprises lists, classifications of monuments and maps of all recorded monuments with known locations and zones of archaeological significance. The monument records are accessible online from the National Monuments Section (NMS) of the Department of Arts,

Heritage and Gaeltacht (DAHG) at www.archaeology.ie. These were used to establish the wider archaeological context of the site.

- *OSI: Ordnance Survey* Ireland historic and contemporary maps were examined to measure the changing landscape of the riverbank and the development of the village.
- The Excavations Bulletin online database (www.excavations.ie) which contains summaries of all archaeological excavations in Ireland, was consulted to review archaeological investigations done previously in the area.
- Wreck Inventory of Ireland Database (WIID) and Wreck Viewer: The information contained within the inventory was gathered from a broad range of cartographic, archaeological and documentary sources, and each entry in the Inventory gives information on the ship's name, type of vessel, port of origin, owner's name, cargo, date of loss and other relevant information where available. The Record of Piers and Harbours is a draft unpublished document compiled by the DAHG. It draws on various historical sources dealing with historical piers and harbour development in Ireland.
- Cartography: Several historic maps and charts were examined (see references below for a full list).
- Aerial Photography: A variety of low and high-altitude aerial photography was examined (see references below for full list).
- Documentary sources: Several sources were examined. For a full list of all sources examined see Bibliography below.



## 4.2 Geophysical survey

The geophysical survey of Ballycotton Harbour was undertaken by *Priority Geotechnical Ltd.* in November 2020 with due regard to the unpublished guidelines for the undertaking of maritime geophysics provided by the Underwater Archaeology Unit (UAU) of the Department of Culture, Heritage and the Gaeltacht.

Hemisphere VS330 was used to collect positional information throughout the survey, which was corrected using Trimble VRS now RTK correction stream.

Side scan sonar survey was undertaken to provide high resolution imagery of the survey area. Imaging was obtained using an Edgetech 4125, dual frequency 400/900kHz sonar. The higher 900kHz channel was used throughout the survey to provide the highest image resolution. The towfish was run off the starboard rear side of the survey vessel.

A Geometrics G882 magnetometer was used for the magnetometer survey. This is a cesium vapour magnetometer. This was also towed with the towfish from the starboard rear side of the survey vessel. The speed of the boat was maintained below 3.0-3.5kts during the survey to reduce any effects of wake on the towfish.

A large number of moorings and vessels were present within the survey area. Lines were run where accessible and where the vessel could safely tow the required equipment.

### 4.3 Dive truthing

The geophysical survey did not identify any anomalies of potential archaeological significance that would have required dive truthing.

### 4.4 Consultation

As part of the preparation of this report, consultation took place with the Underwater Archaeology Unit (UAU) of the Department of Housing, Local Government and Heritage.

## 5. Results

### 5.1 Historical and archaeological background

Ballycotton's development from earliest times has always had a strong association with maritime activity ranging from the abundant raw materials that the first settlers used to trade and seafaring in later times. It is no surprise then, that the known monuments and protected structures primarily are intertwined with the coastal location of the village.



*Figure 3 Extract from National Monuments Services* website *showing* the *distribution of recorded monuments* (red) *and protected* structures (blue) *in Ballycotton Harbour vicinity.*

### 5.1.1 Prehistoric Period

Seasonal occupation of the coastal zone of Ballycotton Bay is evidenced by the presence of a lithic scatter in the townland of Garryvoe Lower. The assemblage consisted of a small collection of flint, including a leaf-shaped arrowhead found in a ploughed field. Approximately 1km to the north of this site a *fulacht fiadh* (CO089-076) is recorded in the townland of Ballycrenane. It was discovered in a marshy area close to Garryvoe beach and levelled in the late 1960s. A butt-trimmed leaf-shaped flint flake, typical of the Mesolithic Period was also was found in association with the burnt material.

Ballycotton is notably rich in discoveries of prehistoric gold dating from the Middle to late Bronze Age (*c.* 1600–600 BC). Examples include two gold bracelets, a gorget, a dress fastener, two gold bracelets, from Ballycotton showing the presence of an elite and powerful group of people in the area (McCarthy 2017)

Six coastal promontory forts are located on low cliffs overlooking Ballycotton Bay; Knockadoon (CO078-033), Capel Island (CO078-039), Glenawilling (CO078-041), Knockadoon (CO078-0420), Ballycotton (CO089-085) and Ballycotton Small Island (CO089-086). Coastal promontory forts are located on headlands above steep cliffs. They are generally connected to the mainland by a narrow neck of land and bounded on the other sides by steep cliff faces. On the mainland side, fortifications of earthen banks, ditches or stone walls run across the narrow neck of the headland. The headlands enclosed by these fortifications vary considerably in size, from relatively small spurs or long narrow necks of lands to substantial areas of 30 or more hectares. The construction date for this monument type is generally assigned to the Iron Age, and many were refashioned and reused in later times. They may have been built for defensive purposes or for prestige/ceremonial use (Downey and Sullivan, 2004).



### 5.1.2 Historic Period

Ringforts are one of the most common monuments in Co. Cork and there are numerous examples of such sites occurring within a kilometre of Ballycotton Bay including three in the townland of Ballycotton (CO089-039, CO089-070, and CO089-040). They were most likely occupied by extended and dispersed family units and were probably largely self-sufficient. The interior would have contained features such as domestic dwellings, outhouses, animal pens, food processing structures, craft areas, hearths and souterrains. A mixed economy would have been practised which would have involved cereal growing and animal husbandry, in particular, dairying.

Of particular interest to this period is the recovery of a 9th Century Carolingian Brooch found in 1875 '*in a bog at, or near, Ballycottin, Co. Cork*'. The BM catalogue identifies it as a "gilt copper alloy cross brooch: equal-armed; cast, chip-carved, Anglo-Carolingian style animal in profile in each arm; silver domed-head pseudo-rivet in a lobe at the inner and outer corners of each arm"; Length: 4.4 centimetres, Length: 12 millimetres (setting), Width: 11 millimetres (setting). Overall, its decoration seems to be of 8th–9th century Tassilo style. But what is most intriguing, is what is contained within the central setting, 'a flat, oval black glass setting inscribed with two lines of early Arabic script': sha['a] [a]llah' or `bismillah' or 'tubna lilllah', which has been translated to 'As God wills', 'In the name of 'Allah' or 'We have repented to God'. The item is now in the British Museum collections (British Museum 2018).

Ballycotton is mentioned in the 1364 Pipe Roll of Cloyne '*Rotulus Pipae Clonensis*', a medieval manuscript which provides an account of all the manors and estates of the Bishop of Cloyne. The name of the settlement given in the document was *Balycottyn* but other spellings included *Balycotekyn* (1260), and *Balycocekyn* (1275-76) (MacCotter and Nicholls 1996). The document lists ten men as holding cottages in the town in 1364, and notes that all ten are fishermen who fish for ling, cod, and haddock (MacCotter & Nicholla 1996, 18).

The Down Survey of 1656–8 records that the townland of *Ballycottine*, comprising 228 acres of profitable land, was in the ownership of James Gough in 1641 (Fig. 4 and 5). Following the Uprising, his lands were confiscated and by 1670 Ballycotton was grated to the Bishop of Cloynes (http://downsurvey.tcd.ie/historical-gis.html).


*Figure 4 Down Survey map of County of Corke (Hibernia Delineatio, 1675).*



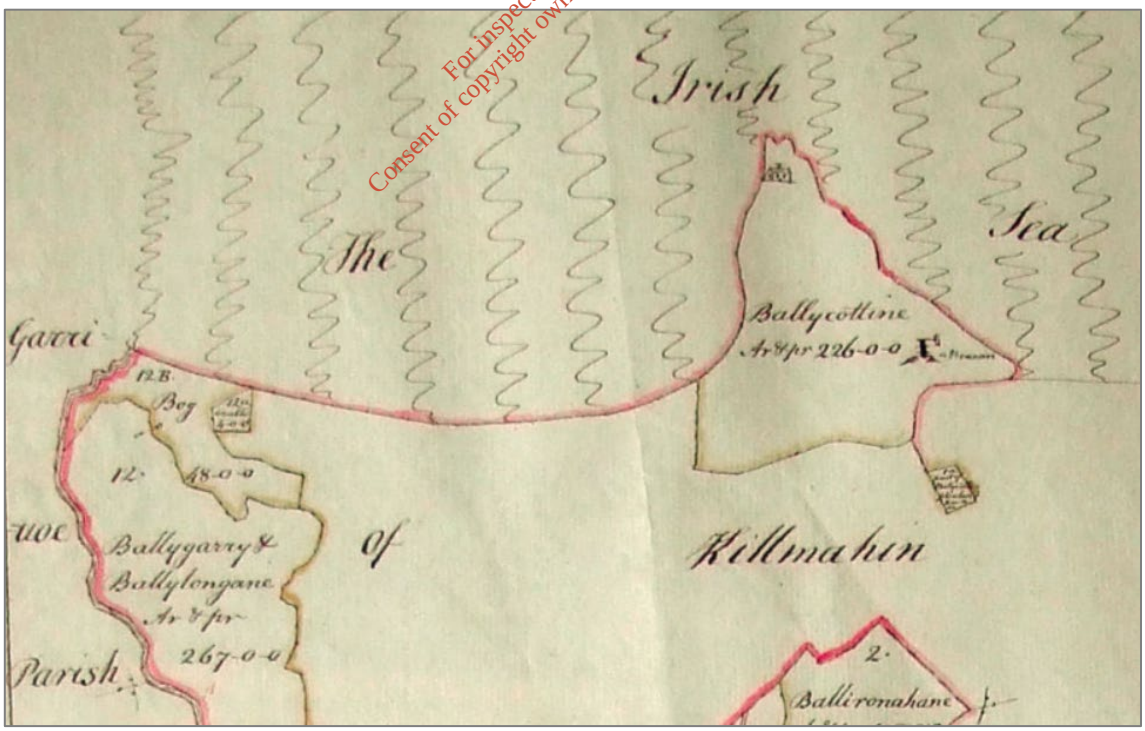



*Figure 5 Excerpt of Down Survey of Imokilly Barony, Cloyne Parish, Ballycottin (1786 Daniel O'Brien copy).*

The settlement appears to continue as a small fishing village without formal landing infrastructure into the 19th Century.

In 1750, Smith described Ballycotton Strand as being '*four miles long, smooth and level and very agreeable to take the air on'* (Smith 1815, 130). He mentions that several species which were fished in the bay including flat fish, lobster and trout (*ibid*).

The Commissioners of Inquiry into The State of the Irish Fisheries noted in 1821 that Ballycotton Bay was remarkable for its clean ground, and that if a small pier was constructed local fishermen could pursue their industry through winter.

In 1837 Samuel Lewis described Ballycotton as '*a village and ploughland in the parish of Cloyne, ..containing 856 inhabitants…. and consists of a scattered village comprising about 150 small houses. It is much frequented in the summer for sea bathing*'.

The 1st edition Ordnance Map of Ballycotton published in 1841, illustrates the village of Ballycotton containing approximately one hundred buildings. *C.* 700m to the southeast of the village, at the tip of the headland is a small group of buildings including the coastguard station (Fig. 6). No harbour infrastructure is denoted on the map. Griffith Valuation of Ballycotton in 1853 shows most the lands in that area still in the ownership of the Bishop of Cloyne.



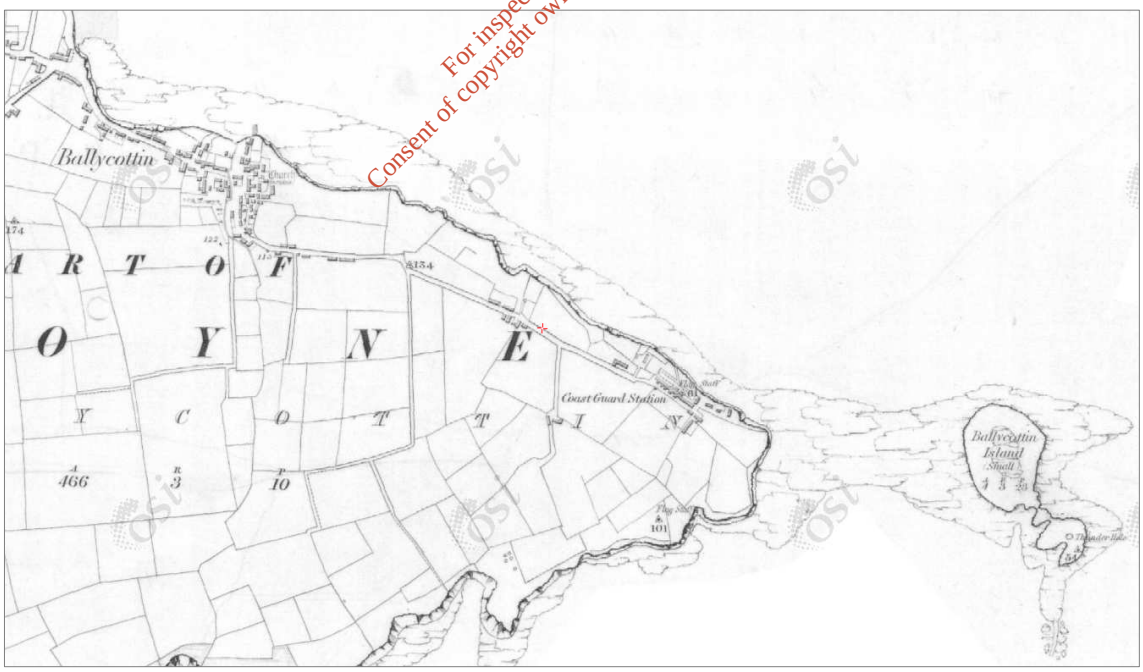



*Figure 6 1st edition Ordnance Survey map of Ballycotton (1842).*

According to Antony Marmion there was a dire need for the construction of a harbour;

> *'In Ballycotton Bay there is capital anchorage, and in the passage from Cork to Dublin there is not so safe a refuge in a gale of wind. A harbour should be constructed here which would not cost more than about £15,000, and for the trifling sum accommodation would be affording to 400 ships of the larges size. The want of such a harbour has been productive of the loss of life and property to an enormous extent* (Marmion, 1855, 546)'.

Following decades of petitions and from merchants of Youghal and Cork, shipowners, masters, Cork Harbour Board, and the Admiralty a lighthouse on Ballycottin Island in 1851. In particular, the wrecking of the infamous paddle steamship *Sirius* on 16 January 1847 had been the impetus for prioritising this project.

A Report from the Board of Public Works for 1852-53 notes that Ballycotton had '*a substantial stone pier, extending into six feet water at low-water springs, and affoarding, in a very exposed place, excellent wharfage, sheltered from all winds except those bloeing over the land, which, however, in this direction is bluff, and affoards considerable protection*."

A RNLI Station was established in Ballycotton in 1858 at a cost of £83. It's first lifeboat was a small rowing boat having a crew of eight and pulling six oars which was kept on a carriage and in a small boat house (https://rnli.org/ballycotton-lifeboat-station/station-history-ballycotton).



The Report of the Inspectors of Irish Fisheries on the Sea and Inland Fisheries of Ireland for 1880 stated that '*The harbour as it exists is little better than a trap, for when gales set in from the south-east if the boats were not removed at once they would inevitably be destroyed.*" The pier refurbishment and a new breakwater was begun in 1884 and completed in 1887 at a cost of £20,500 (Inspectors of Irish Fisheries 1881; Inspectors of Irish Fisheries 1885, 12; Inspectors of Irish Fisheries 1888, 16).

The 2nd edition Ordnance Survey (1897) illustrates Ballycotton Harbour with a pier, breakwater, lifeboat station and slip, another boathouse and slip. The slipway has since been refurbished with new layers of concrete poured on top, but the slip from the 19th century remains as the base. This late 19th century pap largely corresponds to the harbour as it remains today (Figure 7).


*Figure 7 2nd edition Ordnance Survey map (1897) showing structures of Ballycotton Harbour.*



Refurbishments to the harbour structures were undertaken throughout the 20th Century. Records indicate that the pier was repaired between 1903 and 1910. Many proposals for extensions, maintenance, and public toilets were submitted in the 1950s, 1960s, and 1970s but stagnated while awaiting surveys and further investigation. Storm damage during 1990, cause severe splitting of the pier structure. A £3 million grant was awarded in 1993 to construct the concrete and steel extension.

In July 2004 an undersea mains electricity cable was laid by ESB from the pier to Ballycotton Island in order to power three generators for the Ballycotton Island lighthouse (Commissioners of Irish Lights). The most recent development in the harbour is the addition of a floating pontoon to the pier in 2012.

### 5.1.2 Ballycotton Pier

The pier was surveyed by *Mizen Archaeology* in 2018 as part of the Ballycotton Sewerage Scheme (O'Donoghue and Madden, 18D0097 and 18R0142). The following is an extract from the above report.

The pier has undergone several phases of refurbishment, but its overall footprint remains largely consistent with the structure shown on the 6-inch Ordnance Survey map of 1897. It extends from the

land in an NNE direction for *c.* 103m and then turns in an NNW direction. It measures *c.* 164m in overall length, 12.5m in width at the southern end and 13.5m at the northern end.

The northern half of the pier comprises reinforced concrete and steel piles, constructed following severe damage to the structure in the early 1990's.

The southern half of the pier retains its historic fabric. It is generally constructed of well selected coursed rubble sandstone that vary in size from 0.20m by 0.40m to 0.30m and 0.90m on the western elevation and from 0.3m by 0.4m to 0.2m by 0.6m on the eastern elevation. It is nicely finished or edged at the top by squared and dressed linear blocks. The masonry was originally bonded with mortar that is visible in places while more recent pointing is also visible.

A 1m wide band of stone paving is exposed along the western edge of the pier deck. These stones measure on average 0.7m by 1.10m in width. Elsewhere the original decking is concealed or replaced with a concrete deck.

A flight of seventeen steps provides access from the pier to the foreshore on the western elevation. The steps comprise sixteen sandstone blocks and a larger basal flagstone. The blocks measure on average 1m in width and c.0.23m in height.



The parapet wall is constructed of random rubble with the stones varying in size from 0.1m by 0.1m to 0.3 by 0.5m and bonded with a coarse lime mortar. It measures 1.3m in height and is capped with concrete.

Two temporary storage structures and two permanent structures (public toilets and a pump house) are located at the southern end of the pier. An emergency storm overflow outfall is located on the east elevation of the pier. The pier is equipped with electric lighting and a water tap. Two types of mooring bollards are in use on the pier; metal mushroom-top bollards (40 cm in height and 20cm in diameter) and squared conical concrete bollards (*c.* 1m in height).

The pier is not a recorded archaeological monument, though it is included in the National Inventory of Architectural Heritage (Reg. No. 20824038).

## 5.2 Shipwrecks

The Wreck Inventory of Ireland Database (WIID) records 157 wrecking events within Ballycotton Bay.

A list of wrecking events associated with Ballycotton Bay can be found in Appendix 1. Most of these wreck list the location of the wrecking event as "Ballycotton" in general, which could put them in the harbour, in the bay, or in the nearby area. However, two wrecking events are recorded within the

harbour itself. The first is a fishing boat No. 53 (W17622), wrecked in Ballycotton Harbour in May 1887. The second is the schooner *Spring* (W13706), which was wrecked at the entrance to Ballycotton.


## 5.3 Geophysics

The geophysics report produced by *Priority Geotechnical Ltd.* gives full detail of the geophysics results, which will be summarized here as they pertain to the underwater archaeological assessment. The side scan sonar results are shown in a mosaic drawing (Appendix 9.4). Nine targets were identified from the survey, names BAL01 to BAL09. The majority of the targets are taken as detritus, and mooring related blocks, lines and chains present within the harbour. Areas of gravel were identified on the inshore area of the harbour and around the harbour entrance.

Upon review of the resulting mosaic, no anomalies with potential archaeological significance were identified. However, due to the resolution of the received data, some potential archaeological material may have been overlooked.

The magnetometer results were heavily influenced by the sheet piling on the western pier structure, which caused a large decrease in the magnetic intensity (leeside). Due to this constraint, it is possible that potential archaeological material was not detected in the survey.

# 6. Impacts

There is archaeological evidence of human activity in the vicinity of Ballycotton Bay from the prehistoric period through to modern times. The town of Ballycotton itself is referenced in

documentary sources from as early as the 14th century AD, with particular reference to fishing activity at that time. Maritime activity continued to be central to Ballycotton, although it would not receive a harbour structure until the 19th century. The Wreck Inventory shows numerous wrecking events in Ballycotton, including two specifically within the harbour. As a result of this intense history of occupation and maritime activity, there is a high potential for archaeological material to be preserved within the seabed material within the dredging area.

The proposed dredging within the harbour will bring it down to bedrock level or to -3.5m Chart Datum within the area outlined in the scope of works. This will have a significant impact on the seabed and, as such, has a high potential to negatively impact on archaeological material buried in the seabed.

# 7. Mitigation

It is recommended that dredging works are archaeologically monitored by a suitably qualified underwater archaeologist under licence from the National Monuments Service.



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National Monuments Service online database www.archaeology.ie

Ordnance Survey of Ireland online historic mapping www.osi.ie

RNLI-Ballycotton Station www.rnli.org

# 9. Appendices

## 9.1 Shipwreck inventory

| ID | VESSEL NAME | VESSEL TYPE | DATE OF LOSS | LOCATION | SOURCE |
|---|---|---|---|---|---|
| W05141 | Richard de Larrinaga (SS) | Steamship | 1919 | Ballycotton Island, 15 miles SE | UKHO Wreck Data, www.uboat.net |
| W05382 | Aylevarroo (SS) | Steamship | 07/10/2917 | Ballycotton Island | BMS 1914-18,155; BVLS 1914-18,69; Larn & Larn 2002 LR 1917-18 No 1802(A); LCWLR 1914-18,306; SIC Vol. 1,219; Hocking 1989, 65; Lloydís List, No. 32,265, Thur. 22nd Nov. 1917, 5 c.1." |
| W05420 | Gracia (SS) | Steamship | 11/03/1917 | Ballycotton, Co Cork, offshore | ANCL 1914-18,109; Larn & Larn 2002 LCWLR.1914-18,102: LR 1915-16 No. 704(G). |
| W05449 | Mai | Barque | 07/01/1874 | Ballycotton Bay, Co Cork, Capel Island | Larn & Larn 2002 Lloyd's List No 18,632: 08.01.1874(Thu)(R),4 Col 17. |
| W05508 | Sunbeam | Dandy | 19/08/1884 | Ballycotton, Co Cork, 3 miles E | Lloyd's List No. 14,665, Wednesday 20th August 1884; Larn & Larn 2002 e BOT Wk Rtn 1884 Appx C Table 1,99(375); PP 1887, LXXIV, 99 |
| W05730 | Inniscarra (SS) | Steamship | 12/05/1918 | Ballycoton, Co Cork, lightship, 13 miles SE from | |
| W07863 | Abbett | Schooner | 12/03/1841 | Ballycotton, Co Cork, off | PP 1843, Vol. IX, Appendix 3 ‘A Return of all Vessels’, 18; Lloyd's List 8, 431, Wednesday 17th March 1841. |
| W07889 | Alexandra/Alexander | Unknown | 10/11/1861 | Ballycotton, Co Cork, 25 miels off | Lloyd's List, No. 14, 853, Tuesday 12th November 1861; Lloyd's List, No. 14, 855, Thursday 14th November 1861; Register of Examinations on oath concerning wrecks & casualties on the coasts of the U.K....by the Receiver of Wreck for the district of Baltimore, 1854 - í69, HMSO, London, 1869, 40. |
| W07924 | Anne | Unknown | 28/04/1849 | Ballycotton, Co Cork | Bourke 1994, 95 |

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|---|---|---|---|---|---|
| W07926 | Anne | Brig | 24/12/1870 | Ballycotton, CO cork, 7 miles S | PP 1871, Vol. LXI, ëWrecks, casualties & collisionsí, 41, 53 |
| W07941 | Argo | Smack | 21/07/1886 | Ballycotton, Co Cork | Troy, Fr. B., Vol. II, 38 |
| W08017 | Britannia | UNKNOWN | 22/12/1825 | Ballycotton, Co Cork | Bourke 1998, 105. |
| W08086 | City of Bristol (SS) | Steamship | 1829-1840 | Ballycotton, Co Cork | Troy, Vol. I, 20 |
| W08095 | Clementson | Brig | 27/11/1838 | Ballycotton, Co Cork, E of | Bourke 1994, 100; Lloydís List, No. 7719, Sat. Dec. 1, 1838; Troy, Vol. I, 20; Freeman's Journal, Dublin, Saturday, December 1, 1838, Vol. LXXIII, 4, c4 |
| W08112 | Cooleen | Barque | 08/01/1894 | Ballycotton, near lighthouse, 1 mile along cliffs | Bourke 1994, 100; PP 1895, LXXXVII, 137; Larn & Larn 2002; LCR.189, 13(h); LR 1891-2 No.1345(C) & (O), 16; SIC(1), 100; LR 1894 No. 1261(C); Lloydís Report of Total Loss, Casualty etc. 15.01.1894; Troy, Vol. II, 40-41; Lloydís List, No. 17, 584 Tue. 9th Jan. 1894, 10, c.21; Lloydís List, No. 17, 585 Wed. 10th Jan. 1894; Lloydís List, No. 17, 594 Sat. 20th Jan. 1894, 10; Lloydís List, No. 17, 601 Mon. 29th Jan. 1894, 3 |
| W08134 | Dart (SS) | Steamship | 14/06/1917 | Ballycotton lightship, 6 miles SSW | BMS 1914-18, 114; Bourke 1994, 218; BVLS 1914-18, 55; Larn & Larn 2002; LCWLR 1914-18, 145; LR 1916-17 No 191(D); PP 1919, Vol. LXII, 55; PRO Kew ADM 137/2962; SIC Vol. 1p218 |
| W08166 | Dring | Yawl | 17/10/1883 | Ballycotton, Co Cork | Bourke 1994, 100; Troy, Vol. I, Vol. II. |
| W08171 | Dukat (SS) | Merchant vessel | 20/02/1917 | Ballycotton, Co Cork | ANCL 1914-18, 80; Bourke 1994, 221; Larn & Larn 2002; LCWLR 1914-18, 96; LR 1916-17 No 19(supp); SIC Vol. 1, 221 |
| W08175 | Dunsyre (SS) | Collier | 01/04/1900 | Ballycotton, Co Cork, lightship, 4 miles WSW | Cork Examiner, 3.4.1900; BOT Wk Rtn 1900 Appx C Table 1, 113(623); Larn & Larn 2002; NLR; PP 1901, Vol. LXVIII, 113. Lloyd's List 19, 520, Monday, 2nd April 1900; Lloyd's List 19, 522, Wednesday, 4th April 1900; Lloyd's List 19, 529, Thursday, 12th April 1900; Lloyd's List 19, 540, Thursday, 26th April 1900; Lloyd's List 19, 565, Friday, 25th May 1900; Lloyd's List 19, 573, Monday, 4th June 1900 |
| W08207 | Elizabeth | Unknown | 20/12/1825 | Ballycotton, Co Cork | Lloyd's List No. 6076, Tuesday, 27th Dec. 1825; Troy, Vol. I, 13 |

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|---|---|---|---|---|---|
| W08225 | Enterprise | Brigantine | 05/01/1867 | Ballycotton, Co Cork, near | BOT Wk Rtn 1867 Pt II Table 21, 31 (463); Bourke 1994, 101; Larn & Larn 2002; NLR; PP 1867-8 LXIII, 31, 44 |
| W08245 | Falcon | Schooner | 13/12/1848 | Ballycotton, Co Cork | Bourke 1994, 100; PP 1852-3, Vol. XCVIII, 2; Troy, Vol. I, 31; Lloyd's List 10, 842, Saturday 16th December 1848 |
| W08269 | Florida (SS) | Steamship | 22/03/1887 | Ballycotton, off | Lloyd's List No. 16, 550, Tuesday, 30th April 1867; Bourke 1994, 101; BOT Wk Rtn 1867 Pt II Table 21, 34(466); NLR; SIC Vol. 1, 101; Larn & Larn 2002; PP 1867-8 LXIII, 34, 45 |
| W08281 | Foyle | Unknown | 06/01/1821 | Ballycotton, Co Cork | Lloyd's List no. 5560, 16 January 1821 |
| W08358 | Hebe | Unknown | 26/12/1848 | Ballycotton, Co Cork | Troy, Vol. I, 32-33; Lloyd's List 10, 853, Saturday 30th December 1848 |
| W08405 | Idolette | Brig | 19/11/1872 | Ballycotton, Co Cork | Troy, Vol. I, 28 |
| W08420 | Iodes | Unknown | 05/05/1917 | Ballycotton, Co Cork | Bourke 1994, 99 |
| W08450 | John | | 24/09/1874 | Ballycotton, Co Cork | Bourke 1994, 100; Troy, Vol. I, Vol. II |
| W08471 | Joseph Mitchell | UNKNOWN | Pre 8/3/1950 | Ballycotton, Co Cork, lightship, 246 degrees, 2.1 miles from | |
| W08489 | Katie | Ketch | 08/07/1896 | Ballycotton, Co Cork, 30 miles S of | BOT. Wk. Rtn. 1896 Appx.C Tab. 1, 107(545); Larn & Larn 2002; NLR; PP 1898, LXXXIII, 107 |
| W08516 | Lahaina | Brig | 30/12/1869 | Ballycotton, Co Cork | Bourke 1994, 100; Troy, Vol. I, 24-25; PP 1870 LX, 35, 50; Lloydís List, No. 17, 383; Saturday 1st January 1870, 3; Lloydís List, No. 17, 384; Monday 2nd January 1870, 3; Lloydís List, No. 17, 385; Tuesday, 4th January 1870, 4; Lloydís List, No. 17, 398; Wednesday 19th January 1870, 6 |
| W08536 | Little Pet | UNKNOWN | Between 26/02/1846 and 02/03/1846 | Ballycotton, Co Cork | PP 1846, Vol. XLV, Collisions of Shipping, 22 |
| W08539 | Lodes (SS) | Steamship | 05/05/1917 | Ballycotton, Co Cork, 4 miles SE of | Bourke 1994, 218; PP 1919, Vol. LXII, 49; Hocking, 1989, 430; BVLS 1914-18, 49 |

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|---|---|---|---|---|---|
| W08568 | Magnificent | UNKNOWN | 18/03/1836 | Ballycotton, Co Cork | ourke 1994, 100; Lloydís List, No. 7144, Tue. Mar. 22, 1836; Troy, Vol. I, 16-19 |
| W08765 | Porto Nova | Schooner | 18/12/1853 | Ballycotton, Co Cork | Bourke 1994, 100; PP 1854, Vol. XLII, ìAdmiralty Register of Wrecksî, 76-7; Troy, Vol. I, 34; Lloydís List, No. 12400, Wed. 21st Dec. 1853, 3 c.9 |
| W08818 | Rosina | Schooner | 27/11/1810 | Ballycotton, Co Cork | Bourke 1994, 100; Larn & Larn 2002; Lloydís List, No. 4514; 27th Nov. 1810; Troy, Vol. I, Vol. II |
| W08941 | Tadorna (SS) | | 15/11/1911 | Ballycotton, Co Cork | Bourke 1994, 96; Hocking, 1969, 678; PP 1912-13, LXXVI, 96; Lloydís List, No. 23, 130, Wed. 15 Nov. 1911, 11 c.24; Lloydís List, No. 23, 130, Wed. 15 Nov. 1911, 11 c.25; Lloydís List, No. 23, 131, Thur. 16th Nov. 1911, 11 c.23; Lloydís List, No. 23, 133, Fri. 17th Nov. 1911, 8 c.23; Lloydís List, No. 23, 133, Sat. 18th Nov. 1911, 11 c.23; Lloydís List, No. 23, 134, Mon. 20th Nov. 1911, 9 c.23; Lloydís List, No. 23, 135, Tue. 21st Nov. 1911, 11 c.23; Lloydís List, No. 23, 136, .Wed. 22nd Nov. 1911, 11; Lloydís List, No. 23, 137, Thur. 23rd Nov. 1911, 11 c.25-6; Lloydís List, No. 23, 138, Fri. 24th Nov. 1911, 8 c.23; Lloydís List, No. 23, 140, Mon. 27th Nov. 1911, 9 c.23; Lloydís List, No. 23, 140, Tue. 28th Nov. 1911, 11 c.23; Lloydís List, No. 23, 142, Wed. 29th Nov. 1911, 9 c.25; Lloydís List, No. 23, 143, Thur. 30th Nov. 1911, 11 c.24; Lloydís List, No. 23, 144, Fri. 1st Dec. 1911, 8 c.25; Lloydís List, No. 23, 145, Sat. 2nd Dec. 1911, 11 c.22; Lloydís List, No. 23, 146, Mon. 4th Dec. 1911, 9 c.23; Lloydís List, No. 23, 147, Tue. 5th Dec. 1911; Lloydís List, No. 23, 148, Wed. 6th Dec. 1911, 9 c.24; Lloydís List, No. 23, 149, Thur. 7th Dec. 1911, 11 c.23; Lloydís List, No. 23, 150, Fri. 8th Dec. 1911, 9 c.24; Lloydís List, No. 23, 152, Mon. 11th Dec. 1911, 9 c.23; Lloydís List, No. 22, 155, Thur. 14th Dec. 1911, 11, c.24; Lloydís List, No. 23, 157, Sat. 16th Dec. 1911, 12; Lloydís List, No. 23, 160, Wed. 20th Dec. 1911, 11 c.23; Lloydís List, No. 23, 175, Mon. 8th Jan. 1912, 9, c.22; Lloydís List, No. 23, 200, Tue. 6th Feb. 1912, 11, c.24 |
| W08970 | Trader | UNKNOWN | 28/10/1892 | Ballycotton, Co Cork | PP 1894, Vol. LXXVI, Floating Derelicts, 86; Lloydís List, No. 17, 213 Sat. 29th Oct. 1892, 7, c.17; Lloydís List, No. 17, 219 Sat. 5th Nov. |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 1892, 7, c.20; Lloydís List, No. 17, 241 Thur. 1st Dec. 1892, 10, c.19; Lloydís List, No. 17, 241 Thur. 1st Dec. 1892, 11." Trafalgar (SS),W08971,Steel Steamship,"Fastnet, 54 miles SW by W of / 54 miles SW by S",23/08/1915,50.83333,-10.63333,UKHO,We regret that we are unable to supply descriptive details for this record at present.,"PP 1919, Vol. XLII, 10 (636); LR. 1915-16 No 1015(T); PRO. Kew ADM. 137/2959; BMS.1914 - 18, 106; Larn & Larn 2002; BVLS 1914-18, 12. |
| W08995 | UNKNOWN | Schooner | 25/11/1835 | Ballycotton, Co Cork | Bourke 1994, 100; Bourke 1998, 110; Troy, Vol. I, 15 |
| W08999 | UNKNOWN | UNKNOWN | UNKNOWN | Ballycotton, Co Cork | PP 1852-3, Vol. XCVIII, 5 |
| W09008 | UNKNOWN | Yawl | 17/10/1883 | Ballycotton, Co Cork | Troy, Vol. II, 37 |
| W09011 | UNKNOWN | UNKNOWN | 23/11/1868 | Ballycotton, Co Cork | Tory, Vol II, 22 |
| W09129 | UNKNOWN | UNKNOWN | 1905 | Ballycotton, Co Cork | Board of Trade Harbour Dept., Obstructions to Navigation, National Archives Ireland, Box 4/654, H15126; Report on the Sea and Inland Fisheries of Ireland for 1905, xxiii. |
| W09203 | UNKNOWN | Collier | 26/12/1763 | Ballycotton, Co Cork | Freeman's Journal 1763, Record of vessels lost through shipwreck, Dec. 27th - 31st, 139. |
| W09211 | Upupa (SS) | Steamship | 16/01/1903 | Ballycotton, Co Cork | Lloyd's List 20, 389, Monday, 19th January 1903; Lloyd's List 20, 390, Tuesday, 20th January 1903; Lloyd's List 20, 396, Tuesday, 27th January 1903; Lloyd's List 20, 402, Tuesday, 3rd February 1903; Lloyd's List 20, 409, Wednesday, 11th February 1903; Lloyd's List 20, 426, Tuesday, 3rd March 1903; Lloyd's List 20, 444, Tuesday, 24th March 1903; Lloyd's List 20, 459, Saturday, 11th April 1903; Bourke 1994, 95. |
| W09215 | Valiant | Brig | 14/12/1848 | Ballycotton, Co Cork | Bourke 1994, 100; Troy, Vol. I, 31-32. |
| W09226 | Vernon | UNKNOWN | 26/12/1763 | Ballycotton, Co Cork | Freeman's Journal, Column called ‘Ireland’, 130. |
| W09230 | Victoria | | | | |
| W11916 | UNKNOWN | UNKNOWN | Novemner 1850 | Ballycotton, Co Cork | PP 1852-3 XCVIII (385), 5. |

| | | | | | |
|---|---|---|---|---|---|
| W12893 | Mary | UNKNOWN | 03/01/1795 | Ballycotton, Co Cork | Freeman's Journal Sat. Jan. 3rd 1795 No. 75 Vol. XXXIV. |
| W13675 | Joseph | UNKNOWN | 08/01/1828 | Ballycotton, Co Cork | Lloyd's List No. 6290, Tue. Jan. 15, 1828 |
| W13706 | Spring | Schooner | 21/03/1828 | Ballycotton, entrance to | Lloyd's List No. 6310, Tue. Mar. 25, 1828; Lloyd's List No. 6314, Tue. Apr. 8, 1828. |
| W13975 | UNKNOWN | Steamship | 25/03/1941 | Ballycotton, near | Lloyd's List 39, 429, Tuesday 25th March 1941. |
| W14011 | UNKNOWN | Brig | 08/06/1840 | Ballycotton | Lloyd's List 8, 193, Thursday 11th June 1840. |
| W14187 | UNKNOWN | Schooner | 01/12/1835 | Ballycotton, off | Lloyd's List, No. 7113, Fri. Dec. 4, 1835. |
| W14270 | UNKNOWN | UNKNOWN | 12/10/1845 | Ballycotton | Lloyd's List No. 9858, Fri. Oct. 17, 1845. |
| W14382 | Jane | UNKNOWN | 23/11/1846 | Ballycotton | Lloyd's List 10, 201, Tuesday, 24th November 1846. |
| W14857 | UNKNOWN | UNKNOWN | 18/12/1848 | Ballycotton, off | Lloyd's List 10, 845, Wednesday 20th December 1848. |
| W14865 | Lancashire | Barque | 28/02/1894 | Ballycotton, off | Lloyd's List, No. 17, 628 Thur. 1st Mar. 1894, 7, c.17. |
| W15656 | Jane | Schooner | 10/12/1856 | Ballycotton | Lloyd's List, No. 13324, Fri. 12th Dec. 1856 P.4, c.13 |
| W15737 | Douro | UNKNOWN | 27/11/1859 | Ballycotton Strand | Lloyd's List, No. 14, 246, Thur. 1st Dec. 1859, 4 c.15. |
| W15852 | Catherine | Schooner | 08/02/1858 | Ballycotton, rocks off | Lloyd's List, No. 13685, Thur. 11th Feb. 1858, 3 c.10; Lloyd's List, No. 13687, Sat. 13th Feb. 1858, 3 c.9; Lloyd's List, No. 13686, Fri. 12th Feb. 1858, 4 c.14; Lloyd's List, No. 13688, Mon. 15th Feb. 1858, 4 c.15; Lloyd's List, No. 13692, Fri. 19th Feb. 1858, 3 c.12. |
| W15954 | UNKNOWN | UNKNOWN | 03/12/1850 | Ballycotton, near | Lloyd's List, No. 11453, Thurs. Dec. 5, 1850. |
| W15983 | UNKNOWN | UNKNOWN | 20/12/1853 | Ballycotton, off | Lloyd's List, No. 12401, Thur. 22nd Dec. 1853, 3 c.9. |
| W16032 | UNKNOWN | East Indiaman | 06/02/1856 | Ballycotton, on the shore | Lloyd's List, No. 13063, Sat. 9th Feb. 1856 P.3, c.9. |
| W16757 | Naomi & Jane | Sloop | 20/02/1874 | Ballycotton | Lloyd's List, No. 18, 677, Monday 2nd March 1874, 8; Lloyd's List, No. 18, 679, Wednesday 4th March 1874, 9. |
| W17091 | UNKNOWN | UNKNOWN | 09/02/1872 | Ballycotton, near | Lloyd's List, No. 18, 040, Tuesday 13th February 1872, 5. |

| | | | | | |
|---|---|---|---|---|---|
| W17092 | UNKNOWN | UNKNOWN | 09/02/1872 | Ballycotton, near | Lloyd's List, No. 18, 040, Tuesday 13th February 1872, 5. |
| W17117 | UNKNOWN | UNKNOWN | 17/02/1874 | Ballycotton | Lloyd's List, No. 18, 669, Friday 20th February 1874, 8. |
| W17284 | UNKNOWN | Barge | 03/10/1908 | Ballycotton, off | Lloyd's List 22, 166, Wednesday 9th October 1908. |
| W17622 | No. 53 | Fishing boat | 23/05/1887 | Ballycotton Harbour | Lloyd's List No. 15, 521, Monday 23rd May 1887. |
| W18027 | UNKNOWN | Brig | 29/01/1865 | Ballycotton | Lloyd's List No. 15, 854, Wednesday 1st February 1865. |
| W18187 | Alma | Schooner | 10/01/1867 | Ballycotton | Lloyd's List No. 16, 460, Monday, 14th January 1867. |
| W18218 | Belem | Barque | 19/03/1867 | Ballycotton, off | Lloyd's List No. 16, 516, Wednesday, 20th March 1867; LL No. 16, 517, Thursday, 21st March 1867. |

*Table 1 Recorded wrecks in the vicinity of Ballycotton.*

## 9.2 Record of piers and harbours

**Ballycotton, Co. Cork**

**SiteName** *Ballycotton, Co. Cork*

"A substantial stone pier, extending into six feet water at low-water springs, and affoarding, in a very exposed place, excellent wharfage, sheltered from all wwinds except those bloeing over the land, which, however, in this direction is bluff, and affoards considerable protection." (p. 48)

CSP 1852-53, Vol. XLI, Reports from Commissioners, Twentieth Report from the Board of Public Works, Ireland, Piers and Harbours, p. 47-51

"The harbour as it exists is little better than a trap, for when gales set in from the south-east if the boats were not removed at once they would inevitably be destroyed."

Report of the Inspectors of Irish Fisheries on the Sea and Inland Fisheries of Ireland for 1880, p.

Report of the Inspectors of Irish Fisheries on the Sea and Inland Fisheries of Ireland for 1880. 1881. The Queen's Printing Office, Dublin.

Work at Ballycotton was expected to be finished by 1st. June 1887. The estimated cost was £20,500.

Report of the Inspectors of Irish Fisheries on the Sea and Inland Fisheries of Ireland for 1884. 1885. (1884, p. 10) The Queen's Printing Office, Dublin.



"The building of the pier which, I believe, will be begun this year, will be of great benefit, as at present there is no protection whatever from easterly winds."

Report of the Inspectors of Irish Fisheries on the Sea and Inland Fisheries of Ireland for 1884. 1885 (1884, p. 12). The Queen's Printing Office, Dublin.

Work at Ballycotton was expected to be finished by 1st. June 1887. The estimated cost was £20,500. The contract was for £18,795.

Report of the Inspectors of Irish Fisheries on the Sea and Inland Fisheries of Ireland for 1885. 1886 (1885, p. 10). The Queen's Printing Office, Dublin.

Report of the Inspectors of Irish Fisheries on the Sea and Inland Fisheries of Ireland for 1886. 1887 (1886, p. 11). The Queen's Printing Office, Dublin.

Report of the Inspectors of Irish Fisheries on the Sea and Inland Fisheries of Ireland for 1887. 1888 (1887, p. 16). The Queen's Printing Office, Dublin.

Work was completed in December 1887.

Report of the Inspectors of Irish Fisheries on the Sea and Inland Fisheries of Ireland for 1887. 1888 (1887, p. 16). The Queen's Printing Office, Dublin.

**Site Name** Ballycotton

The Pipe Roll of Cloyne makes refernce to Ballycotton in the year c.1364. 10 men are listed as holding cottages and it is stated that all are fishermen. In season they fish for ling, cod and haddock.

MacCotter & Nicholls 1996 p.18

**'**About two leagues west of Ring-point, is the island of Ballycotton, appearing pretty high; within it, is a tolerable road for ships in westerly winds, at four, five, or six fathom.

Smith 1815 p.289

Smith, C. 1815 *The Ancient and Present State of the County and City of Cork,* Vol. II, a new edition Cork

"The pier at Ballycottin is making good progress and will no doubt when finished be of great assistance to the fishermen of that place, by enabling them to employ larger boats, &c."

Report of the Inspectors of Irish Fisheries on the Sea and Inland Fisheries of Ireland for 1885. 1886 (1885, p. 15). The Queen's Printing Office, Dublin.

"Ballycotton Bay is remarkable for its clean ground: it is from two to nine fathoms deep; and if a small pier or harbour were formed in it, to provide a shelter against S.E. gales, the fishermen would be able to pursue their industry in winter; at present their boats must be hauled up during the winter months. It is probable that a local contribution could be obtained."

First Report of the Commissioners of Inquiry into The State of the Irish Fisheries; with The Minutes of Evidence, and Appendix, p. 227. MDCCCXXXVI. His Majesty's Stationery Office, Dublin**.**



**Site Name** Ballycotton Pier

1884-1888 - 'Improvements to pier and harbour.'

OPW Archives Piers and Harbours, OPW 6387/88

1885-1896 - 'Question as whether there is subsidence in the sea walls since repairs were carried out some years previously.'

OPW Archives Piers and Harbours, OPW 10395/96

1903-1910 - 'Proposed improvements to pier.'

OPW Archives Piers and Harbours, OPW 7897/10

## 9.3 Previous archaeological excavations and investigations

The Database of Irish Excavation Reports lists the following investigations for Ballycotton;

- 07D33, 07R150 underwater assessment for Ballycotton/Shanagarry/Garryvoe Sewage Scheme. In June 2007 an underwater assessment was carried out at two outfall sites in Ballycotton. The assessment discovered no archaeological features in the outfall areas.
- 10R109, 10D38 geophysical survey in Ballycotton. Sub-bottom profiler survey, multi-beam echo sounder survey, and a marine magnetometer survey were carried out between June and September 2010 to determine the best path for a pipeline project. The two most significant finds of the project were the discovery of the remains of the World War I German U-boat U58. The survey concluded that while the deeper waters of Ballycotton Bay could increase preservation of materials, the amount of trawling in the area decreased the survival of archaeological material.
- 2014: *ADCO* Desktop Survey of Ballycotton Bay. A desktop assessment noted seventeen known wrecks that would be within 1500 meters of the cable proposed cable line.
- 2018: *Mizen Archaeology* AIA for sewerage scheme comprising of a desktop assessment and a wade survey. No archaeology was uncovered.

Unit 12, Owenacurra Business Park, Midleton, Co. Cork

**T** +353 21 4631600 **F** +353 21 463 8690 **E** geotechnical@priority.ie



# Ballycotton Harbour, Co. Cork

# Geophysical Survey Report

# Report Number: P20126_Gp_Rp_D01

# Project: P20126

# REPORT CONTROL SHEET

| | | | | | | |
|---|---|---|---|---|---|---|
| **Client** | Cork County Council | | | | | |
| **Engineer Representative** | Byrne Looby | | | | | |
| **Project Name** | Ballycotton Harbour, Co. Cork | | | | | |
| **Document Type** | Technical Report | | | | | |
| **Project Number** | P20126 | | | | | |
| **This Report Comprises of** | TOC | Text | No. of Volume | No. of Appendices | Drawings | Electronic data |
| | 1 | 68 | 1 | 2 | 2 | *.dwg, *.pdf |



| Revision | Status | Author(s) | Approved by | Issue Date |
|---|---|---|---|---|
| D01 | Draft | HP (PGeo, EurGeol) | GH | 19/11/2020 |

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## Acronyms

bgl – below ground level

PGL – Priority Geotechnical Ltd.

ITM – Irish Transverse Mercator

OD Malin – metres above Ordnance Datum Malin (OSGM15)

## A) Executive Summary

Priority Geotechnical Ltd. was instructed by Byrne Looby Consulting Engineers on behalf of Cork County Council to undertake a geophysical investigation at Ballycotton Harbour, Co. Cork. This geophysical survey is in conjunction with an overall site investigation project.

The survey consisted of marine side scan sonar and magnetometer surveying. The survey locations are shown in Figure B-1 below.

The survey was carried out on 5th and 10th November 2020. The survey was conducted over periods of high water.

The side scan sonar mosaic and contoured magnetic intensity are shown in APPENDIX A: DRAWINGS Drawing No. P20126_GP_D01 to D02. These drawings are plotted at paper size ISO A3 and can be supplied in AutoCAD format.

A number of targets have been identified by the magnetometer and side scan sonar surveys. From the side scan sonar dataset, a large amount of mooring line, mooring chain and mooring blocks are present within the survey area. A selection of targets has been selected from the side scan data and are presented in APPENDIX B: SIDE SCAN SONAR TARGETS. Gravel is seen to be present on the inshore areas of the harbour.



The magnetometer dataset was greatly affected by the sheet pilling present in the quay walls. A small target has been identified on the entrance of the harbour.

# B) Introduction

## B.1) Scope of Works

Priority Geotechnical Ltd. was instructed by Byrne Looby Consulting Engineers on behalf of Cork County Council to undertake a geophysical investigation at Ballycotton Harbour, Co. Cork. This geophysical survey is in conjunction with an overall site investigation project.

The survey consisted of marine side scan sonar and magnetometer surveying.

The survey was carried out on 5th and 10th November 2020. The survey was conducted over periods of high water across the survey area as indicated in Figure B-1.

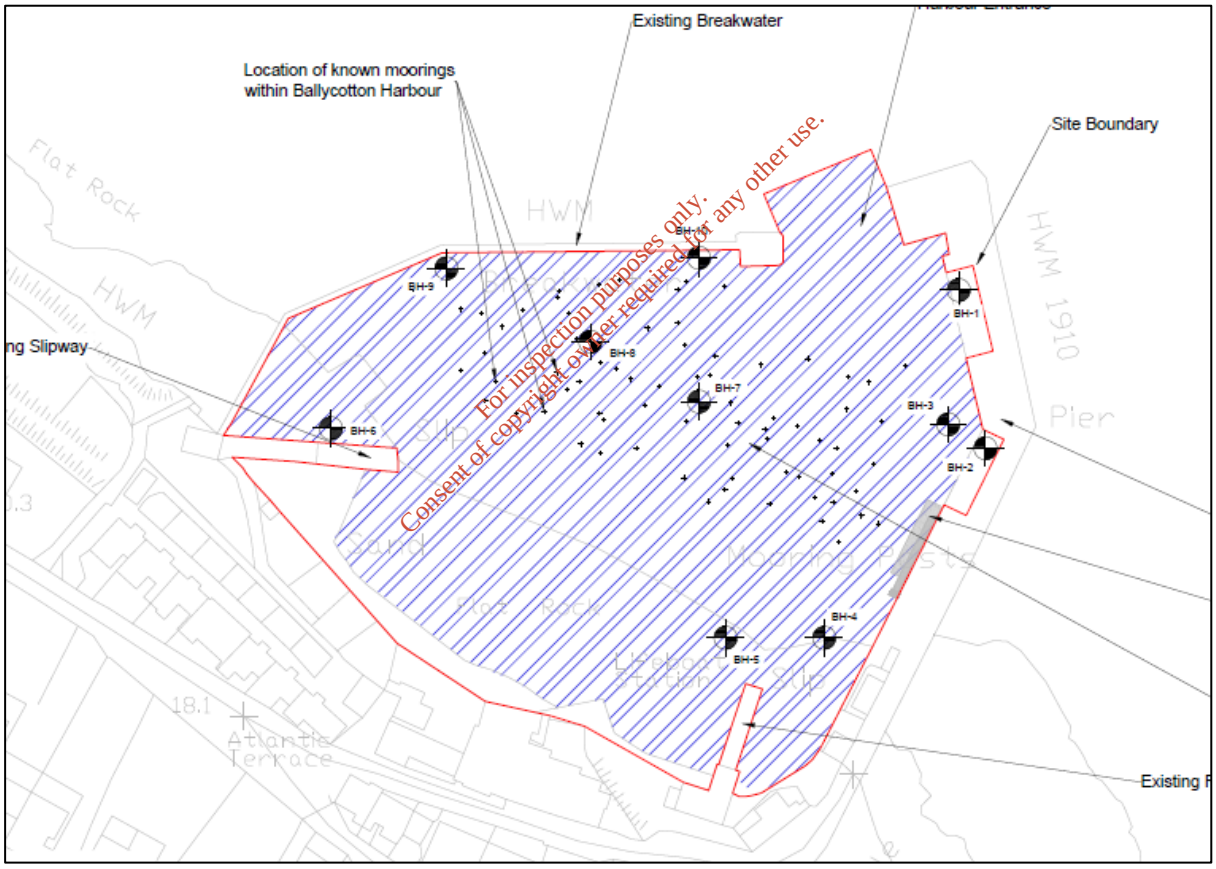



**Figure B-1: Geophysical Survey Area**

## B.2) Survey Objectives

The purpose of the investigation was to record high quality side scan sonar and magnetometer data across the survey area.

## B.3) Coordinate System and Datum

All coordinates are given in Irish Transverse Mercator (ITM). All elevations are given in metres Ordnance Datum Malin (OD Malin) corrected using geoid model OSGM15.

## B.4) Intrusive Works

This report considers all relevant site investigation results. Relevant site investigation results have been overlaid on the interpretive drawings.

## C) SURVEY METHODOLOGY.

### C.1) Planned Survey Lines

The survey area was as outlined in Figure B-1 above. A large number of moorings and vessels were present within the survey area. Lines were run where accessible and where the vessel could safely tow the required equipment.

### C.2) Positioning Control

A Hemisphere VS330 was used to collect all positional information throughout the survey. The Hemisphere VS330 was corrected using Trimble VRS now RTK correction stream. Published accuracies of the Trimble VRS network are 0.01 – 0.02m horizontal and 0.01 – 0.03m vertical.

In the VRS correction method a server generates a virtual station close to the user and network corrections are interpolated at this virtual station which in turn transmits corrections across a very short single baseline to the roving receiver.

Hypack™ software was used for navigation purposes during all data acquisition where the planned survey lines were preloaded and online transformation from WGS84 Lat / Lon to Irish Transverse Mercator was undertaken.



#### 1.1 Side Scan Sonar Survey

The side scan sonar survey was undertaken to provide high resolution imagery of the survey area.

Sidescan sonar imaging was obtained using a Edgetech 4125, dual frequency 400/900kHz, sonar. The higher 900kHz channel was used throughout this survey to provide the highest image resolution.

The towfish was run off the starboard rear side of the survey vessel. The GNSS signal was interfaced in Max View and Hypack™ survey software where all layback values were applied.

Survey lines were run in a manner to acquire a 100% data overlap and achieve maximum data resolution.

Processing was undertaken utilizing Edgetech processing software and mosaics produced in AutoCAD charts using Hypack™ survey software.

### C.3) Magnetometer Survey

For the magnetometer survey a Geometrics G882 magnetometer was used. This magnetometer is a cesium vapour magnetometer. The system was equipped with an altimeter to provide water depth below fish, zero for atmospheric pressure pre deployment.

This is a towed magnetometer, with the towfish towed from the starboard rear side of the survey vessel. The speed of the boat was maintained below 3.0-3.5kts during the survey to reduce any effects of wake on the towfish.

The magnetometer was interfaced with navigation software MagLog during acquisition. All offsets were entered within the acquisition software. The towfish position was calculated through MagLog using the position and heading of the boat.

Data was recorded as individual profiles along the predesignated profiles in the MagLog standard format. Navigation was provided in real-time to the skipper.

Processing was also undertaken in the MagMap software. Where necessary a despiking filter was applied. Each individual profile was inspected for integrity.



The towfish positions were checked against the raw GNSS positions to ensure the integrity of the locations.

### C.4) List of equipment used

- Navigation: Hemisphere VS330 receiver with RTK corrections (Trimble VRS Now)
- Magnetometer: G882
- Side Scan Sonar: Edgetech 4125

## D) Results and Geophysical Interpretation

The side scan sonar mosaic and contoured magnetic intensity are shown in APPENDIX A: DRAWINGS Drawing No. P20126_GP_D01 to D02. These drawings are plotted at paper size ISO A3 and can be supplied in AutoCAD format.

### D.1) Side Scan Sonar Results

The side scan sonar results have been presented as a georeferenced tiff mosaic image. Individual side scan sonar files can be provided to the client if required. The mosaic is presented in APPENDIX A: DRAWINGS Drawing No. P20126_Gp_D01. Artifacts of water column (horizontal black lines) and variation in gain resulting in a contrast in shading are present in the mosaic.

A list of targets has been picked directly from inspection of each file. These targets are named BAL01 to BAL09 and are detailed in the accompanying drawing and listed with pictures in APPENDIX B: SIDE SCAN SONAR TARGETS.

The majority of the targets are taken as detritus, and mooring related blocks, lines and chains present within the harbour. Areas of gravel have been identified on the inshore area of the harbour and around the harbour entrance.



### D.2) Magnetometer Survey Results

Magnetometer survey results have been presented as a contour map with a 1 dipole target identified from the survey, see Table D-1. The magnetometer survey results were influenced heavily by the sheet piling on in the western pier structure causing a large decrease in the magnetic intensity (leeside).

Magnetometer field strength varied from 33656nT and 49033nT (mean 47175nT, median 48238nT, 95%tile 48726nT) with areas above and below this present in dipolar anomalies.

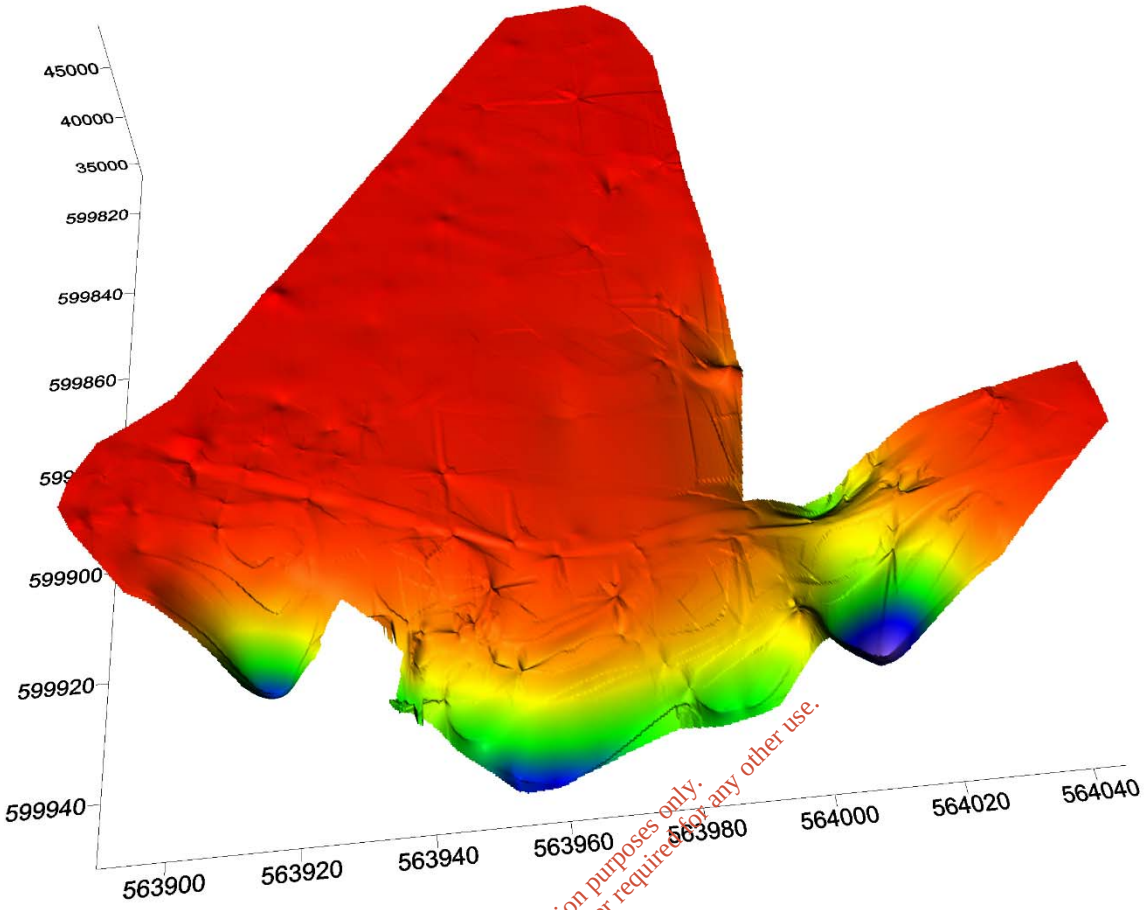



**Figure D-1: 3D contours of magnetometer data north up**



| Target | Easting | Northing | Target Strength |
|---|---|---|---|
| A1 | 599913 | 564015 | Weak |

**Table D-1: Targets identified by magnetometer survey**

## APPENDIX A: DRAWINGS

| Drawing Number | Description | Scale |
|---|---|---|
| P20126_Gp_D01 | Side Scan Sonar Survey Results | 1:800 @ A3 |
| P20126_Gp_D02 | Magnetometer Survey Results | 1:800 @ A3 |

FIGURE 1: SIDE SCAN SONAR MOSAIC AND INTERPRETATION INCLUDING ALL TARGETS
SCALE: 1:800


| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Ballycotton Harbour, Co. Cork Geophysical Investigation | CLIENT: Cork County Council | JOB NUMBER: P20126 | DRAWN BY: HP | APPROVED: GH | LEGEND: |
| | CONSULTING ENGINEERS: Byrne Looby | DRAWING NUMBER: P20126_Gp_D01 | COORDINATE SYSTEM: ITM | | A1 MAGNETOMETER SURVEY TARGET |
| SHEET TITLE: Side scan sonar mosaic including interpretation and all targets | SURVEYED BY: pgl priority geotechnical | REVISION: D01 - Draft for comment | VERTICAL DATUM: Malin (OSGM15) | | BAL01 SIDE SCAN SONAR SURVEY TARGET |
| | | | SCALE: 1:800@A3 | ISSUE DATE: 19/11/2020 | MAGNETOMETER CONTOUR MAP COLOUR SCALE (NANO TESLA) 49000 48000 47000 46000 45000 44000 43000 42000 41000 40000 39000 38000 37000 36000 35000 34000 33000 |

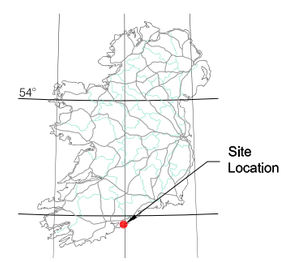
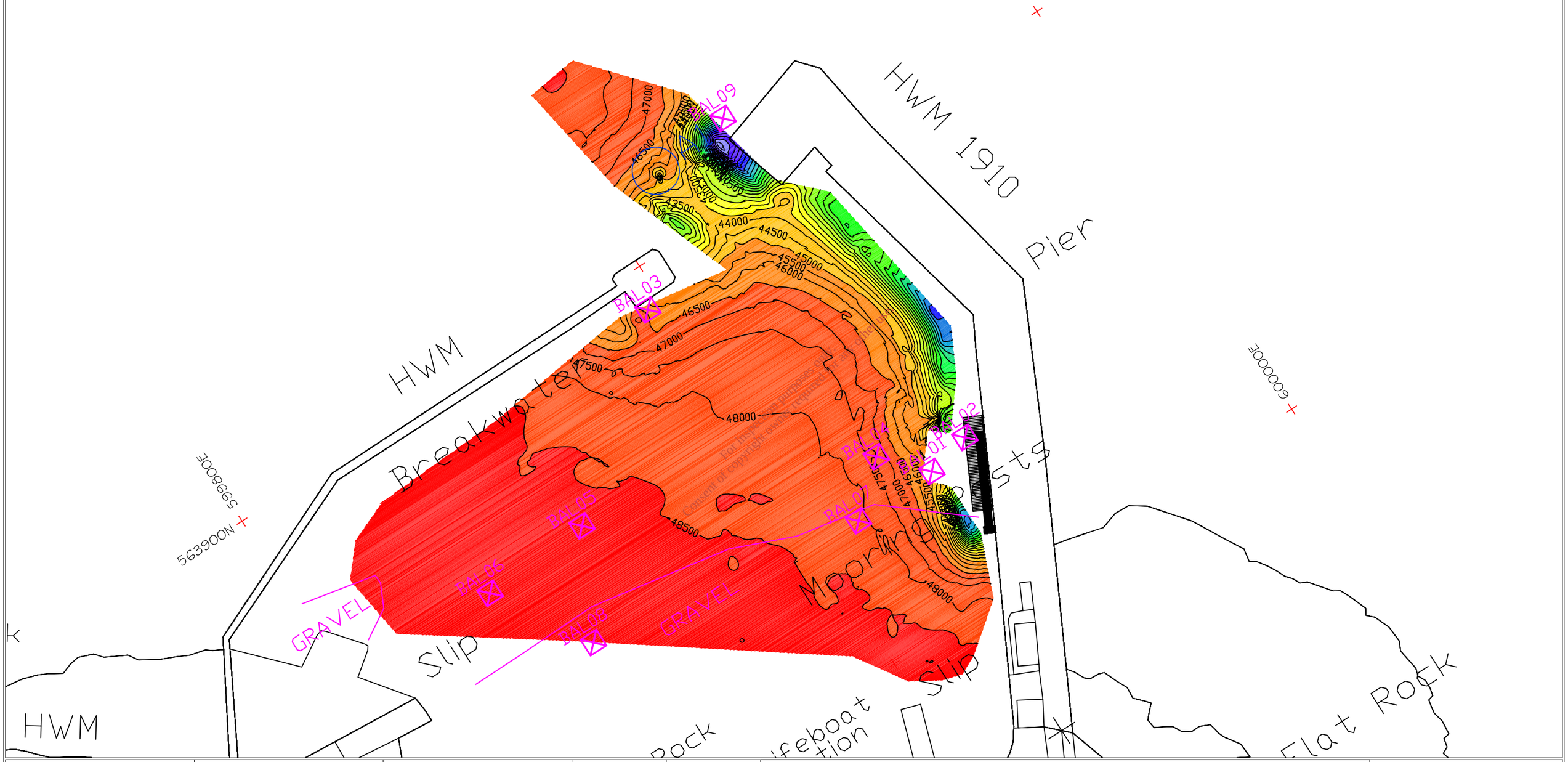
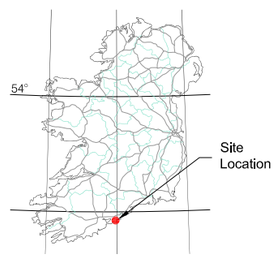


FIGURE 1: MAGNETOMETER SURVEY RESULTS INCLUDING ALL TARGETS
SCALE: 1:800




| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Ballycotton Harbour, Co. Cork Geophysical Investigation | CLIENT: Cork County Council | JOB NUMBER: P20126 | DRAWN BY: HP | APPROVED: GH | LEGEND: |
| | CONSULTING ENGINEERS: Byrne Looby | DRAWING NUMBER: P20126_Gp_D02 | COORDINATE SYSTEM: ITM | | A1 MAGNETOMETER SURVEY TARGET<br>BAL01 SIDE SCAN SONAR SURVEY TARGET<br>MAGNETOMETER CONTOUR MAP COLOUR SCALE (NANO TESLA): 49000 48000 47000 46000 45000 44000 43000 42000 41000 40000 39000 38000 37000 36000 35000 34000 33000 |
| SHEET TITLE: Magnetometer survey results including all targets | | | VERTICAL DATUM: Malin (OSGM15) | | |
| | SURVEYED BY: pgl priority geotechnical | REVISION: D01 - Draft for comment | SCALE: 1:800@A3 | ISSUE DATE: 19/11/2020 | |



## APPENDIX B: SIDE SCAN SONAR TARGETS

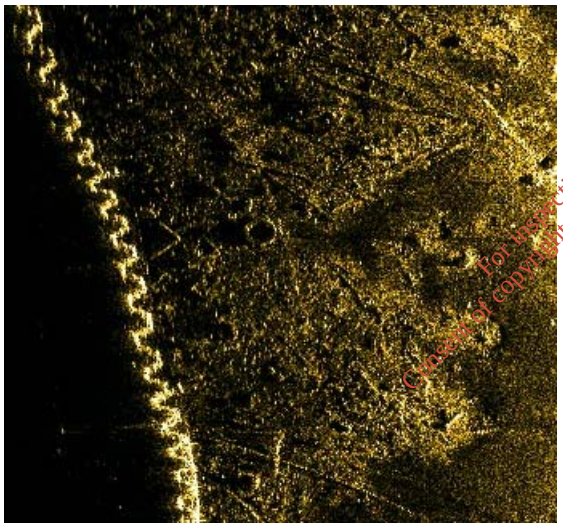
| Name | Date | **11/05/2020** |
|---|---|---|
| **BAL01** | Time | **08:45:50** |
| Survey File | Event | **0** |
| **20201105084124_ss1** | X | **599928.7** |
| Capture File | Y | **563930.0** |
| **BAL01.JPG** | WGS84 Latitude | **51 49 39.393 N** |
| | WGS84 Longitude | **008 00 3.7238 W** |
| | Heading | **224.0** |
| | Fish Altitude | **2.70** |
| | Range to Target | **8.1** |
| | Height Above Bottom | **0.0** |
| | Length | **1.3** |
| | Width | **0.9** |

| Notes | **Length: 1.3 Width: 0.9 hole in seabed** |
|---|---|



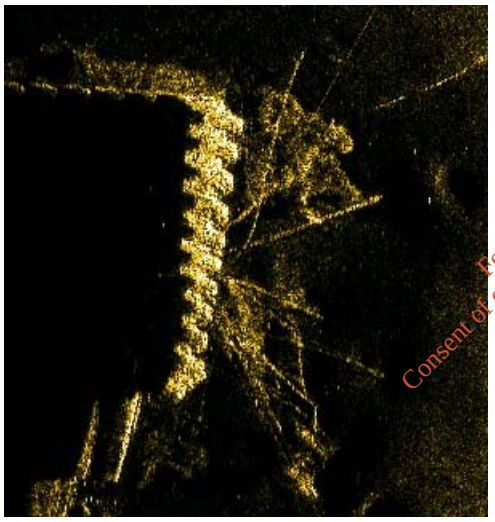
| Name | Date | **11/05/2020** |
|---|---|---|
| **BAL02** | Time | **08:45:43** |
| Survey File | Event | **0** |
| **20201105084124_ss1** | X | **599938.5** |
| Capture File | Y | **563932.3** |
| **BAL02.JPG** | WGS84 Latitude | **51 49 39.4675 N** |
| | WGS84 Longitude | **008 00 3.212 W** |
| | Heading | **223.2** |
| | Fish Altitude | **2.90** |
| | Range to Target | **13.6** |
| | Height Above Bottom | **0.0** |
| | Length | **1.1** |
| | Width | **0.6** |

| Notes | **Length: 1.1 Width: 0.6 rubble at base if sheet piling** |
|---|---|



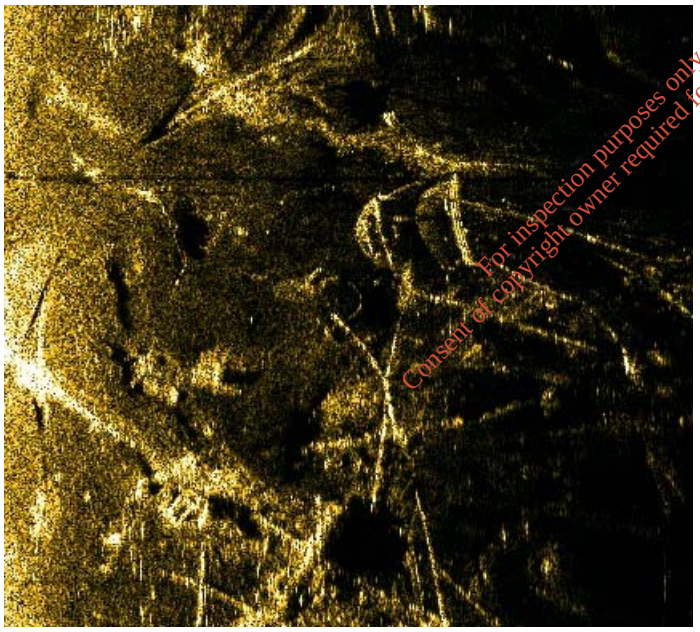
| Name | Date | **11/05/2020** |
|---|---|---|
| **BAL03** | Time | **08:44:51** |
| Survey File | Event | **0** |
| **20201105084124_ss1** | X | **599896.5** |
| Capture File | Y | **563991.3** |
| **BAL03.JPG** | WGS84 Latitude | **51 49 41.3767 N** |
| | WGS84 Longitude | **008 00 5.4056 W** |
| | Heading | **78.4** |
| | Fish Altitude | **4.10** |
| | Range to Target | **15.7** |
| | Height Above Bottom | **0.0** |
| | Length | **0.0** |
| | Width | **0.0** |

| Notes | **mooring lines / chains connecting to pier** |
|---|---|



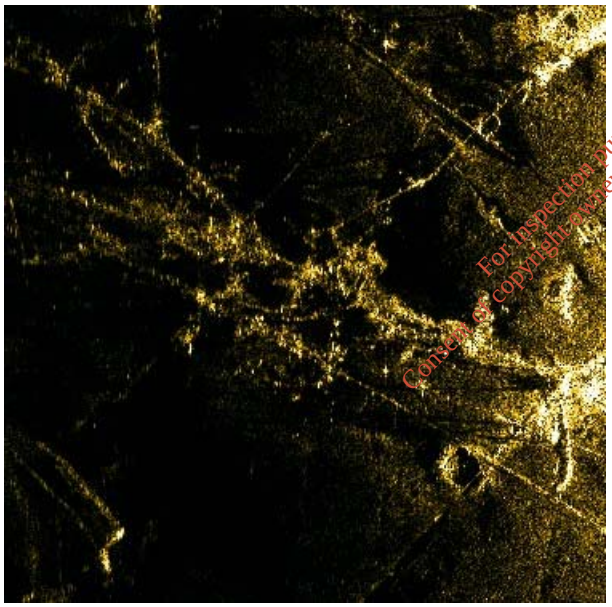
| | | |
|---|---|---|
| Name | Date | **11/05/2020** |
| **BAL04** | Time | **08:49:22** |
| Survey File | Event | **0** |
| **20201105084612_ss1** | X | **599920.5** |
| Capture File | Y | **563939.0** |
| **BAL04.JPG** | WGS84 Latitude | **51 49 39.6843 N** |
| | WGS84 Longitude | **008 00 4.1521 W** |
| | Heading | **40.4** |
| | Fish Altitude | **2.50** |
| | Range to Target | **15.2** |
| | Height Above Bottom | **0.0** |
| | Length | **0.0** |
| | Width | **0.0** |

| | |
|---|---|
| Notes | **cluster of mooring chain / lines / blocks** |



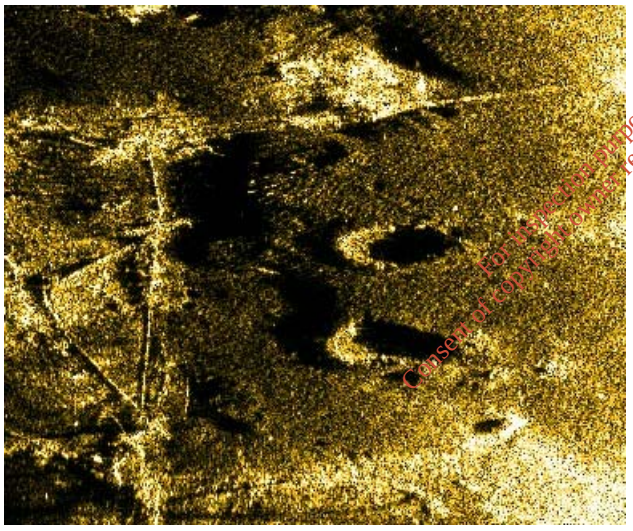
| Name | Date | **11/05/2020** |
|---|---|---|
| **BAL05** | Time | **08:48:31** |
| Survey File | Event | **0** |
| **20201105084612_ss1** | X | **599860.1** |
| Capture File | Y | **563960.3** |
| **BAL05.JPG** | WGS84 Latitude | **51 49 40.3735 N** |
| | WGS84 Longitude | **008 00 7.3067 W** |
| | Heading | **104.2** |
| | Fish Altitude | **2.00** |
| | Range to Target | **15.4** |
| | Height Above Bottom | **0.0** |
| | Length | **0.0** |
| | Width | **0.0** |

| Notes | **cluster of mooring chain / line / blocks** |
|---|---|



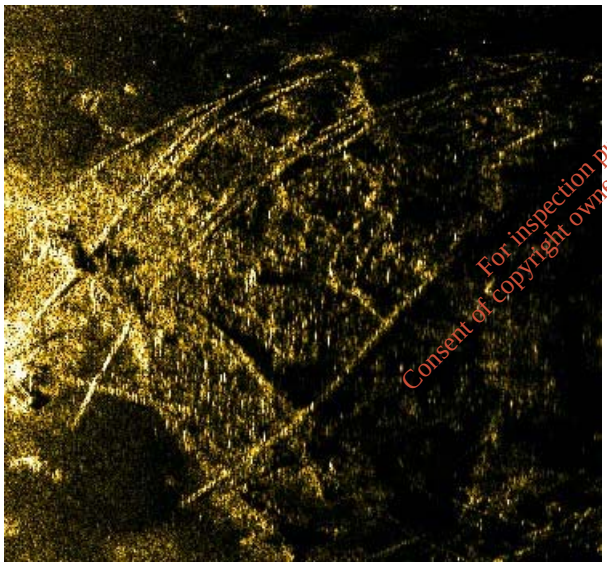
| Name | Date | **11/05/2020** |
|---|---|---|
| **BAL06** | Time | **08:48:13** |
| Survey File | Event | **0** |
| **20201105084612_ss1** | X | **599836.0** |
| Capture File | Y | **563958.8** |
| **BAL06.JPG** | WGS84 Latitude | **51 49 40.325 N** |
| | WGS84 Longitude | **008 00 8.5654 W** |
| | Heading | **106.5** |
| | Fish Altitude | **1.80** |
| | Range to Target | **6.2** |
| | Height Above Bottom | **0.0** |
| | Length | **1.6** |
| | Width | **0.9** |

| Notes | **Length: 1.6 Width: 0.9 two large holes in seabed** |
|---|---|



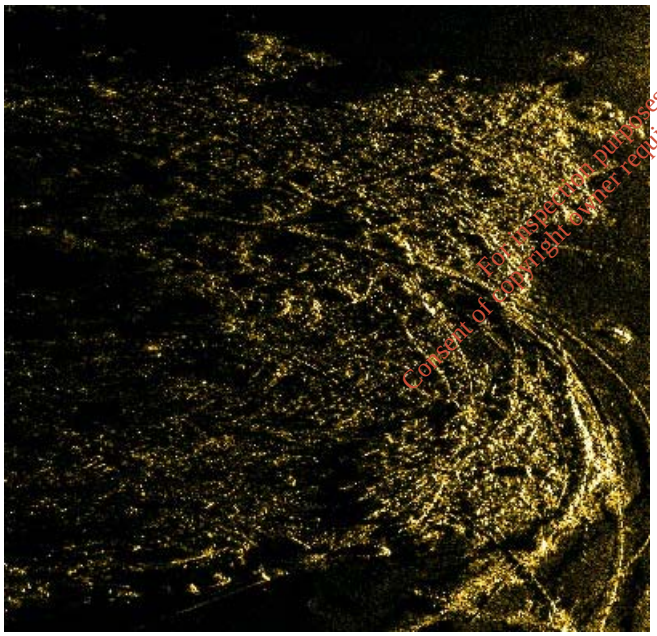
| Name | Date | **11/05/2020** |
|---|---|---|
| **BAL07** | Time | **08:55:24** |
| Survey File | Event | **0** |
| **20201105084805_ss1** | X | **599910.0** |
| Capture File | Y | **563929.6** |
| **BAL07.JPG** | WGS84 Latitude | **51 49 39.3801 N** |
| | WGS84 Longitude | **008 00 4.7005 W** |
| | Heading | **119.3** |
| | Fish Altitude | **2.30** |
| | Range to Target | **13.8** |
| | Height Above Bottom | **0.0** |
| | Length | **0.0** |
| | Width | **0.0** |

| Notes | **general detritus including mooring line / chain** |
|---|---|



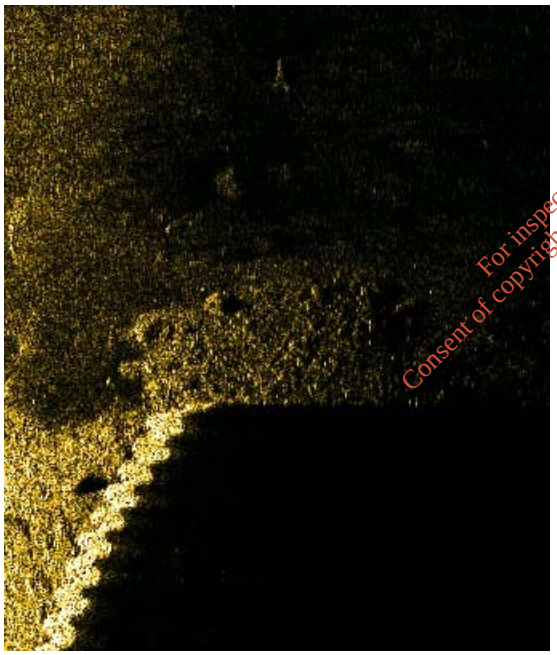
| Name | Date | **11/05/2020** |
|---|---|---|
| **BAL08** | Time | **08:53:55** |
| Survey File | Event | **0** |
| **20201105084805_ss1** | X | **599848.8** |
| Capture File | Y | **563938.2** |
| **BAL08.JPG** | WGS84 Latitude | **51 49 39.6583 N** |
| | WGS84 Longitude | **008 00 7.8968 W** |
| | Heading | **268.7** |
| | Fish Altitude | **2.00** |
| | Range to Target | **10.7** |
| | Height Above Bottom | **0.0** |
| | Length | **0.0** |
| | Width | **0.0** |

| Notes | **area of gravel with mooring chain / line** |
|---|---|



| Name | Date | **11/05/2020** |
|---|---|---|
| **BAL09** | Time | **08:58:48** |
| Survey File | Event | **0** |
| **20201105085012_ss1** | X | **599931.8** |
| Capture File | Y | **564016.8** |
| **BAL09.JPG** | WGS84 Latitude | **51 49 42.202 N** |
| | WGS84 Longitude | **008 00 3.562 W** |
| | Heading | **315.6** |
| | Fish Altitude | **5.80** |
| | Range to Target | **16.5** |
| | Height Above Bottom | **0.0** |
| | Length | **0.0** |
| | Width | **0.0** |

| Notes | **gravel around pier head** |
|---|---|



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Milsom, (1989). Field Geophysics. John Wiley and Sons.

Telford W.S., Geldart L.P, Sheriff R.E. (1990) Applied Geophysics Second Edition (Cambridge University Press) 769pp

# Appendix 4

# Hartley Anderson Limited

Marine Environmental Science and Consultancy

# Screening for Appropriate Assessment

## Ballycotton Harbour Dredging Foreshore Licence Application

Report to
Department of Housing, Local Government and Heritage



January 2022

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# SECTION 1 - INTRODUCTION

## 1.1 Background

Arup with Hartley Anderson Limited have been commissioned by the Department of Housing, Local Government and Heritage (DHLGH) to conduct a Screening for Appropriate Assessment (AA) (stage 1 screening for the likelihood of significant effects on Natura 2000 sites), from an application by Cork County Council (CCC) for a Foreshore Licence to cover the proposed dredging of Ballycotton Harbour to restore it to navigable depths, and the dumping at sea of uncontaminated dredged material at the previously used dumping site to the south of Power Head, 16km southwest of Ballycotton. Any contaminated dredged material will be disposed of at a licensed landfill facility.

## 1.2 Application documents submitted

A number of application documents submitted by CCC have informed this AA Screening, including:

- Application form [Applicant: Cork County Council: 30 April 2021]
- Admiralty Chart [Byrne Looby Partners, dated 23/03/2021]
- Foreshore License Map 1 [Byrne Looby Partners, dated 22/03/2021]
- Foreshore License Map 2 [Byrne Looby Partners, dated 22/03/2021]
- Cross Section [Byrne Looby Partners, dated 22/03/2021]
- Existing Bathymetry [Byrne Looby Partners, dated 22/03/2021]
- Overall Site Layout Plan [Byrne Looby Partners, dated 22/03/2021]
- Proposed Dredging Arrangement [Byrne Looby Partners, dated 22/03/2021]
- Natura Impact Statement [MERC Consultants, dated 13/05/2021 and an updated version of 21/01/2022]
- Marine Mammal Risk Assessment [IWDG Consulting, undated]
- Bird Survey Report [EirEco, dated 25/07/2019]
- Foreshore Application Report [Byrne Looby Partners, dated 22/03/2021]
- Prescribed Body Consultation
    - Prescribed Bodies Observations
    - Applicant's response to Prescribed Bodies Observations.



An application (S0032-01[1]) for a Dumping at Sea Licence (required under the Dumping at Sea Act 1996 as amended) for the proposed works is currently with the EPA for consideration.

## 1.3 Relevant consultation responses

The licence application was open for public consultation between 26th July 2021 to 24th August 2021.

Consultation responses from the prescribed bodies are provided in Table 1.1. Note that most of the responses are not directed at the Habitats Directive aspects of the proposal.

[1] https://epawebapp.epa.ie/terminalfour/DaS/DaS-view.jsp?regno=S0032-01

Table 1.1: Responses from prescribed bodies to the consultation

| Statutory Body | Applicant's Response |
|---|---|
| **Marine Advisor of the Department of Housing local Government and Heritage**<br><br>The Marine Advisor noted the findings of his/her inspection of the site took place on 19/10/2021 and that Irish Water have application FS007022 under consideration for a licence to construct a temporary work area which overlaps partially with the proposed dredge area. The Marine Advisor considered that basic sequencing and communications should ensure the works do not conflict. The existing moorings in the harbour are to be lifted and replaced by the mooring holders after the dredging is complete. Leisure users and fishers will have to accept the disruption caused by the dredging by either removing the vessel for the period of dredging or tying up to the pier when weather allows and seeking shelter in Cork Harbour when poor weather is forecast. However, accommodation will have to be made for the lifeboat, as in certain poor weather it cannot remain alongside the pier and it cannot be relocated to Cork Harbour and remain on service. A mooring within the harbour will have to be provided at all times throughout the works to the RNLI's specification and requirements to ensure the lifeboat's lifesaving service is maintained at all times.<br><br>The Marine Advisor noted there are no known or established claims of private ownership of the foreshore at Ballycotton Harbour or off Power Head. Therefore, the foreshore the subject of the application is currently presumed state owned and proposed development does not conflict with the existing overlapping licences, nor does it significantly injure the public use of, access to and enjoyment of the foreshore. Total area of foreshore the subject of the application: Dredge area: 1.13 ha, Dump site: 377.8ha.<br><br>The proposed works are to ensure the safe operation of the harbour and safe navigation and mooring of vessels within the harbour. Harbours such as Ballycotton are the gateway to the sea and are fundamental infrastructure that supports public access, marine leisure, tourism, sea fishing, communications and the associated local community and economy. | The Applicant had no objection to the conditions proposed by the Marine Advisor. |

| Statutory Body | Applicant's Response |
|---|---|
| Considering this, the Marine Advisor was satisfied that the proposed dredging and disposal at sea are in the public interest.<br><br>The Marine Advisor noted that there are no conflicts with existing leases or licences and the works as proposed are in the public interest. The works, if completed as proposed and in accordance with conditions as set out below, will not have significant adverse impacts on the public use of, access to and enjoyment of the foreshore, navigation, fisheries or the environment (subject to MLVC confirmation).<br><br>**Recommendation**<br>The Marine Advisor had no objection to the granting of Foreshore Licence under Section 3 of the Foreshore Act for this application subject to the following conditions.<br><br>1. The licensee shall use that part of the foreshore, the subject matter of this licence for the purposes as outlined in the application and for no other purposes whatsoever.<br><br>2. The following drawings shall be attached to and referenced in the licence document.<br>Foreshore Licence Map 1, Drawing Number: CM1123-BLP-ZZ-DR-C-00004, Date: 22/03/21, Rev: 03, 06/2021,<br>Foreshore Licence Map 2, Drawing Number: CM1123-BLP-ZZ-DR-C-00005, Date: 22/03/21, Rev: 03, 06/2021,<br><br>3. A valid Dumping At Sea Permit shall be in place and a copy of the permit shall be submitted to the Marine Planning and Foreshore Section of the Department of Housing, Local Government and Heritage prior to the works proceeding.<br><br>4. Irish Water have application ref. FS007022 under consideration for a licence to construct a temporary work area which overlaps partially with the proposed dredge area. If approved the licensee shall coordinate with Irish Water in terms of sequencing to ensure both set of works do not conflict. | |

| Statutory Body | Applicant's Response |
|---|---|
| 5. A fore and aft mooring within the Harbour shall be available at all times throughout the duration of the dredging for the RNLI Trent Class Lifeboat. This shall require coordination and agreement of the RNLI to relocate their mooring as the dredging works proceed or as otherwise agreed with the RNLI.<br>6. The licensee shall notify the Marine Planning and Foreshore Section of the Department of Housing, Local Government and Heritage at least 14 days in advance of the commencement of any works on the foreshore. This notification shall include an up to date Programme of Works for the completion of the project. | |
| **Marine Institute**<br><br>Chemical analysis of sediments to be loaded was carried out and presented with the application. The results of sediment analysis indicated approximately 1,500 tonnes* are contaminated and it is proposed that these sediments will be separately removed to land and disposed in a suitably licenced facility. The remaining material, (which is considered clean and suitable for disposal at sea) will be dredged and loaded for disposal at a site South of Power Head, 16km southwest of Ballycotton.<br><br>It should be noted that the assessment guidelines for Dumping at Sea are not used for bringing the sediment on land. The sediment to be brought up on land will need to be assessed using the Waste Assessment Criteria. It is the understanding of the Marine Institute that the EPA issues waste licences for this activity.<br><br>The Marine Institute noted that the risk to conservation features associated with the proposed activity was communicated in the NIS report. The Marine Institute considered that the interactions identified are appropriate and assuming the mitigation measures proposed are implemented in full, the likely interactions are not considered significant to conservation features. The Marine Institute agrees with the conclusions communicated in the NIS.<br><br>**Interaction with Fisheries and Aquaculture operations:**<br>The Marine Institute noted that the closest licenced aquaculture sites to the proposed development are in Cork Harbour (approx. 16km line of sight) or | The Applicant had no objection to the conditions proposed by the Marine Institute. |

| Statutory Body | Applicant's Response |
|---|---|
| Ballymacoda Bay (approx. 11 km line of sight). The closest shellfish growing water is Ballymacoda Bay at approx. 11km.<br><br>On the basis of the information provided in the application and supporting documents the Marine Institute concluded that the proposed development is unlikely to impact on any licenced aquaculture activities or shellfish growing waters.<br><br>Interactions with fisheries interests are likely in the harbour. The Marine Institute recommended full engagement with users of the pier and suggests it is carried out on an ongoing basis until the works are completed.<br><br>On this basis, and considering the information above, the Marine Institute concluded that impacts on aquaculture and sea fishing from the proposed activity are not considered likely.<br><br>*Arup notes that the quantity to be separately removed to land and disposed in a suitably licenced facility is 1500m$^3$. | |
| **Inland Fisheries Ireland**<br><br>Inland Fisheries Ireland noted that the proposed works are not within known proximity of sensitive fisheries location or fish spawning grounds.<br><br>The nearest significant river, in terms of potential use by anadromous fish species to the proposed dredge site is the Munster Blackwater, approximately 18km (hydrologically) from Ballycotton harbour. This river is designated for *Salmo salar* (Salmon), *Petromyzon marinus* (Sea lamprey), *Lampetra fluviatilis* (River Lamprey) and *Alosa fallax* (Twaite Shad) as habitat for Annex II migratory fish species. The proposed works have the potential to affect these species as they migrate along the coast by way of suspended sediment, pollution via drift of contaminated sediment or by accidental oil/fuel spills during works.<br><br>Inland Fisheries Ireland pointed out that the mitigation measures and guidance of NPWS in regard to marine mammals are not transferrable to fish species. The fish remain invisible to any shore- or boat-based observer. | The Applicant had no objection to the conditions proposed by Inland Fisheries Ireland. |

| Statutory Body | Applicant's Response |
|---|---|
| Mitigation measures should aim to reduce the sound generated, in intensity and duration for the fish species present. The use of soft-start and ramp-up procedures for any sound-generating surveys undertaken – both on a day-to-day basis and on re-start after any stoppages within any day should be undertaken. This measure should be a condition of the foreshore licence. The estimated zone of influence (ZOI) extending from the dredging works is approximately 3km and is a relatively small distance that migratory species may avoid if suspended sediment levels are inhospitable during works.<br><br>Inland Fisheries Ireland noted that the Marine Institute was consulted in relation to environmental testing of proposed dredge material within the harbour and provided sediment site-specific sampling and disposal recommendations for the contaminated and non-contaminated sediment, which should limit any impact from contaminated dredged material to the environment.<br><br>The application has a detailed methods statement with mitigation measures outlined for various risks highlighted. To avoid the possibility of accidental spillage of oil/fuel associated with machinery or inshore shallow water vessels, a series of mitigation measures are to be implemented, as described in the Natura Impact Statement. These mitigation measures should be a condition of the Foreshore licence. Inland Fisheries Ireland concluded that, given the localised nature of the project, including the ZOI and notwithstanding the past history of the dumping site, southwest of Ballycotton, the proposed works are not considered deleterious to migratory fish species in the long term. The local IFI office in Macroom should be informed in advance of works starting. | |
| **Underwater Archaeology Unit of the Department of Housing, Local government and Heritage – Observation No 1**<br><br>The Underwater Archaeology Unit noted that archaeological monitoring is to be carried out during dredging works and for the works at the pier. The pier is a Protected Structure, registered on the Local Authority's List of Protected Structures (RPS Reg. No. 20824038). Similarly, Ballycotton has a substantial record of shipwrecking events, with the potential being high for | The Applicant respectfully requested that Underwater Archaeology Unit review the proposed condition:<br><br>"*As part of the Finds Retrieval Strategy in the methodology, if the material is being brought ashore, 25% of the dredged material removed is to be spread and metal detected to assess the artefacts-bearing potential. If large quantities of artefacts are present, then the percentage of material being assessed may be increased. Similarly, if, after an agreed period of time, there is minimal artefactual evidence, the archaeological assessment of the* |

| Statutory Body | Applicant's Response |
|---|---|
| the remains of wrecks or artefactual material associated with such events still extant in the near harbour area awaiting discovery.<br><br>The Underwater and Archaeology Unit proposed that monitoring shall take the following format to ensure the continued preservation (either in situ or by record) of our underwater cultural heritage and all associated features, objects and structures:<br><br>The services of a suitably qualified and suitably experienced underwater archaeologist (with experience in the archaeological monitoring of marine dredging operations) shall be engaged to carry out the archaeological monitoring of all works.<br><br>The archaeological monitoring shall be licensed by this Department and a detailed method statement is to accompany the licence.<br><br>The method statement shall set out the monitoring strategy for the dredging works.<br><br>A communication strategy is to form part of the monitoring strategy to ensure full communication is in place between the monitoring archaeologist and the plant operators at all times during works.<br><br>The archaeological personnel undertaking the monitoring will be in a position to monitor directly all elements of the dredging works, to ensure they have unobstructed views of the dredging plant head, and the plant and machinery operators shall be prepared to facilitate the archaeological personnel in the undertaking of their monitoring work.<br><br>No works at the pier should damage the existing protected structure and all provisions shall be made to ensure that the historic pier structure is protected from all potential impacts. This to include the pier itself and any pier furniture, features, etc. The archaeological monitoring strategy shall include the plan for the protection of the historic pier. | *dredged spoil may be scaled down. The methodology should seek to have a representative percentage assessed from all areas*."<br><br>The material which is proposed to be disposed of at Sea will be loaded directly into a barge and towed to the proposed disposal site, south of Power Head.<br><br>It is proposed to dispose the material which has been identified as contaminated in a suitably licensed landfill facility. There is insufficient space available on Ballycotton pier to spread the dredge material in order to assess the artefact bearing potential while also ensuring the pier remains operational for fishing vessels.<br><br>Sufficient archaeological personnel shall be in place to monitor all aspects of the proposed dredge works including the loading of contaminated dredge material directly into covered tipper trucks on the pier. |

| Statutory Body | Applicant's Response |
|---|---|
| As part of the Finds Retrieval Strategy in the methodology, if the material is being brought ashore, 25% of the dredged material removed is to be spread and metal detected to assess the artefacts-bearing potential. If large quantities of artefacts are present, then the percentage of material being assessed may be increased. Similarly, if, after an agreed period of time, there is minimal artefactual evidence, the archaeological assessment of the dredged spoil may be scaled down. The methodology should seek to have a representative percentage assessed from all areas.<br><br>Sufficient archaeological personnel will be in place to cover all aspects of the monitoring and assessment of the dredging and pier works.<br><br>Should potential archaeology be identified during the dredging or pier works, then the dredging is to be suspended in that location pending full resolution of the archaeology, which may include archaeological assessment, testing, avoidance/preservation in situ or full excavation.<br><br>In the event that potential archaeology is identified and dredging works have to be suspended, the Underwater Archaeology Unit shall be contacted immediately to ensure the least delays to works are incurred. | |
| **Underwater Archaeology Unit – Observation No 2**<br><br>The Underwater Archaeology Unit noted that the applicant's proposals re. disposal of dredged material, are acceptable to them and they await submission of the archaeological licence application. The services of a suitably qualified and suitably experienced underwater archaeologist (with experience in the archaeological monitoring of marine dredging operations) shall be engaged to carry out the archaeological monitoring of all works. The archaeological monitoring shall be licensed by their Department and a detailed method statement is to accompany the licence application. The method statement shall set out the monitoring strategy for the dredging works. | The Applicant had no objection to the conditions proposed by the Underwater Archaeology Unit. |
| **National Parks and Wildlife Service**<br><br>The National Parks and Wildlife Service noted that the proposed dredging application for Ballycotton Harbour had been evaluated by a Natura Impact | The Applicant had no objection to the conditions proposed by the National Parks and Wildlife Service. |

| Statutory Body | Applicant's Response |
|---|---|
| Statement (NIS) and other documents. The conclusion of the Natura Impact Statement document is that the proposed works are unlikely to pose a significant likely risk to nature conservation interests in the vicinity. It is noted that potential interaction with marine mammals can be ameliorated by the application of "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters".<br><br>National Parks and Wildlife Service concurred with this conclusion and requested that mitigation outlined in Section 7.1 of the NIS document is implemented in full. | |
| **Department of Agriculture, Food and Marine**<br><br>The department propose that the following should be included in any licence that issues:<br><br>The Marine Institute recommends full engagement with users of the pier and suggests it is carried out on an ongoing basis until the works are completed. | The Applicant had no objection to the conditions proposed by the Department of Agriculture, Food and the Marine. |
| **Sea Fisheries Protection Authority**<br><br>Sea Fisheries Protection Authority stated that the application is limited to the internal boundaries of the harbour foreshore and therefore will not interfere with any sub-tidal wild fisheries. Some temporary disturbance regarding an increase in turbidity immediately outside of the harbour is likely but it should be short in duration.<br><br>Fisheries control activities by the SFPA may be restricted due to the restriction of access at times during the construction of the proposed works, the expected timeframe is detailed within the foreshore application of 8 weeks of dredging activity within the harbour.<br><br>Sea Fisheries Protection Authority noted that there are no classified shellfish production areas in the area of the proposed works.<br><br>Sea Fisheries Protection Authority stated that seafood safety issues, caused by the proposed works, are not expected. The operators should be aware of the notification process should a pollution incident take place during the | The Applicant had no objection to the conditions proposed by the Sea Fisheries Protection Authority. |

| Statutory Body | Applicant's Response |
|---|---|
| three month works period. The SFPA office with responsibility for Ballycotton is Clonakilty and should be contacted directly on 023 88559300 or sfpaclonakilty@sfpa.ie | |
| **Marine Survey Office**<br><br>After a comprehensive review of this application the MSO had no comment with regard to the safety of navigation.<br><br>A local Marine Notice shall be published for the information of all local maritime users detailing the proposed dredging campaign and any associated hazards to navigation arising for the duration of the license period. | The Applicant had no objection to the conditions proposed by the Marine Survey Office. |

## 1.4 Legislative context

The *Foreshore Act 1933* (as amended), requires that a lease or licence must be obtained from the Minister for Housing, Local Government and Heritage for the carrying out of works or placing structures or material on, or for the occupation of or removal of material from, State-owned foreshore.

The 1992 EU Habitats Directive (Council Directive 92/43/EC) and Birds Directive (2009/147/EC) are transposed into Irish law by Part XAB of the *Planning and Development Act 2000* (as amended) and the *European Communities (Birds and Natural Habitats) Regulations 2011* (as amended). The latter outlines the requirements for screening for AA and AA under Regulation 42:

> *42. (1) A screening for Appropriate Assessment of a plan or project for which an application for consent is received, or which a public authority wishes to undertake or adopt, and which is not directly connected with or necessary to the management of the site as a European Site, shall be carried out by the public authority to assess, in view of best scientific knowledge and in view of the conservation objectives of the site, if that plan or project, individually or in combination with other plans or projects is likely to have a significant effect on the European site.*
>
> *(2) A public authority shall carry out a screening for Appropriate Assessment under paragraph (1) before consent for a plan or project is given, or a decision to undertake or adopt a plan or project is taken.*
>
> *(6) The public authority shall determine that an Appropriate Assessment of a plan or project is required where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site.*

# SECTION 2 - DESCRIPTION OF PROPOSED WORKS

## 2.1 Proposed works

The works which will comprise a single dredging programme, are summarised below.

- Dredge the area outlined in orange in Figure 2.1 to bedrock or -3.5m below Chart Datum whichever is shallowest.
- Dredge remainder of the harbour outlined in purple to bedrock or -2.5m below Chart Datum whichever is shallowest.
- Disposal of suitable dredged materials at the previously used dumping site to the south of Power Head, 16km southwest of Ballycotton (Figure 2.2).
- Dispose of contaminated dredged material outlined in cyan to a licensed landfill facility.

## 2.2 Sediment analyses

Cork County Council's agent consulted with the Marine Institute' environmental chemist regarding their plans to submit both Foreshore licence and Dumping at Sea Permit applications. The Marine Institute provided a site-specific sampling and analyses plan for the analysis of the material to be dredged. Sediment sampling was undertaken in two rounds, in October 2020 and January 2021. Five samples were taken in the first round and 10 in the second round. The sediment samples were analysed by Socotec, an accredited laboratory which is based in Burton-upon-Trent in the UK.



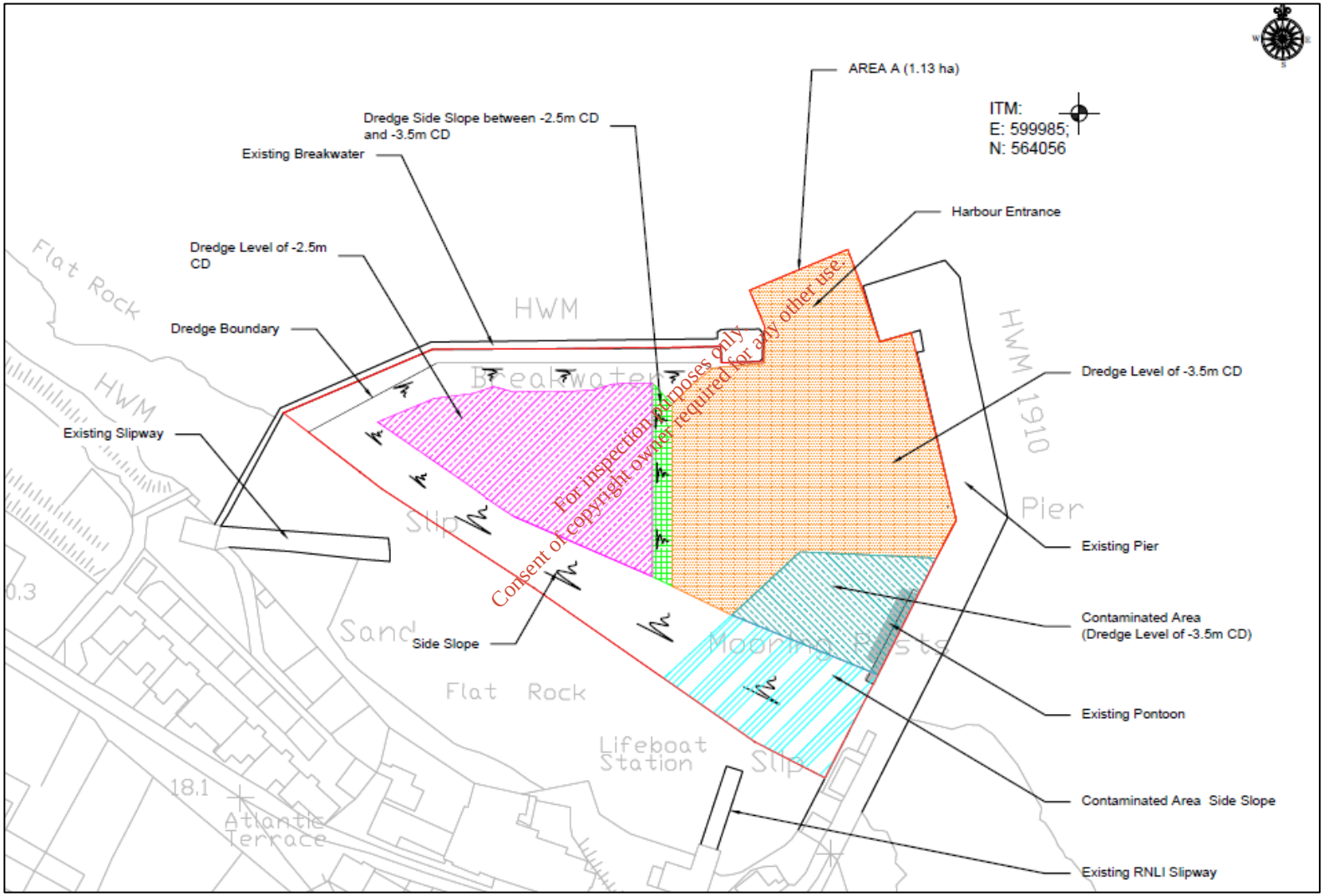
The five samples from the first round were analysed for a very wide range of parameters including 10 heavy metals, organochlorines, total extractable hydrocarbon, tributyl tin (TBT) and dibutyl tin (DBT), and 16 polycyclic hydrocarbons (PAH). Following consultation with the Marine Institute, the second round of sampling was undertaken, and the samples were analysed for copper, lead, TBT/DBT and PAH. The sampling and analyses plan and analyses results are provided in appendices to the Cork County Council Ballycotton Harbour Dredging Foreshore Application Report, Byrne Looby Partners, 2021.

The results of the analyses were compared with the Marine Institute guidelines (Cronin *et al*. 2006). The guidelines established threshold levels for upper and lower levels of sediment contamination and define three classes of material as follows:

| | |
|---|---|
| Class 1 | Contaminant concentrations less than level 1 and level 2;<br>Uncontaminated: no biological effects likely. |
| Class 2: | - Contaminant concentrations between Level 1 and Level 2.<br>- Marginally contaminated.<br>- Further sampling & analysis necessary to delineate problem area, if possible. |
| Class 3 | - Heavily contaminated<br>- Very likely to cause biological effects / toxicity to marine organisms.<br>- Alternative management options to be considered. |

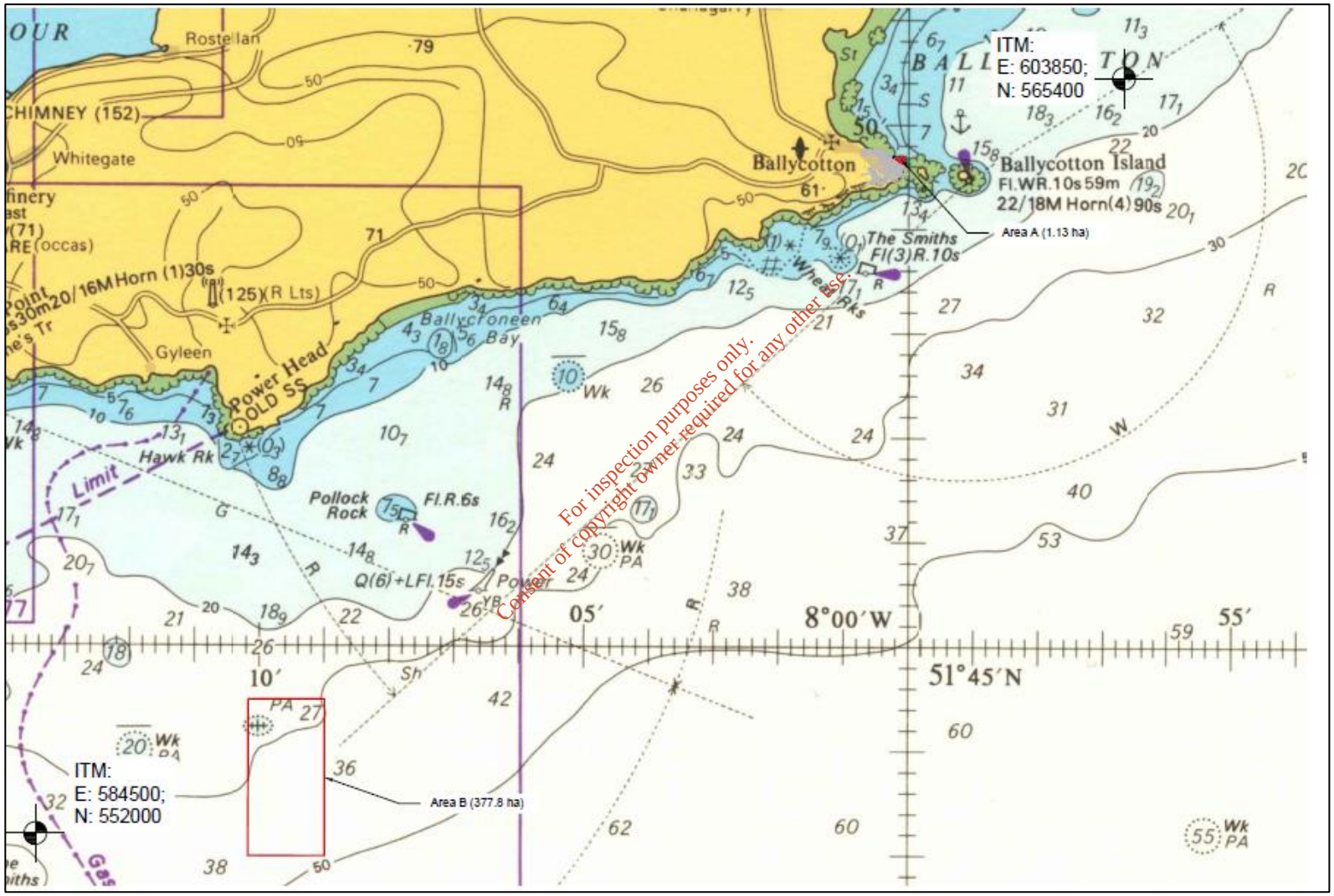
The analyses results indicated low levels of contamination in several of the samples. Class 2 levels of lead were found between the pontoon and the head of the pier. The contamination level did not preclude the option of disposing the dredged material at sea. Class 2 and 3 levels of TBT/DBT were found adjacent to the RNL slipway. This material is not suitable for disposal at sea. This area is indicated in cyan in Figure 2.1.

Figure 2.1: Proposed Foreshore licence area (in red) for dredging




*Source: Byrne Looby Partners, Foreshore Consent Application Ref. FS007037*

Figure 2.2: Proposed Foreshore Licence area (in red) for dredge disposal




*Source: Byrne Looby Partners, Foreshore Consent Application Ref. FS007037*

## 2.3 Dredging methodology

A pre-condition survey of the site will be carried out by the contractor to determine the suitability of the plant proposed. It is proposed that the following equipment will be mobilised to the site for the dredging elements of the works:

- Long-reach back-hoe excavator
- Dredge barge
- 1,000m$^3$ hopper barge
- Tugboat
- Articulated dump trucks
- Safety boat
- Road sweeper

A site compound will be set up on site. Appropriate fencing will be erected around the perimeter of the compound. The size of the site compound will be minimised to limit obstructions to the normal operation of the port. The compound will incorporate a site office, canteen, welfare facilities and storage.

All existing swing moorings will be removed from the seabed before commencing dredging works. All swing moorings will be stored off site in a location agreed with Cork County Council while dredging works take place. Swing moorings will be reinstalled on completion of dredging works. The pontoon and gangway shall be removed by the dredging contractor, stored and reinstated on completion of the works.



A bathymetric survey will be carried out to determine the exact seabed levels prior to dredging. A dredge barge will be towed to the harbour by a tugboat.

For the contaminated material, indicated in cyan in Figure 2.1, a long-reach excavator, mounted on the dredge barge, will use a dig control system to determine the dredge level achieved. The excavated material will be placed in a hopper barge. This material will then be transferred to tipper trucks, which will transport it to a suitably licensed facility for disposal.

For uncontaminated material, the excavated material will be placed in a hopper barge and towed to the disposal site, south of Power Head (Figure 2.2), for disposal at sea. Storage of the material will not take place on the quay. It is likely that dredging activities will take place 24hrs per day, 7 days per week to achieve the maximum production rates within tidal envelopes.

It is not anticipated that there will be any requirement to dredge rock from the harbour. Table 2.1 indicates the estimated volumes of dredge materials.

Table 2.1: Estimated dredge volumes

| Material to be dredged | Volume (m$^3$) | Mass (tonnes) |
|---|---|---|
| Silt, Sands & Gravels | 19,500 | 35,743 |
| Assume bulk density is 1,300kg/m$^3$ | | |

It is estimated that 18,000m$^3$ of gravel, silt and sand will be disposed of at sea. The remaining 1,500m$^3$ of contaminated gravel, silt and sand will require disposal at a suitably licensed site.

## 2.4 Expected schedule

It is anticipated that overburden (gravel, silt and sand) will have a maximum dredging rate of 500m³ per 24 hours. It is estimated that the haulage contractor would dispose of overburden material over 12 hours per day. The expected programme is indicated in Table 2.2 with an expected duration for the project of two months.

Table 2.2: Proposed works programme

| Activity | Duration |
|---|---|
| Mobilisation | 2 weeks |
| Removal of existing moorings | 1 week |
| Dredging | 8 weeks |
| Mooring reinstallation | 2 weeks |
| De-mobilisation | 1 week |

## 2.5 Review of proposed works

EC (2002, 2021) guidance indicates that a project description should identify all those elements of the project, alone or in combination with other projects or plans, that have the potential for having significant effects on the Natura 2000 site. To this end, the guidance (EC 2021) provides an indicative list of the key parameters of the plan or project to be identified.



| | |
|---|---|
| **Size (e.g. in relation to direct land-take)** | Yes: The foreshore boundary of the proposed works is described in Section 2.1 and Figures 2.1 and 2.2. |
| **Overall affected area including the area affected by indirect impacts (e.g. noise, turbidity, vibrations)** | Yes. The potentially affected area is described in Section 3.2 of this report. |
| **Physical changes in the environment (e.g. modification of riverbeds or morphology of other water bodies, changes in the density of forest cover)** | Yes: The potential physical changes to the environment from the proposed works are summarised in Section 2.1 and Figure 2.1. |
| **Changes in the intensity of an existing pressure (e.g. increase in noise, pollution or traffic);** | Yes. Increase in dredging and disposal activities (increased suspended sediment, vessel activity). |
| **Resource requirements (e.g. water abstraction, mineral extraction);** | N/A. Due to nature of project, no additional resources required. |
| **Emissions (e.g. nitrogen deposition) and waste (and whether they are disposed of on land, water or in the air)** | Yes. Section 2.2 provides details of the analysis of sediments and the identification of contaminated sediments for onshore disposal. |
| **Transportation requirements (e.g. access roads)** | Single dredge vessel to carry out dredging and disposal operations. |

| | |
|---|---|
| **Duration of construction, operation, decommissioning, etc.** | Yes. Section 2.4 above. |
| **Temporal aspects (timing of the different stages of a plan or project)** | Yes. Section 2.4 above. |
| **Distance from Natura 2000 sites and in particular from their designating features** | Yes. See Table 3.1 of this report. |
| **Cumulative impacts with other projects or plans** | Yes addressed in Section 3.5 of this report. |

# SECTION 3 - STAGE 1 SCREENING FOR APPROPRIATE ASSESSMENT

## 3.1 Basis for screening the project

Article 6(3) of the Habitats Directive indicates that, "*Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4[2], the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public*." These provisions are transposed under regulation 42 of the *European Communities (Birds and Natural Habitats) Regulations 2011* (as amended).

The project, as defined in Section 2, is not directly connected with the management of a Natura 2000 site, and under the provisions of the *European Communities (Birds and Natural Habitats) Regulations 2011* (as amended), and the Competent Authority (in this case the Department of Housing, Local Government and Heritage) must therefore determine whether an Appropriate Assessment is required.

Relevant guidance informing the AA screening includes that at a European (European Commission 2019, European Commission 2021) and national (DoEHLG 2010, Office of the Planning Regulator 2021) level.



## 3.2 Identification of possible effects

The applicant used a source-pathway-receptor-consequence model for screening consistent with OPR (2021) to establish the project's zone of influence (ZoI). The model consisted of the following steps:

1. **Identify the Source** - The origin of a hazard e.g., noise generation from site investigation equipment.
2. **Identify the Pathway** - Route that a hazard takes to reach Receptors e.g., through water. A pathway must exist for a Hazard to be realised.
3. **Identify the geographical range** – The range the source, by way of the identified pathway, could extend.
4. **Identify the Receptor** - The entity that may be affected (e.g., a marine mammal, a habitat etc.).
5. **Assess the Consequence** - An effect e.g., hearing damage as a consequence of noise generation.

Using this approach all elements of the proposed project were reviewed to assess potential pathways and receptors which might be affected so that a ZOI could be established for the proposed project. Table 3.1 summarises the model outputs and the ZoI for each of the sensitive receptors identified.

[2] Article 6(4) relates to plans or projects which must be undertaken despite identification of an assessment determining a negative effect on a given site due to imperative reasons of overriding public interest (IROPI), including those of a social or economic nature. Suitable compensatory measures are required to maintain the coherence of the network should such a case be made.

Table 3.1: Source, pathway, receptor matrix

| Ballycotton Harbour dredge site | | | |
|---|---|---|---|
| **Source** | **Pathway** | **ZoI (km)** | **Receptor** |
| Dredging: Sediment disturbance & mobilisation | Sediment and Water | 3 | Benthic habitats & associated species, coastal habitats, foraging seabirds, fish |
| Dredging: Noise | Water | 10* | Marine mammals, fish, avifauna |
| Vessel operations: disturbance/ noise/pollution, IAS | Water and air | 20 | Marine mammals, fish, avifauna, coastal habitats, benthic habitats |
| **Powers Head Dump site** | | | |
| Dredge spoil dumping | Sediment and Water | 3 | Benthic habitats & associated species, fish, foraging seabirds |

## Sediment disturbance

**Benthic habitats and species**

The applicant indicated that while the dredged material will be removed from the site in the bucket of the excavator, disturbance of residual mobilised sediment will occur. Depending on the exact location within the harbour where the material is being dredged from, a quantity of this will settle out within the confines of the harbour while the remainder will be washed out of the harbour and will settle out at a location determined by on the nature and direction of the following tide. Given that the majority of the dredged material will be removed from the site, the applicant considered that sediment disturbance and residual settlement would be limited and any sediment would settle out or disperse within a very short time period (days). While sediment dispersion modelling for the proposed project was not available, it was considered reasonable to assume that suspended fine sediment, as a result of mobilisation, would be expected to remain in suspension for a number of days dispersing over a large area, possibly up to 2-3km. The sediment load over such a wide area of such an exposed coast would not be considered to be significant except in the immediate vicinity of the dredging operations (up to 1km radius) and for a limited period of time (days).



**Coastal habitats**

The potential for sediment dredging to lead to erosion and/or accretion of coastal habitats was also noted. The potential for dredging to lead to such impacts is a factor of the location and volume of dredged material and location of the dredge site relative to prevailing tidal currents and exposure. However, given the size, scale and location of the dredged sediment within the confines of Ballycotton Harbour and its subsequent disposal at the Power Head disposal site, the potential for erosion and/or accretion of coastal habitats was not considered possible.

**Avifauna**

The applicant indicated that the mobilisation of sediments during dredging may increase turbidity and reduce water clarity thereby affecting seabirds which feed by sight such as terns, common guillemot and northern gannet (Cook & Burton 2010). Birds such as sea ducks, divers, grebes and mergansers which forage under water are likely to be similarly affected. The impact of increased turbidity is considered to be dependent on initial background levels (Cook & Burton 2010).

**Fish**

The applicant noted that behavioural changes (avoidance) by fish to elevated suspended sediment was well documented and varied depending on the species and level of turbidity. The mobilisation of contaminated sediment may lead to greater impacts than that from clean

sediment with early life stages such as eggs and larvae most likely to suffer lethal impacts. While a single event exposure to contaminants released from sediment may have little impact, repeat maintenance dredging of contaminated sediments may expose resident fish populations to multiple pulses of suspended sediments and released contamimants which have the potential to lead to cumulative impacts over time (Wenger *et al*. 2017).

## Underwater noise

**Fish**

It was noted that underwater sounds are detectable by fishes and may affect their behaviour, causing them to move away from their migration routes or leave favoured habitats (Normandeau Associates, Inc. 2012).

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

However, given the low level of vessel activity associated with the proposed project which requires only the mobilisation of the barge to the dredge area by a tug boat, vessel noise is not considered a significant factor. In view of the fact that the normal vessel activity associated with the harbour will be suspended during dredging operations, noise levels associated with vessel traffic would be lower than normal in the immediate area of the harbour for the duration of the dredging operations.



**Marine mammals**

Marine mammals rely on sound to navigate, to communicate with one another and to sense and interpret their surroundings. Behavioural responses of marine mammals to a sound are known to be strongly influenced by the context of the event and individual factors such as the animal's experience, motivation, conditioning and activity (e.g. Nowacek *et al*. 2007, Southall *et al*. 2007).

DAHG (2014) indicates that dredging operations have been reported to produce low frequency omnidirectional sound of several tens of Hz to several thousand Hz (and up to approximately 20 kHz) at sound pressure levels of 135-186 dB re: 1 µPa. Therefore some coastal dredging operations can be detected at received levels (RL) exceeding ambient sound more than 10km from shore. While sound exposure levels from such operations are thought to be below that expected to cause injury to a marine mammal, they have the potential to cause lower-level disturbance, masking or behavioural impacts. The dredging within Ballycotton Harbour will be limited to a period of 8 weeks and limited to backhoe dredging of soft sediments. Therefore, noise levels will be at the lower range of the scale. Nonetheless, dredging may have the potential to lead to behavioural changes in marine mammals if they are within the area during dredging operations.

The applicant noted that noise related effects from vessels normally accessing Ballycotton harbour will be reduced from normal levels during dredging. Whilst marine mammals are highly mobile species which may be associated with European sites a great distance away from the proposed project area it was considered that noise related impacts on marine mammals will be highly localised and not at a level with the potential to cause any significant

impacts to marine mammals should they be present in the area during dredging or dumping operations.

**Avifauna**
The applicant noted that impacts of underwater noise on foraging seabirds are poorly understood although bird species most likely to be vulnerable to underwater sound are those that forage by diving for fish of shellfish (Leopold & Camphuysen 2009). Owing to the nature of the works (dredging within a harbour and dumping at sea), the applicant indicated that interaction impacts with bird species which forage over open water i.e. divers, seaducks, cormorant, shag, and seabirds (auks, gulls, petrels, terns) were possible.

### Vessel operations: pollution

There are potential sources of pollution of the marine environment that may arise as a result of the proposed works, limited to the release of substances from the inshore working vessels and barges, including oil and fuel. However, an accidental pollution event of a significant magnitude is highly unlikely given the relatively small fuel inventories on board the vessels and the requirement for the vessels to be equipped and operate in accordance with regulations to prevent pollution (e.g. *Sea Pollution Act 1991* (as amended)).

### Vessel operations: Invasive Alien Species (IAS)

The risk of IAS introduction was considered very low by the applicant. The main area of concern is the presence of Japanese knotweed to the back of the intertidal area within the harbour and the potential spread of this species by construction traffic (spoil disposal vehicles) leaving the harbour area.



### Vessel operations: disturbance

Vessel activity for the duration of works will take place at the dredge site and dump site and transiting between the sites. Some species of seabird such as gulls may be attracted to vessel activity, while others are disturbed and displaced. Some species are more likely to be disturbed than others. Garthe & Hüppop (2004) developed a wind farm sensitivity index for seabirds and as part of this index assessed divers (great northern and red throated divers), scoters (velvet and common scoters) and cormorant as most sensitive to disturbance by vessels (strong escape/avoidance behaviour and/or large fleeing distance). Terns, shearwaters and grebes are known to activity avoid shipping lanes (Cook & Burton 2010). Prolonged vessel activity may create a barrier between breeding and foraging sites or increase the time required to reach alternative foraging sites.

However, it is considered that the vessel activity associated with this project is not at a level likely to lead to significant disturbance/displacement. Vessel activity at the dredge site will be reduced due to the removal of access to the harbour by fishing vessels during works. Transit to, from and at the dump site is considered insignificant above the current background levels.

**Summary**: It is concluded that the applicant correctly identifies the possible effects for relevant Natura 2000 sites and their related qualifying interests, from the proposed works.

## 3.3 Identification of relevant sites and features

As indicated in Section 3.2, a source-pathway-receptor approach was used to identify possible effects and relevant sites (Figure 3.1) and qualifying interests (see Table 3.1).

The applicant indicated that there was no direct spatial overlap between any element of the proposed project site and any European site. There was a hydrological connection, and potential flight path/suitable foraging habitat link in the case of avifauna, between the proposed project site and a number of European sites which may have the potential to lead to indirect impacts on the conservation objectives of these sites.

## Sediment disturbance

**Bird species associated with SPAs**
(Ballycotton Bay SPA, Ballymacoda Bay SPA, Blackwater Estuary SPA, Sovereign Islands SPA and Cork Harbour SPA)

Impacts from sedimentation may affect seabirds which feed by sight such as terns, common guillemot and northern gannet (Cook & Burton 2010). Birds such as sea ducks, divers, grebes and mergansers which forage under water are likely to be similarly affected. However, given the short duration of works and location of the dredge site outside of any SPA designated for these species (the closest relevant site being Cork Harbour SPA, 12km away), likely significant effects on SCI bird species as a result of sediment disturbance was excluded. It was noted that the south coast sea environment is turbulent under natural conditions and any increase in turbidity as a result of the proposed dredging and dumping is not likely to be significant above normal levels.

**Fish**
(Blackwater River (Cork/ Waterford) SAC - Sea Lamprey, River Lamprey, Twaite Shad, Salmon)

The applicant noted that impacts related to the mobilisation of sediment and contaminated sediments in particular were unlikely to represent a significant impact to fish as the potential ZOI is relatively small (limited to 3km), and the contaminated sediment will be removed to landfill, thereby providing limited opportunity for the mobilisation of contaminants into the water column. No contaminated sediment will be disposed of at the Power Head dump site. The potential for LSE on relevant fish qualifying features as a result of sediment was excluded.



## Underwater noise

**Bird species associated with SPAs**
(Ballycotton Bay SPA, Ballymacoda Bay SPA, Blackwater Estuary SPA, Sovereign Islands SPA and Cork Harbour SPA)

Underwater noise associated with dredging and dumping operations and vessel activity will be short term and localised. Ambient noise off Ballycotton Harbour is expected to be dominated by environmental noise (e.g. tidal movement of water and sediment, and wind and wave noise), and shipping noise, especially with peaks in noise due to large vessels transiting to Cork and Waterford Harbours. As such the proposed project will not significantly contribute to increased noise levels above ambient.

**Fish**
(Blackwater River (Cork/ Waterford) SAC - Sea Lamprey, River Lamprey, Twaite Shad, Salmon)

While there is the potential for temporary changes in the behaviour of the fish species, resulting from the impact of underwater noise generated by the proposed activities, it was not considered likely that such temporary changes in behaviour would lead to significant effects in their migration through the area (given the Blackwater River (Cork/ Waterford) SAC is 17km

from the dredging location). The proposed dredging activities would be over a short duration of time (weeks) and not considered to be at a scale which could lead to any significant effect on fish migration.

## Vessel operations: pollution

**Benthic and coastal habitats**
(Relevant benthic habitats - Mudflats and sandflats not covered by seawater at low tide (Ballymacoda (Clonpriest and Pillmore) SAC, Blackwater River (Cork/Waterford) SAC), Estuaries (Blackwater River (Cork/Waterford) SAC)
(Relevant coastal habitats - *Salicornia* and other annuals colonising mud and sand, Atlantic salt meadows (Glauco-Puccinellietalia maritimae), Mediterranean salt meadows (Juncetalia maritimi), Perennial vegetation of stony banks (Blackwater River (Cork/ Waterford) SAC))

The applicant noted that the accidental spillage of hydrocarbons from small vessels, jack-up barges and plant operating in the area could have the potential to lead to temporary impacts on benthic habitats in the event of any accidental spillage or leakage. However, given the required measures that will be in place to prevent pollution from vessels, the limited temporal and spatial extent of the proposed activities and the distance of potentially sensitive benthic and coastal habitats from the dredge location, the potential for LSE can be excluded.

**Bird species associated with SPAs**
(Ballycotton Bay SPA, Ballymacoda Bay SPA, Blackwater Estuary SPA, Sovereign Islands SPA and Cork Harbour SPA)

Whilst oil spillages can have serious implications for seabirds and waterbirds, given the required measures that will be in place to prevent pollution from vessels, the limited temporal and spatial extent of the proposed activities and the distance of the SPAs from the dredge location, the potential for LSE can be excluded.



**Fish**
(Blackwater River (Cork/ Waterford) SAC - Sea Lamprey, River Lamprey, Twaite Shad, Salmon)

The conservation objectives for Salmon, Sea Lamprey, River Lamprey and Twaite Shad are to maintain the favourable conservation condition of these species within the freshwater habitat of SACs where they are designated for these species. These five species have a marine phase in their life cycle and while the conservations objectives set for these species, in all Irish SACs, relate to the freshwater phase of their life cycle, the proposed project has the potential to affect these species ex-situ during their marine phase by way of pollution in the unlikely event of hydrocarbon spillage. Freshwater pearl mussel had been screened out by the applicant but screened in since salmon are host to the larval form of the freshwater pearl mussel and, thus, are essential to the completion of the life cycle (NPWS 2012). However, given the required measures that will be in place to prevent pollution from vessels, the limited temporal and spatial extent of the proposed activities and the distance of the SAC from the dredge location, the potential for LSE can be excluded.

## Vessel operations: Invasive Alien Species (IAS)

No relevant sites and features identified.

## Vessel operations: disturbance

**Bird species associated with SPAs**

(Ballycotton Bay SPA, Ballymacoda Bay SPA, Blackwater Estuary SPA, Sovereign Islands SPA and Cork Harbour SPA)

Vessel activity at the dredge site will be reduced due to the removal of access to the harbour by fishing vessels during the works. Transit to, from and at the dump site is considered insignificant above the current background levels.

**Summary:** It is considered that, the applicant's source-pathway-receptor approach has identified the relevant sites and qualifying interests. The applicant provides a comprehensive assessment of the proposed works although consideration of the conservation objectives and targets of the relevant sites and their qualifying interests was left to a Stage 2 AA if required.

## 3.4 Sites identified by the applicant to be screened for AA

The sites identified by the applicant as having a potential impact pathway with the proposed project were subject to screening assessment. The high level outcome for each site is presented in Table 3.1. The table lists the sources of potential likely significant effect which are considered against each of the relevant sites and their qualifying interests. Where a potential for LSE has been identified (cell shaded blue) this is indicated for the relevant qualifying interest against the possible effect. Note that cells shaded grey indicate no consideration was made as qualifying interest screened out.

Figure 3.1: Natura 2000 sites considered in the screening

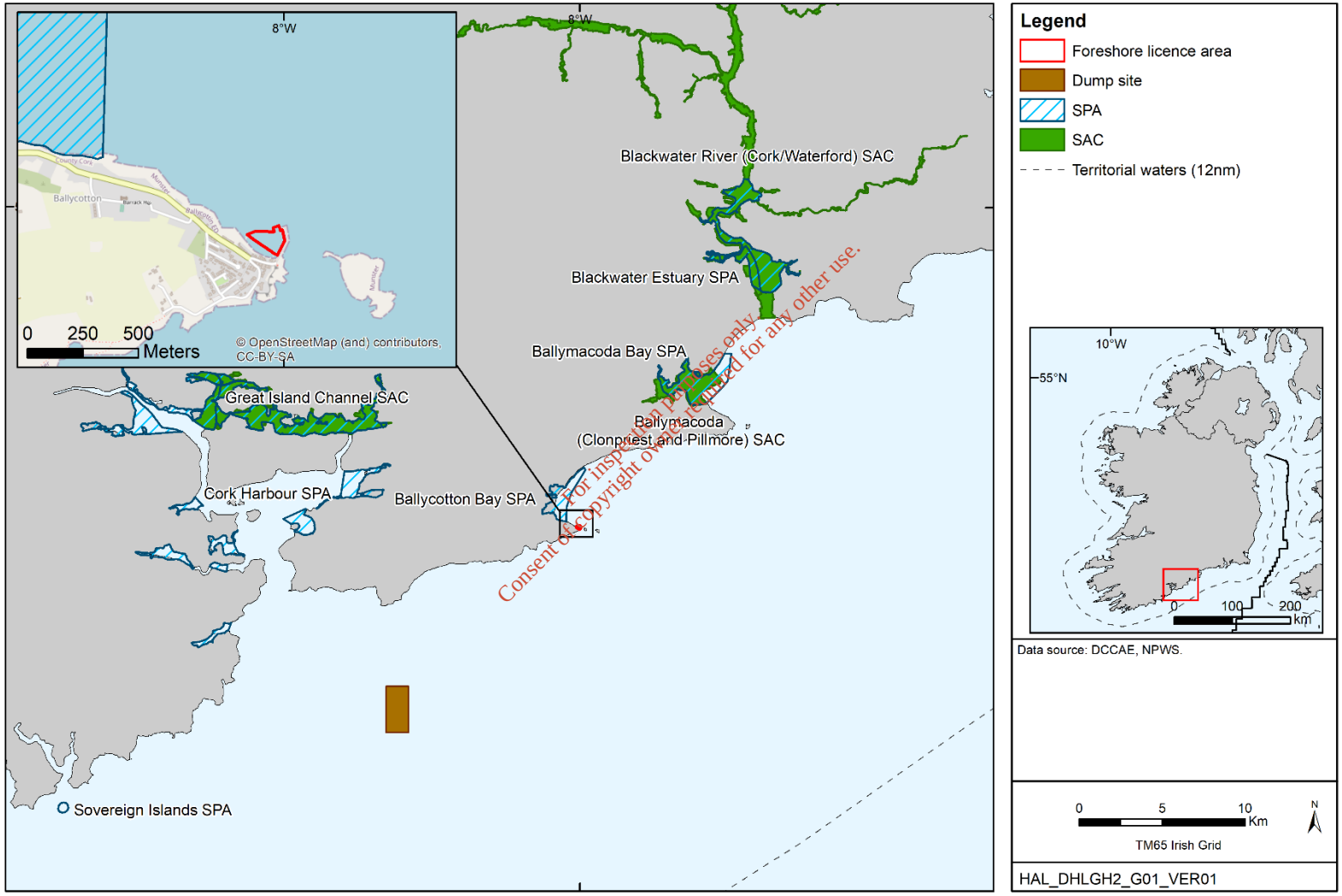


Table 3.1: Sites screened for likely significant effect and the high level outcome for each site

| Site name | Site code | Distance to application area (km)[3] | | Qualifying interests | Sediment disturbance | Underwater noise | Vessel operations: pollution | Vessel operations: IAS | Vessel operations: disturbance | In-combination effects |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dredge site | Disposal site | | | | | | | |
| **SACs** | | | | | | | | | | |
| Ballymacoda (Clonpriest and Pillmore) | 000077 | 8 | 22 | Estuaries[4] | | | | | | |
| | | | | Mudflats and sandflats not covered by seawater at low tide | | | | | | |
| | | | | *Salicornia* and other annuals colonising mud and sand[2] | | | | | | |
| | | | | Atlantic salt meadows (Glauco-Puccinellietalia maritimae)[2] | | | | | | |
| | | | | Mediterranean salt meadows (Juncetalia maritimi)[2] | | | | | | |
| Blackwater River (Cork/ Waterford) | 002170 | 17 | 31 | Estuaries | | | | | | |
| | | | | Mudflats and sandflats not covered by seawater at low tide | | | | | | |
| | | | | Perennial vegetation of stony banks | | | | | | |
| | | | | *Salicornia* and other annuals colonising mud and sand | | | | | | |
| | | | | Atlantic salt meadows (Glauco-Puccinellietalia maritimae) | | | | | | |
| | | | | Mediterranean salt meadows (Juncetalia maritimi) | | | | | | |
| | | | | Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation[5] | | | | | | |



[3] Shortest straight line distance to site.
[4] Screened out - Habitat only occurs behind the spit at Ring Point within Ballymacoda Bay. It is considered that even in the unlikely event of accidental hydrocarbons spillage it would not have the potential to be impacted owing to its location behind the spit and the strong influence of the Womanagh River draining outwards at this location.
[5] Screened out – Habitat/species outside of ZoI. In the case of White-clawed Crayfish and Brook Lamprey, noted that upstream of a hydrological gradient.

| Site name | Site code | Distance to application area (km)[3] | | Qualifying interests | Sediment disturbance | Underwater noise | Vessel operations: pollution | Vessel operations: IAS | Vessel operations: disturbance | In-combination effects |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dredge site | Disposal site | | | | | | | |
| | | | | Old sessile oak woods with Ilex and Blechnum in the British Isles[3] | | | | | | |
| | | | | Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno- Padion, Alnion incanae, Salicion albae)[3] | | | | | | |
| | | | | Freshwater Pearl Mussel (*Margaritifera margaritifera*)[6] | | | | | | |
| | | | | White-clawed Crayfish (*Austropotamobius pallipes*)[3] | | | | | | |
| | | | | Sea Lamprey (*Petromyzon marinus*) | | | | | | |
| | | | | Brook Lamprey (*Lampetra planeri*)[3] | | | | | | |
| | | | | River Lamprey (*Lampetra fluviatilis*) | | | | | | |
| | | | | Twaite Shad (*Alosa fallax fallax*) | | | | | | |
| | | | | Salmon (*Salmo salar*) | | | | | | |
| | | | | Otter (*Lutra lutra*)[3] | | | | | | |
| | | | | Killarney Fern (*Trichomanes speciosum*)[3] | | | | | | |
| Great Island Channel | 001058 | 13 | 15 | Mudflats and sandflats not covered by seawater at low tide[7] | | | | | | |
| | | | | Atlantic salt meadows (Glauco-Puccinellietalia maritimae)[5] | | | | | | |
| **SPAs** | | | | | | | | | | |
| | 004022 | 0.7 | 13 | Teal | | | | | | |

[6] Applicant had screened out this feature but screened in due to association with salmon, which is screened in. Salmon are host to the larval form of the freshwater pearl mussel and, thus, essential to the completion of the life cycle (NPWS 2012).
[7] Screened out - Great Island Channel SAC is located in the extreme northern end of Cork harbour and protected by Great Island to the south. There are only two narrow entrances to the SAC, one of which is protected by means of a hydrological gradient. Therefore, even in the unlikely event of accidental hydrocarbons spillage it would not have the potential to reach this habitat.

| Site name | Site code | Distance to application area (km)[3] | | Qualifying interests | Sediment disturbance | Underwater noise | Vessel operations: pollution | Vessel operations: IAS | Vessel operations: disturbance | In-combination effects |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dredge site | Disposal site | | | | | | | |
| Ballycotton Bay | | | | Ringed plover | | | | | | |
| | | | | Golden plover | | | | | | |
| | | | | Grey plover | | | | | | |
| | | | | Lapwing | | | | | | |
| | | | | Black-tailed godwit | | | | | | |
| | | | | Bar-tailed godwit | | | | | | |
| | | | | Curlew | | | | | | |
| | | | | Turnstone | | | | | | |
| | | | | Common gull | | | | | | |
| | | | | Lesser black-backed gull | | | | | | |
| | | | | Wetland and waterbirds | | | | | | |
| Ballymacoda Bay SPA | 004023 | 10 | 23 | Wigeon | | | | | | |
| | | | | Teal | | | | | | |
| | | | | Teal | | | | | | |
| | | | | Ringed plover | | | | | | |
| | | | | Golden Plover | | | | | | |
| | | | | Grey Plover | | | | | | |
| | | | | Lapwing | | | | | | |
| | | | | Sanderling | | | | | | |
| | | | | Dunlin | | | | | | |
| | | | | Black-tailed Godwit | | | | | | |
| | | | | Bar-tailed Godwit | | | | | | |
| | | | | Curlew | | | | | | |
| | | | | Redshank | | | | | | |
| | | | | Turnstone | | | | | | |

| Site name | Site code | Distance to application area (km)[3] | | Qualifying interests | Sediment disturbance | Underwater noise | Vessel operations: pollution | Vessel operations: IAS | Vessel operations: disturbance | In-combination effects |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dredge site | Disposal site | | | | | | | |
| | | | | Black-headed Gull | | | | | | |
| | | | | Common gull | | | | | | |
| | | | | Lesser black-backed gull | | | | | | |
| | | | | Wetland and Waterbirds | | | | | | |
| Blackwater Estuary | 004028 | 18 | 31 | Wigeon | | | | | | |
| | | | | Golden plover | | | | | | |
| | | | | Lapwing | | | | | | |
| | | | | Dunlin | | | | | | |
| | | | | Black-tailed Godwit | | | | | | |
| | | | | Bar-tailed Godwit | | | | | | |
| | | | | Curlew | | | | | | |
| | | | | Redshank | | | | | | |
| | | | | Wetland and waterbirds | | | | | | |
| Cork Harbour | 004030 | 12 | 10 | Little Grebe | | | | | | |
| | | | | Great Crested Grebe | | | | | | |
| | | | | Cormorant | | | | | | |
| | | | | Grey Heron | | | | | | |
| | | | | Shelduck | | | | | | |
| | | | | Wigeon | | | | | | |
| | | | | Teal | | | | | | |
| | | | | Pintail | | | | | | |
| | | | | Shoveler | | | | | | |
| | | | | Red-breasted Merganser | | | | | | |
| | | | | Oystercatcher | | | | | | |
| | | | | Golden plover | | | | | | |

| Site name | Site code | Distance to application area (km)[3] | | Qualifying interests | Sediment disturbance | Underwater noise | Vessel operations: pollution | Vessel operations: IAS | Vessel operations: disturbance | In-combination effects |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dredge site | Disposal site | | | | | | | |
| | | | | Grey Plover | | | | | | |
| | | | | Lapwing | | | | | | |
| | | | | Dunlin | | | | | | |
| | | | | Black-tailed Godwit | | | | | | |
| | | | | Bar-tailed Godwit | | | | | | |
| | | | | Curlew | | | | | | |
| | | | | Redshank | | | | | | |
| | | | | Black-headed Gull | | | | | | |
| | | | | Common gull | | | | | | |
| | | | | Lesser black-backed gull | | | | | | |
| | | | | Common tern | | | | | | |
| | | | | Wetland and Waterbirds | | | | | | |
| Sovereign Islands | 004124 | 35 | 20 | Cormorant | | | | | | |

## 3.5 In-combination effects

The proposed project is entirely marine based. Therefore, only additional projects which have a marine component are considered in relation to the potential for cumulative effects.

This Power Head site has been used for the disposal of dredge spoil from Cork Harbour since 1978. Impact assessment carried out have not indicated the use of the site for disposal of dredged material has resulted in any significant effects on the receiving environment. Given the relatively low volume of dredge spoil from the proposed Ballycotton Harbour dredging works and the disposal of all contaminated material from the site at a separate on-shore licened landfill, no in-combination impacts are considered likely.

A search by the applicant of Foreshore licence applications on the Department of Housing, Local Government and Heritage website and Applications for Statutory Petroleum Consent on the website of the Department of the Environment, Climate and Communications did not indicate any other current projects within the ZOI of the proposed project.

However, In their response to consultation (Table 1.1), the Marine Advisor of the DHLGH noted that Irish Water have application FS007022 under consideration for a licence to construct a temporary work area which overlaps partially with the proposed dredge area[8]. The Marine Advisor recommended that if approved the licensee shall coordinate with Irish Water in terms of sequencing to ensure both set of works do not conflict.

The AA Screening[9] for the proposed Irish Water pumping station on Ballycotton Pier (FS007022) concluded that the potential for adverse effects on the Conservation Objectives of Natura 2000 sites by the proposed works could be screened out. Given this, that likely significant effects associated with the proposed harbour dredging project can also be excluded, and the Marine Advisor recommendation above, the potential for any in-combination effects can also be excluded.



## 3.6 Transboundary effects

No transboundary effects were identified.

## 3.7 Screening conclusion

| **Finding of no significant effects statement:** |
|---|
| The applicant has used a Source-Pathway-Receptor approach to identify sources of possible effects associated with the proposed project which have the potential to interact with qualifying interests of relevant Natura 2000 sites. Given the nature and scale of the proposed works; the possible effects, SPA/SAC site selection and feature screening is deemed appropriate, and an adequate level of information has been provided to justify the screening conclusions. |

[8] https://www.gov.ie/en/foreshore-notice/4bed4-irish-water-temporary-wall-and-working-area-at-ballycotton-pier/?referrer=http://www.gov.ie/en/publication/f132d-irish-water-temporary-wall-and-working-area-at-ballycotton-pier/

[9] https://assets.gov.ie/138057/a304ed79-a84b-4f6a-8b26-7dae60e3420e.pdf

| **SACs** |
|---|
| LSE was discounted for all SACs considered relevant to the proposed works with respect to sediment disturbance effects.<br><br>LSE was discounted for all SACs considered relevant to the proposed works with respect to underwater noise effects.<br><br>LSE was discounted for all SACs considered relevant to the proposed works with respect to invasive alien species associated with vessel operations.<br><br>LSE was discounted for all SPAs considered relevant to the proposed works with respect to disturbance associated with vessel operations.<br><br>LSE was discounted for all SACs considered relevant to the proposed works with respect to in-combination effects.<br><br>It is accepted that likely significant effects can be discounted for these SAC sites and their qualifying interests. |
| **SPAs** |
| LSE was discounted for all SPAs considered relevant to the proposed works with respect to sediment disturbance effects.<br><br>LSE was discounted for all SPAs considered relevant to the proposed works with respect to underwater noise effects.<br><br>LSE was discounted for all SPAs considered relevant to the proposed works with respect to invasive alien species associated with vessel operations.<br><br>LSE was discounted for all SPAs considered relevant to the proposed works with respect to disturbance associated with vessel operations.<br><br>LSE was discounted for all SPAs considered relevant to the proposed works with respect to in-combination effects.<br><br>It is accepted that likely significant effects can be discounted for these SPAs sites and their Special Conservation Interests (SCI). |
| **Consultation with conservation authorities** |
| The consultation feedback from prescribed bodies is provided in Table 1.1. Comments relating to Natura 2000 aspects of the application were received from the Marine Institute and NPWS. |
| **Screening determination** |
| **SACs** |
| It is accepted that likely significant effects can be discounted for the relevant sites and their qualifying interests and that Stage 2 Appropriate Assessment is not required. |

| SPAs |
| --- |
| It is accepted that likely significant effects can be discounted for the relevant sites and their qualifying interests and that Stage 2 Appropriate Assessment is not required. |

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# Appendix 5

Marine Environmental Resource Conservation Consultants Ltd.
*Loughaunbeg, Inverin, Co. Galway*
*www.mercenvironmental.ie*
*Phone +353 (0)91 442523*

6/4/2022

**Addendum to: Supporting Information for Screening for Appropriate Assessment and Natura Impact Statement for Ballycotton Harbour Dredging.**

The initial report to inform screening for appropriate assessment (version 0.4.1) for the proposed Ballycotton Harbour dredging project identified the ongoing use of the Powers Head disposal site as having potential for in-combination effects. The search of Foreshore licence applications on the Department of Housing, Local Government and Heritage website and Applications for Statutory Petroleum Consent on the website of the Department of the Environment, Climate and Communications at the time the original NIS was submitted did not indicate any further projects within the ZOI of the proposed projects. However, due to delays with the processing of the application a revised search of additional projects that may have the potential to lead to in-combination impacts was carried out in March 2022. This further search identified a proposed pumping station at Ballycotton pier and a Waste Treatment Facility for the Ballycotton Agglomeration, proposed since the time of the original application, as also having the potential for in-combination effects. All three projects are considered below.



## In-combination impacts

While a single development may not in itself cause a significant impact on the conservation objectives of a site, a combination of projects within a localised area may cause a negative impact on a site. Therefore, the cumulative impacts of a project or plan in association with other projects and plans must be taken into consideration when assessing the possible impacts of a project.

The proposed project is entirely marine based. Therefore, only additional projects which have a marine component are considered in relation to the potential for cumulative effects.

### Ongoing use of Powers Head disposal site

This site has been used for the disposal of dredge spoil from Cork Harbour since 1978. Impact assessment carried out has not indicated the use of the site for disposal of dredged material has resulted in any significant effects on the receiving environment. Given the relatively low volume of dredge spoil from the proposed Ballycotton Harbour dredging works and the disposal of all contaminated material from the site at a separate on-shore licensed landfill, no in- combination impacts are considered likely.

### Proposed Pumping Station on Ballycotton Pier

Irish water has proposed a project to address the issue of discharging untreated wastewater into the sea at Ballycotton Pier. The project will involve the construction of a pumping station on Ballycotton Pier. A screening report to inform Appropriate Assessment for this project was carried out to include the construction of the pumping station and associated adjacent temporary working on the foreshore immediately west of Ballycotton pier (P. Sweeney, 2021a).

The report to inform screening for Appropriate Assessment screened out potential impacts from disturbance on wintering birds associated with Ballycotton SPA, disturbance to nesting birds associated with Ballycotton SPA and impacts arising from the spread of invasive alien plants during the construction phase of the project. It further screened out the potential for habitat loss and eutrophication during operation. The screening report also found no additional projects or plans with the potential to give rise to in-combination effects. Finally, the report concluded that "all potential for adverse effects on the Conservation Objectives of Natura 2000 sites by the proposed works [construction and operation of a Pumping station] on Ballycotton Pier can be screened out"

### Proposed Waste Treatment Facility for Ballycotton Agglomeration

Irish water has proposed a project for the construction of the scheme in order to meet the primary objective of providing treatment for wastewaters collected in the village of Ballycotton, Co. Cork. The proposed project will end the current practice of discharging untreated wastewater into the sea at Ballycotton Pier by constructing a new Wastewater Treatment Plant (WwTP) for the Ballycotton agglomeration. A report to inform screening for Appropriate Assessment and a Natura Impact Assessment (NIS) was carried out for the proposed project (P. Sweeney, 2021b).

The report to inform screening for Appropriate Assessment concluded that "The proposed works, unless adequately mitigated, could potentially negatively impact on Features of Interest of SPA 004022. Therefore, it cannot be presumed that no adverse effects will result from this project and it is considered that a Natura Impact Statement is required to inform the Appropriate Assessment process.



The subsequent NIS proposed mitigation measures and concluded that "If all mitigation measures detailed [in the NIS] are implemented in full, there will be no adverse effects of the proposed development on the Features of Interest of SPA 004022 and therefore no adverse effects on the Conservation Objectives and site integrity of this Natura 2000 site."

Both the report to inform screening for Appropriate Assessment and the NIS found no additional projects or plans with the potential to give rise to in-combination effects.

## Conclusion

Information on the proposed dredging project was not available during the preparation of the reports for the proposed Irish Water Pumping Station on Ballycotton Pier and the WwTP.

The potential impacts arising from the proposed Irish Water Pumping Station on Ballycotton Pier are documented in the aforementioned report and screened out. The potential impacts arising from the proposed WwTP are documented as bird disturbance and petrochemical contamination during construction. Similarly the potential for hydrocarbon run-off is identified as a potential impact in the report to inform screening for appropriate assessment for dredging of Ballycotton Harbour (version 0.4.1) and therefore is considered as a potential in-combination effect without mitigation. Disturbance related impacts on bird species as a result of construction work, identified during the proposed construction phase at the Cows slipway for the WwTP project, is not considered to be an issue in-combination with the proposed dredging project due to the temporary nature of the proposed dredging project, distance from Cows Head slip way and timing of the works (September/October) outside of the main wintering bird season. Further, the practice of ending the discharge of untreated wastewater will improve the overall water quality of the receiving environment.

## Natura Impact Statement conclusion

The further inclusion and assessment of the proposed pumping station at Ballycotton pier and Waste Treatment Facility for the Ballycotton Agglomeration within the context of the original Screening for Appropriate assessment and NIS for this project does not alter the final conclusion of the document which states:

*The Natura Impact Statement for this project has assessed the implications of the project, alone and in-combination with other projects or plans, on the integrity of European sites in view of the site's conservation objectives. The potential for significant effects as a result of the proposed site investigations have been mitigated. The NIS therefore objectively concludes that, provided the mitigation measures described in this document are fully implemented, no adverse effect on the features of interest or Conservation objectives of any European site is expected, i.e., the integrity of the sites will not be adversely affected*.

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Sweeney, P (2021b). Habitats Directive Appropriate Assessment Report (Screening and Natura Impact Statement) for a Proposed Waste Treatment Facility for Ballycotton Agglomeration.

# Appendix 6

# MARINE MAMMAL RISK ASSESSMENT OF PROPOSED DREDGING AT BALLYCOTTON, CO CORK AND DISPOSAL AT SEA

Prepared by
Simon Berrow and Dave Wall

IWDG Consulting, Merchants Quay, Kilrush, Co Clare

**Update version: 1.1. Date: 21.3.2022**



## 1 | INTRODUCTION

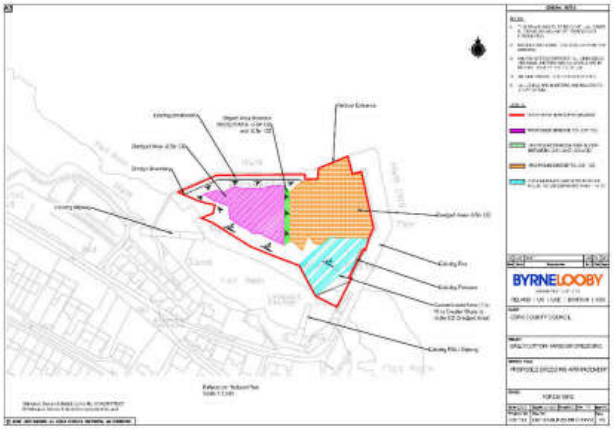
The Irish Whale and Dolphin Group (IWDG) were contracted by the engineering and environmental consultants MERC Consultants to carry out a Marine Mammal Risk Assessment of the proposed dredging operations at Ballycotton, Co Cork and subsequent disposal of dredge material at a proposed dump site located around 16km to the southwest. The proposed works in Kilmore Quay will involve the removal of approximately 19,500 $m^3$ of material.

The proposed dump site is outside of any Special Areas of Conservation (SACs) but is halfway between the Saltee Islands SAC, which includes grey seal as a qualifying interest and Roaringwater Bay and Islands SAC, which includes harbour porpoise as a qualifying interest. The proposed works will take place over 8 weeks at a time informed by this MMRA.


**Figure 1. Ballycotton Harbour, Co Cork and adjacent Ballycotton Island**

**Proposed works**

The dredge site is at Ballycotton, Co. Cork and preferred dumping at Location A. The dredge material at the mouth of the harbour consists of silts, sands and gravels and will be dredged by a long reach back-hoe excavator from a floating dredge barge. It is not anticipated that there will be any requirement to dredge rock from the harbour.



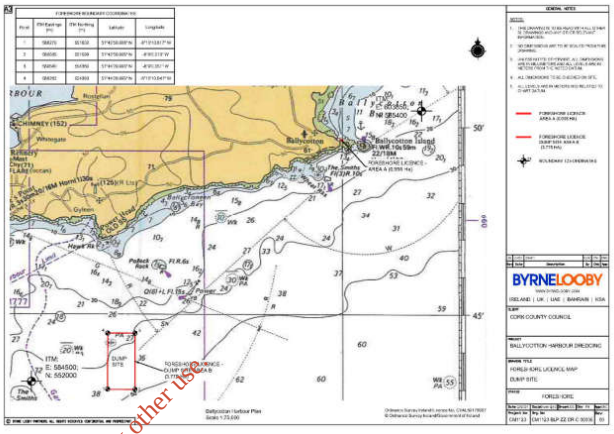




**Figure 2a. Areas to be dredged in Ballycotton Harbour** **2b. Disposal at Sea disposal site**



## 2 | METHODS

The risk assessment was based on a review of the available literature and data sources. Maps of the distribution of cetacean sightings adjacent to Kilmore Quay were prepared using data from the Irish Whale and Dolphin Group's sightings database (IWDG, accessed April 2021).

## 3 | LEGAL STATUS

Irish cetaceans and pinnipeds are protected under national legislation and under a number of international directives and agreements which Ireland is signatory to. All cetaceans as well as grey and harbour seals are protected under the Wildlife Act (1976) and amendments (2000, 2005, 2010 and 2012). Under the act and its amendments it is an offence to hunt, injure or wilfully interfere with, disturb or destroy the resting or breeding place of a protected species (except under license or permit). The act applies out to the 12 nml limit of Irish territorial waters.

All cetaceans and pinnipeds are protected under the EC Habitats Directive. All cetaceans are included in Annex IV of the Directive as species 'in need of strict protection'. Under this Directive, the harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) are designated Annex II species which are of community interest and whose conservation requires the designation of special areas of conservation.

Ireland is also signatory to conservation agreements such as the Bonn Convention on Migratory Species (1983), the OSPAR Convention for the Protection of the Marine Environment of the northeast Atlantic (1992) and the Berne Convention on Conservation of European Wildlife and Natural Habitats (1979).

In 2007, the National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage and the Gaeltacht produced a '*Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters* (NPWS, 2007). These were subsequently reviewed and amended to produce '*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters*' (NPWS, 2014) which include mitigation measures specific to dredging. The guidelines recommend that listed coastal and marine activities (including dredging) be subject to a risk assessment for anthropogenic sound-related impacts on relevant protected marine mammal species to address any area-specific sensitivities, both in timing and spatial extent, and to inform the consenting process.

Once the listed activity has been subject to a risk assessment, the regulator may decide to refuse consent, to grant consent with no requirement for mitigation, or to grant consent subject to specified mitigation measures.

## 4 | BASELINE ENVIRONMENT

### 4.1 | Ambient Noise Levels

The ambient noise levels at the site are not known with the closest site with data available is Cork Harbour (Sutton et al. 2014). However, as Cork is a busy shipping port, these measurements are not considered relevant to Ballycotton Harbour. Ambient noise off Ballycotton Harbour is expected to be dominated by environmental noise (e.g. tidal movement of water and sediment, and wind and wave noise) and shipping noise, especially with peaks in noise due to small vessels using Ballycotton Harbour and large vessels transiting to Cork and Waterford Harbours.



### 4.2 | Cetaceans

A review of cetacean (whale, dolphin and porpoise records) submitted to the IWDG during the period 1 January 2000 to 31 December 2020 was accessed on 5 April 2021 and mapped. During this period, 281 validated cetacean records were available. In addition 38 sighting records of basking sharks were also exported and mapped.

Most records were of bottlenose dolphins (106 or 37.7% of all records) followed by common dolphin with 45 records (16%), which were the most abundant species. Another six species including harbour porpoise, fin, humpback, minke and killer whale and Risso's dolphin were also recorded reflected the high species diversity and productivity of this area (Table 1).

Cetacean sightings were made throughout the area of interest with concentrations off Ballycotton (Figure 3).

**Table 1. Cetacean sightings (including IWDG downgrades) recorded off Ballycotton Harbour, Co Cork from 2000-2020.**

| Species | Number of sightings | Number of individuals | % of total sightings |
|---|---|---|---|
| Bottlenose dolphin | 106 | 738 | 37.7 |
| Common dolphin | 45 | 2943 | 16.0 |
| Fin whale | 33 | 91 | 11.7 |
| Minke whale | 16 | 45 | 5.7 |
| Harbour Porpoise | 15 | 79 | 5.3 |
| Killer whale | 7 | 14 | 2.5 |
| Humpback whale | 5 | 111 | 1.8 |
| Risso's dolphin | 2 | 20 | 0.8 |
| | | | |
| Dolphin species | 18 | 210 | 6.4 |
| Large whale | 11 | 23 | 3.9 |
| Dolphin possibly harbour porpoise | 8 | 91 | 2.8 |
| Whale species | 7 | 14 | 2.5 |
| Sei/Fin/Blue | 3 | 7 | 1.1 |
| Cetacean species | 3 | 34 | 1.1 |
| Patterned dolphin species | 1 | 3 | 0.4 |
| Medium whale | 1 | 1 | 0.4 |
| | | | |
| **Total** | **281** | **4324** | **100** |



*Bottlenose dolphin (Tursiops truncatus)*

Bottlenose dolphins are frequently recorded off Ballycotton Harbour, Co Cork and adjacent to the disposal site (Figure 3). Bottlenose dolphins are widespread and relatively abundant off the Irish coast with most sightings along the western seaboard (Berrow *et al.* 2010).

Recent genetic evidence (Mirimin *et al.* 2011) suggests the existence of three discrete populations of bottlenose dolphins in Ireland: the Shannon Estuary, an inshore population and an offshore population that ranges from the Bay of Biscay and the Azores (Louis *et al.* 2014). The inshore population is highly mobile and photo-identification has shown individuals recorded off Co Cork to be part of this population (O'Brien et al. 2009). Although the semi-resident dolphins in Cork Harbour (Ryan *et al.* 2010) were attributed to the "Shannon" genetic population (Mirimin *et al.* 2011), it is likely that the dolphins off Ballycotton are part of the inshore population. Bottlenose dolphins have mainly been recorded during spring and summer months. Bottlenose dolphins are listed on Annex II of the EU Habitats Directive but the nearest SAC for this species is the Shannon estuary.

*Common dolphin (Delphinus delphis)*

Common dolphins are distributed around the entire Irish coast but highest concentrations are off the southwest and west coasts (Berrow *et al.* 2010). However, in the winter large numbers of common dolphins enter the Celtic sea to feed on schools of pelagic fish such as herring and sprat. Common dolphin were sighted throughout the area of interest (Figure 5) but almost exclusively during the winter period. They have been reported adjacent to the disposal site (Figure 6).

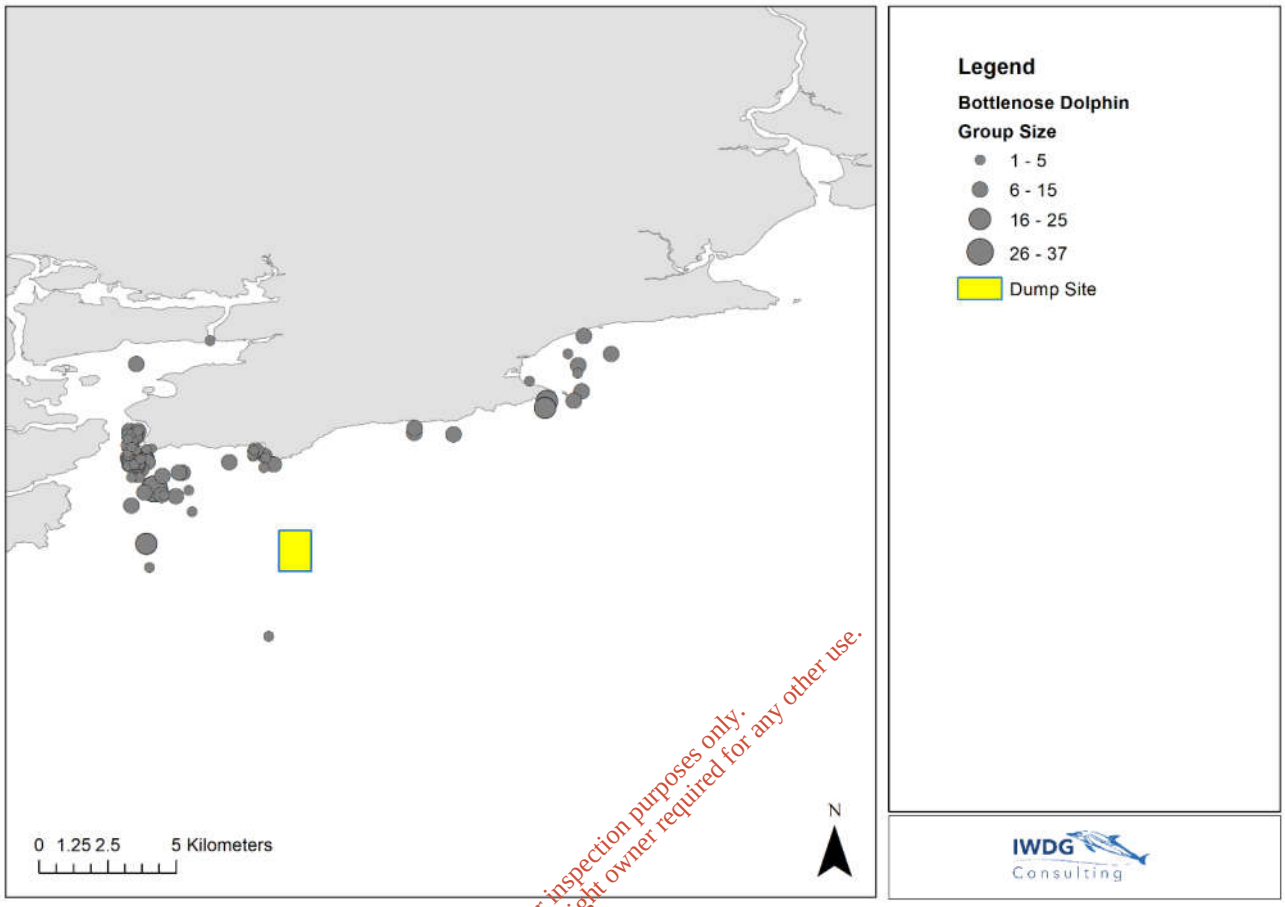





**Figure 3. Sighting records of bottlenose dolphins off Ballycotton Harbour, Co Cork (from IWDG accessed April 2021)**


**Figure 4. Monthly distribution of bottlenose dolphin sightings off Ballycotton Harbour, Co Cork (from IWDG accessed April 2021)**

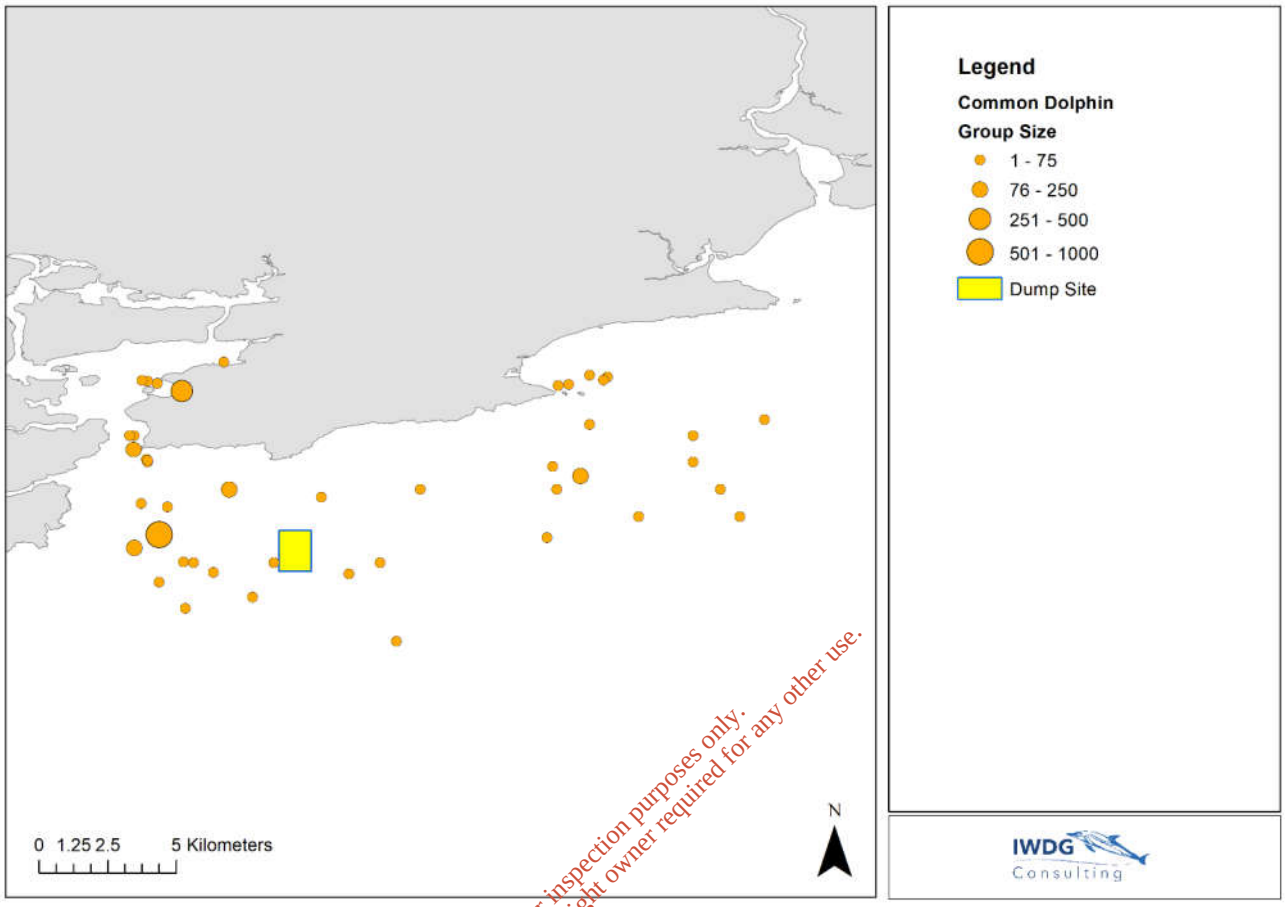





**Figure 5. Sighting records of common dolphins off Ballycotton Harbour, Co Cork (from IWDG accessed April 2021)**

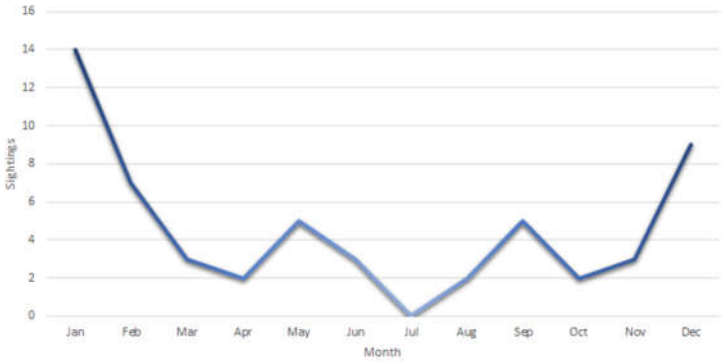



**Figure 6. Monthly distribution of common dolphin sightings off Ballycotton Harbour, Co Cork (from IWDG accessed April 2021)**

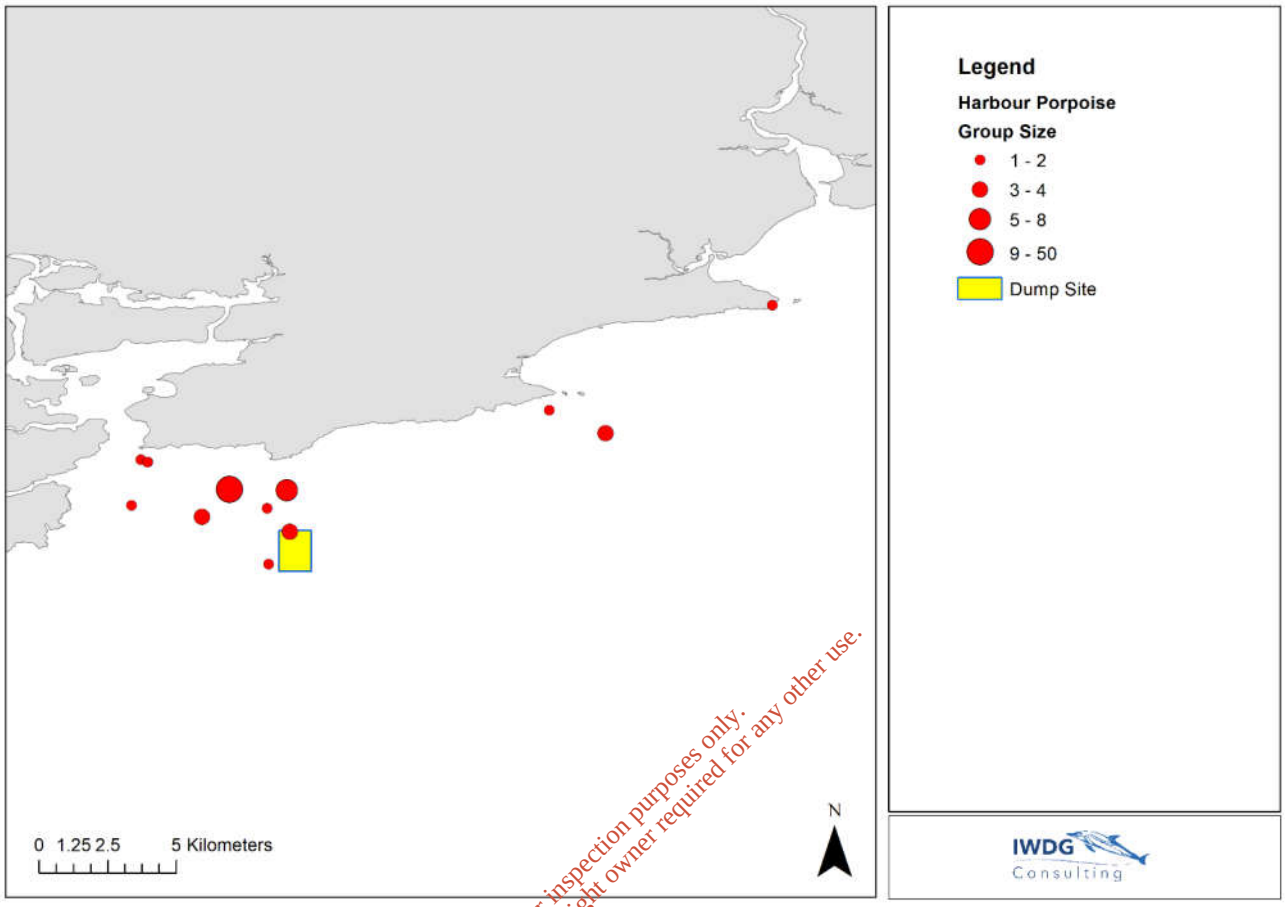





**Figure 7. Sighting records of harbor porpoise off Ballycotton Harbour, Co Cork (from IWDG accessed April 2021)**

*Harbour porpoise (Phocoena phocoena)*

Harbour porpoise are the most widespread and abundant cetacean in inshore Irish waters, with highest abundances in the Irish Sea (Berrow *et al.* 2010). Harbour porpoise were sighted in small numbers throughout the area of interest but with most sightings off Cork Harbour to the west of the disposal site (Figure 7). There were few sightings near Ballycotton Harbour. Sightings occurred at the proposed dredge site and adjacent to the disposal site and throughout the year (Figure 8) though there were more sightings in winter.

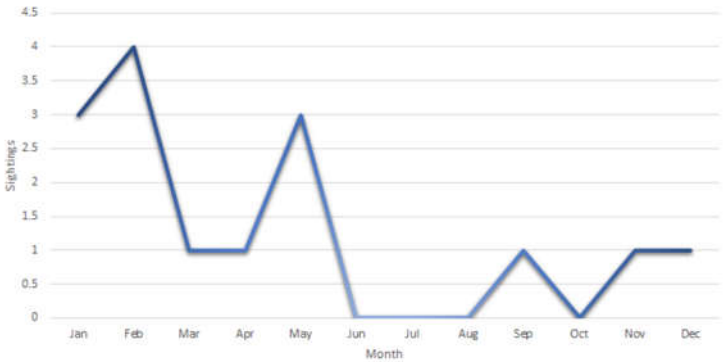



**Figure 8. Monthly distribution of harbor porpoise sightings off Ballycotton Harbour, Co Cork (from IWDG accessed April 2021)**

Harbour porpoise are known to particularly associate with areas of strong tidal currents and can be regularly seen foraging off Hook Head. Sightings of harbor porpoise have occurred in all months with a peak in numbers during the winter.

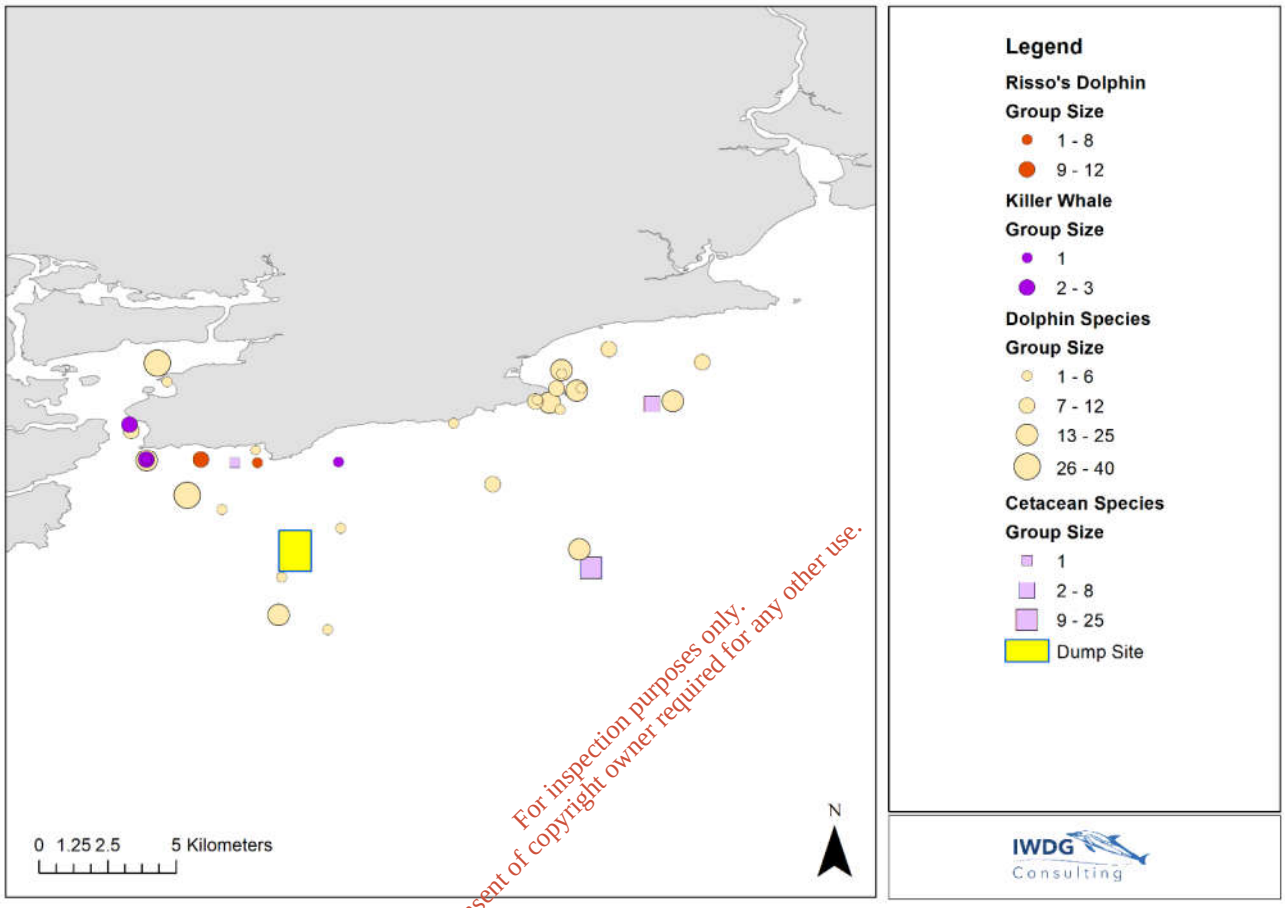





**Figure 9. Sighting records of killer whales and dolphins off Ballycotton, Co Cork (from IWDG accessed April 2021)**

*Killer whale (Orcinus orca)*

Killer whales or Orca are widespread in Ireland and recorded off all coasts (Berrow *et al.* 2010) but are unpredictable. There have been 7 sightings of a total of 14 individuals over the past 20 years in the area of interest (Figure 9) but with the proximity to Cork Harbour these are likely to include the three that took up residency in 2001 (Ryan and Wilson 2003).

*Risso's dolphin (Grampus griseus)*

Risso's dolphins are also patchily distributed around the Irish coast but seem to favour islands, especially off west Kerry, Galway and the Saltee Islands (Berrow *et al.* 2010). There were two sightings of a total of 20 individuals, both west of the disposal site in the mouth of Cork Harbour (Figure 9).

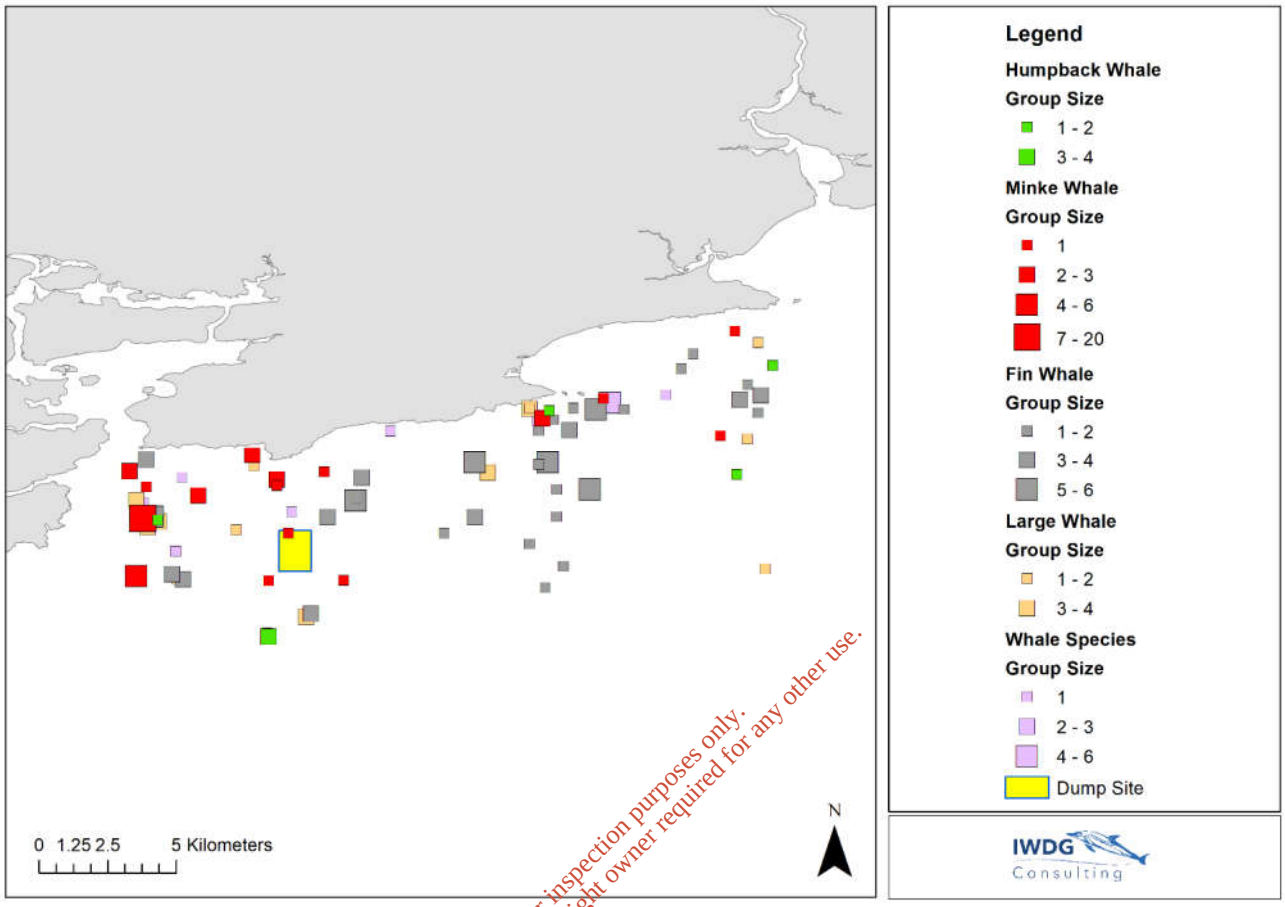





**Figure 10. Sighting records of whales off Ballycotton, Co Cork (from IWDG accessed April 2021)**

*Fin whale (Balaenoptera physalus)*

Fin whales were the most frequently record baleen whale, accounting for 11.7% of all sightings (Table 1). They were recorded offshore along the entire area of interest and adjacent to the disposal site (Figure 10) and almost exclusively during the winter (Figure 11) from October to February.

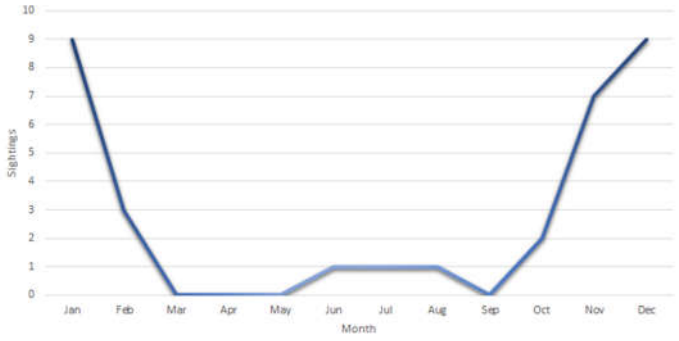



**Figure 11. Monthly distribution of fin whale sightings off Ballycotton Harbour, Co Cork (from IWDG accessed April 2021)**

Fin whales are regularly recorded off the south coast of Ireland especially during winter (Berrow *et al.* 2010). Whooley *et al*. (2011) showed using photo-identification that it was frequently the same individual fin whales

returning each year to the south coast and they stayed in coastal waters for many months feeding on pelagic schooling fish such as herring and sprat. Timing of their easterly movement through the winter seemed to coincide with herring moving inshore to spawn.

*Minke whale (Balaenoptera acutorostrata)*

Minke whales are widespread and abundant in inshore Irish waters from May to October (Berrow *et al.* 2000). The summer distribution tends to be concentrated around southwest Ireland. They were recorded within the entire area of interest including adjacent Ballycotton Harbour and within the disposal site (Figure 10). They were reported mainly between April and August (Figure 12).


**Figure 12. Monthly distribution of minke whale sightings off Ballycotton Harbour, Co Cork (from IWDG accessed April 2021)**



*Humpback whale (Megatera novaengliae)*

Humpback whales are regularly recorded off the south coast of Ireland especially during winter (Ryan *et al.* 2015). The same individual humpback whales are recorded each year and spend many months feeding on pelagic schooling fish such as herring and sprat. Sightings of humpback whales were made throughout the area of interest and adjacent to the disposal site (Figure 10) and were nearly all of single individuals sighted during January and February.

*Basking shark (Cetorhinus maximus)*

Although not currently protected under Irish wildlife law, basking sharks are listed under threatened and/or declining species by OSPAR and are frequently recorded throughout the area of interest (Figure 13) largely between April and June (Figure 14)


**Figure 14. Monthly distribution of basking shark sightings off Ballycotton Harbour, Co Cork (from IWDG accessed April 2021)**

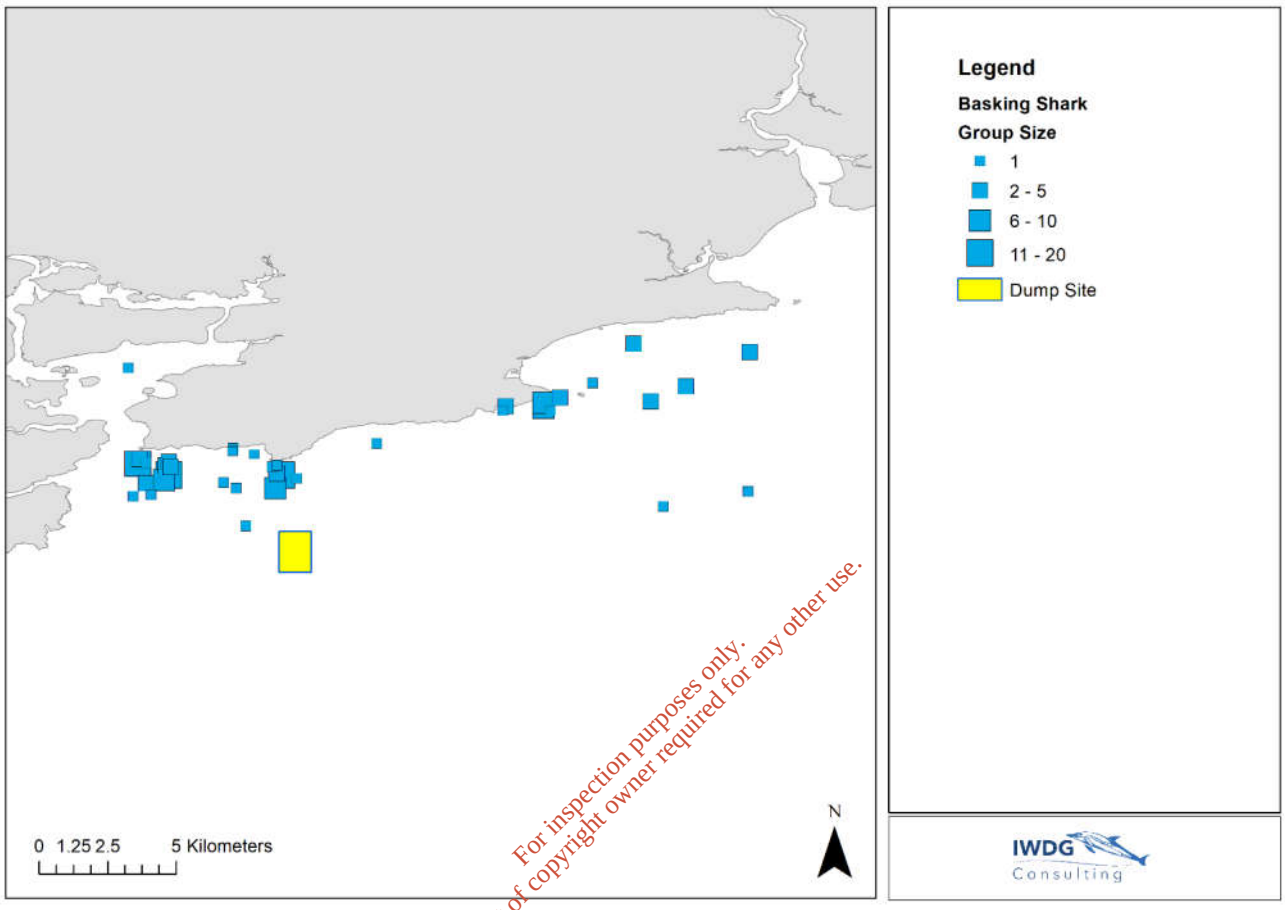





**Figure 13. Sighting records of basking sharks off Ballycotton, Co Cork (from IWDG accessed April 2021)**

### 4.3 | Pinnipeds

Grey and harbour seals are distributed around the entire Irish coast with grey seals being more abundant along the western seaboard (Cronin *et al.* 2004; O'Cadhla and Strong 2007; Morris and Duck, 2019).

*Harbour Seal (Phoca vitulina)*

There were no major harbour seal haul-out or breeding sites recorded near Ballycotton during the National Parks and Wildlife Service (NPWS) surveys during 2002 or 2003. A small number of harbour seals (six) were recorded hauled out at Dungarvan to the east and in Kinsale Harbour to the west in 2003 (Cronin *et al.*, 2004). Duck and Morris (2013) counted no seals during August/September 2012 using thermal imagery. A repeat survey carried out in 2017/18 also recorded along the south coast (Morris and Duck, 2019) (Figure 15). Harbour seals generally forage close to their haul out sites and are unlikely to occur at the dredging or dumping sites.

**Figure 15. Map of the locations of groups of harbour seals recorded on the south coast of Ireland, August and September 2017/18 (from Morris and Duck 2019)**



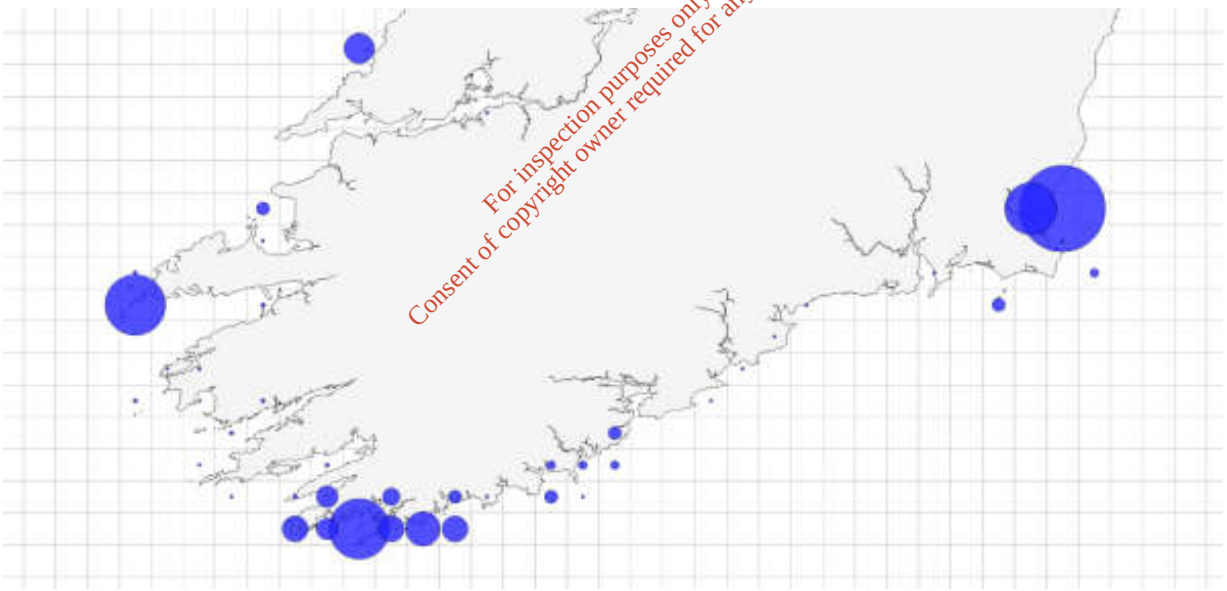


**Figure 16. Map of the locations of groups of grey seals recorded on the south coast of Ireland, August and September 2017/18 (from Morris and Duck 2019)**

*Grey Seal (Halichoerus grypus)*

There were no major grey seal haul-out or breeding sites recorded near Ballycotton reported during the National Parks and Wildlife Service (NPWS) surveys since 2003. Cronin *et al.* (2004) reported 6 grey seals hauled out in Kimsale Harbour in August 2003 during an aerial survey for harbour seals. O'Cadhla and Strong (2007) reported no grey seals east of Saltee Islands and west of Kedge Island to the west during an aerial survey during the moulting period. Duck and Morris (2013) reported no seals between Power Head and Youghal in August/September 2012

using thermal imagery. A repeat survey carried out in 2017/18 recorded single grey seals hauled out in Ballycotton Bay (Morris and Duck, 2019) (Figure 16).

Grey seals forage locally and may also range long distances and are likely to be encountered at the disposal site and during dredging. Grey seals are typically encountered as individuals when foraging.

## 5 | IMPACT ASSESSMENT

### 5.1 | Description of Activities

As part of the proposed site works the activities likely to impact on marine mammals include:

#### 5.1. Dredging

The dredge site is within Ballycotton Harbour and consists of gravel silts, sands and gravels. This will be dredged by long reach back-hoe excavator from a floating barge. An estimated total quantity of 19,500m$^3$ of material is being dredged. A total of 18,000m$^3$ of gravel, silt and sand will be disposed of at sea. The remaining 1,500m$^3$ of contaminated gravel, silt and sand will require disposal at a suitably licensed site. It is anticipated that overburden (gravel, silt, and sand) will have a maximum dredging rate of 500m$^3$ per 24 hours. It is likely that dredging activities will take place 24hrs per day, 7 days per week to achieve the maximum production rates within tidal envelopes, and continue for around 8 weeks during September-October.



#### 5.2. Dumping

The disposal site is approximately 10km to the west of Kilmore Quay and around 16km southwest of Ballycotton and 4.81 kms (2.59 nmls) offshore and has been used previously to dispose of dredge material.

The dredged material will be loaded onto a hopper barge with 1,000m$^3$ capacity and towed to the disposal site with a tug. Therefore it is anticipated around 25-30 loads will be transported to the dump site at a rate of 3-4 loads per week

Typical Dredge Barge, Backhoe Excavator, and Hopper Barge

### 5.3 Vessel noise

The barge once filled with dredged material will transit to the disposal site. At a speed of 8 nmls and a distance of 12nmls, it will take around 3 hours minutes for a round trip back to Ballycotton harbour and a total of 25-30 trips to dispose of approximately 18,000m$^3$. This increase in vessel noise is very low and is unlikely to cause any significant disturbance as fishing and other vessels regularly use this area.

The timing of the dredging and disposal at sea is dependent on the recommendations of this Marine Mammal Risk Assessment.

## 5.2 | Literature Review of Impacts and Mitigation

The NPWS '*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters – January 2014*' recommends that listed coastal and marine activities, undergo a risk assessment for anthropogenic sound-related impacts on relevant protected marine mammal species to address any area-specific sensitivities, both in timing and spatial extent, and to inform the consenting process. It is required that such an assessment must competently identify the risks according to the available evidence and consider (i) direct, (ii) indirect and (iii) cumulative effects of anthropogenic sound (NPWS, 2014).

A risk assessment, following NPWS Guidelines, was conducted based on the published literature, data from the IWDG sightings databases and knowledge of the study area.



**Dredging Impacts**

Todd *et al.* (2015) provide a very useful review of the state of current knowledge and potential impacts of dredging on marine mammals. Dredging produces continuous, broadband, low frequency sound, below 1 kHz, with sound pressure levels between 168dB and 186dB re 1µPa at 1m (Todd *et al.* 2015). In most cases the noise is continuous in nature.

There have been few studies on the effects of marine dredging (Thomsen *et al*. 2006; Nowacek *et al.* 2007). Richardson *et al*. (1995) identified only two studies on the effects of dredging on marine mammals and both were on large baleen whales (bowhead and northern right whales). Both Odontocetes (toothed whales) and Mysticetes (baleen whales) have been recorded regularly at the proposed dredging and dump site so here we considered the effects on both groups as well as seals.

*Baleen whales*

Of the baleen whales in the vicinity of the proposed operations, minke whales would potentially be exposed to dredge disposal activity during summer months and fin and humpback whales during winter. Richardson *et al.* (1995) reported on a controlled exposure experiment on Bowhead whales which received broadband levels of <113 – 131 dB re 1 µPa (<11 – 30 dB above ambient) from a suction dredger which lead to weak and inconspicuous avoidance, however he considered the low frequency components were under-represented. Off the southeast coast of the US, Northern Right whales exposed to intensive dredging by noisy hopper dredges apparently show some tolerance of this noise (cited in Richardson *et al.* 1995). The best documented case of long-term change by baleen whales is from Baja California where Gray whales breeding in lagoons subjected to industrial activities, including dredging were virtually absent during years with shipping which led to the suggestion that the constant dredging may have been the main source of disturbance (cited in Richardson *et al.* 1995).

*Odontocetes*

The effects of dredging on dolphins and porpoise have been poorly studied. Belugas showed less reaction to stationary dredges than moving barges in the Mackenzie estuary, Canada and it was concluded that passage of belugas along a shoreline was temporarily blocked by a dredging operation involving frequent barge traffic but not by a dredging operation with little barge traffic (cited in Richardson *et al.* 1995).

Recently Pirotta *et al.* (2013) carried out the most comprehensive study of the potential effects of dredging on bottlenose dolphins using static acoustic monitoring before, during and after maintenance and capital dredging of Aberdeen Harbour off NE Scotland, where 400,000m$^3$ of spoil was removed. The Moray Firth is home to a resident group of bottlenose dolphins and they demonstrated a clear avoidance response to dredging at a foraging area despite it being a highly urbanised site. Dolphins spent less time in the harbour as the intensity of dredging increased. Visual monitoring also showed a lower probability of observing dolphins occurred when dredging boats were present. Group size was not affected suggesting that all individuals in a group were affected equally and were likely to leave the area (Pirotta *et al.* 2013). The mechanism leading to displacement was not clear. The response may have been due to the discontinuous and rarely occurring stimulus, not regularly experienced by dolphins, or due to masking and impacting on communication or foraging. The effect may have been indirect by effecting the dolphins prey within this prey patch.

Diederichs *et al.* (2010), through the use of acoustic monitoring with click detectors, showed that porpoises temporarily avoided an area where sand extraction took place off the Island of Sylt in Germany. The authors found that when the dredging vessel was closer than 600m to the monitoring location, it took three times longer before a porpoise was again detected compared with times without sand extraction. However, all of these studies only considered dredging and not the dumping of dredged material. Tougaard *et al.* (2015) recently reviewed proposed noise exposure limits for harbour porpoises. TTS was previously induced at 164 dB at 4kHz with a single pulse or 164-175 if exposed for longer periods and a range of frequencies. Tougaard *et al.* (2015) suggested TTS could be elicited at SEL of 100-110 dB but this work was really aimed at pulse sounds from pile driving and not continuous sound produced by dredging and shipping. It is clear that of all the odontocetes, harbour porpoise are likely to be most affected by anthropogenic noise due to their high foraging rates as they tend to prey on small fish (Wisniewska *et al.* 2016).



Odontocetes are often quite tolerant of shipping noise, being repeatedly exposed to many vessels, small and large. Thus dredging seems to have less effect on marine mammals than moving sound sources although avoidance behaviour of whales exposed to high levels of activity have been documented. Reactions, when measured have only occurred when received sound levels are well above ambient levels.

*Seals*

Although there are fewer studies on pinnipeds or odontocetes these animals do tolerate considerable noise from such sources (Richardson *et al.* 1995). Elevated noise from dredging could also affect seals which are sensitive to a lower frequency range (Todd *et al.* 2015). Todd *et al.* (2015) reported on observations of dredging operations in Geraldton, Western Australia between 2002 and 2003, reported that New Zealand fur seals and Australian sea lions showed no sign of disturbance reactions, despite the relative closeness of dredging to popular haul-out sights. Similarly, Hawaiian monk seals showed no adverse reactions to bucket dredgers around Tern Island. Anderwald *et al.* (2013) found that grey seals showed some level of avoidance to high construction vessel traffic in Ireland, although it should be noted that observations were undertaken from a cliff, so animals possibly taking advantage of increased food close to operating dredgers may have been missed by observers.

Pinnipeds may exhibit great tolerance to coastal activities and often haul out on man-made structures where there is considerable human activity. This exposure may lead to some chronic exposure to man-made noise, with which they tolerate. Ecological or physiological requirements may leave some marine mammals with no choice but to remain in these areas and continue to become chronically exposed to the effects of noise. In areas with repeated exposure, mammals may become habituated with a decline in avoidance responses and thus become less sensitive to noise and disturbance (Richardson *et al*. 1995).

Despite these references to the potential effects of dredging on marine mammals there is little consideration of the impact of the actual dumping of dredge material as opposed to removal of material from the site to be dredged. This is either an oversight, or more likely reflects the extremely low impact of the dumping of dredged material on marine mammals, compared to the effects of dredging, which are considered low down the spectrum of impacts of coastal activities on marine mammals. OSPAR (2008) suggested that the dumping of dredge materials are largely irrelevant with respect to environmental impact and the issue are confined to disturbance due to underwater noise emission during the dumping process and during the transport (ship noise).

#### 5.2.2 Turbidity

A review carried out by Truitt (1988) showed that significantly elevated turbidity levels are generally confined to the lower 15-20% of the water column depth, declining by orders of magnitude toward the surface. Turbidity levels at all depths decline rapidly, approaching background levels within a matter of minutes to tens of minutes, with the bottom levels declining slowest.



Sedimentation and any increases in turbidity are unlikely to affect marine mammals, which use echolocation. Marine mammals often inhabit turbid environments, and many utilise sophisticated sonar systems to sense the environment around them (Au *et al.* 2000). Pinnipeds do not produce sonar for prey detection purposes, however Newby *et al.* (1970) reported apparent blindness in three harbour seals on Gertrude Island, Puget Sound, Washington and found them to appear healthy suggesting their ability to forage was unaffected by blindness. McConnell *et al.* (1999) tracked grey seals in the North Sea and included one blind seal in their study. No significant difference in foraging behaviour was found indicating vision is not essential to pinnipeds' survival or ability to forage.

### 5.3 Risk Assessment

The total amount to be dredged is estimated at 19,500 $m^3$ of which approximately 18,000 $m^3$ will be disposed of at sea. With a full load of a maximum of 1000 $m^3$ per operation it is calculated that around 25-30 dumping operations will be carried out. This is a relatively small compared to larger dredging operations in ports along the south coast, including adjacent Waterford and Cork Harbours. The disposal site has been routinely used for the dumping of dredged material, with approximately eight million tonnes of material dumped at this site between 1997 and 2012 at an average rate of around 550,000 $m^3$ per annum. The site is is 4.81 kilometers (2.59 nautical miles) offshore of Power Head. There is a large diversity and abundance of marine mammals in the area. The risk of a negative interaction is restricted to the potential impact of the dumping of dredged material in the dump zone and the potential for disturbance associated with the dump vessel.

#### 5.3.1 Acoustic disturbance

**Noise associated with dredging**

The potential for disturbance to marine mammals is greatest when elevated levels of underwater noise are considered. Marine mammals, especially cetaceans, have well developed acoustic capabilities and are sensitive to sound at much higher frequencies compared to humans (Richardson *et al.* 1995). They are less sensitive to lower frequencies but there is still great uncertainty over the effects of sound pressure levels on marine mammals and thus the assessment of its impact. Sources of noise include that generated during dredging and the vessel transiting to and from the disposal site.

Received levels of dredging noise by marine mammals can exceed ambient levels to considerable distances depending on the type of dredger used (Richardson *et al.* 1995). Noise levels emanating from a backhoe dredger operating around the Shetland Islands, UK, were recorded by Nedwell et al. (2008). Using a scaling of 10 log (R/1 m), the back-calculated source level was 163 dB re 1 mPa at 1 metre (bandwidth ¼ 20 Hz–100 kHz). In contrast, Reine et al. (2012) calculated source levels of 179 dB re 1 mPa at 1 metre (bandwidth ¼ 3 Hz – 20 kHz), but the used scaling was different [15 log (R/1 m)], so results are difficult to compare. McKeown (2016) carried out underwater noise measurements during the 2016 maintenance dredging campaign in Dublin Port. The PSD plots of the dredging operation show some lower frequency tonal components between 200 Hz and 2 kHz were attributed to the pump. The dredging operation has a higher frequency signal in comparison to the dumping operation. Sound levels for the dredging operations at ranges of 213 and 268 m were below the disturbance threshold for harbour porpoise of 140 dB re 1 µPa SPLRMS and 140 dB re 1µPa² s SEL. Noise levels were below the NOAA general behavioural threshold for marine mammals of 160 dB re 1 µPa SPLRMS (McKeown 2016).

Audiograms for bottlenose dolphins show peak sensitivity between 50-60 kHz and no sensitivity below 2 kHz and above around 130 Khz (Richardson *et al.* 1995). Because of rapid attenuation of low frequencies in shallow water dredge noise normally is undetectable underwater at ranges beyond 20-25km (Richardson *et al.* 1995). The effects of low frequency (4-8 kHz) noise level and duration in causing threshold shifts in bottlenose dolphins were predicted by Mooney *et al.* (2009). They found that if the sound exposure levels were kept constant, significant shifts were induced by longer duration exposures but not for shorter exposures.



NPWS (2014) identify increased sound pressure levels above ambient do occur due to TSHD dredging which could be detected up to 10km from shore. These levels are thought to potentially cause masking or behavioural effects but are not thought to cause injury to a marine mammal. There is no guidance on the effects of noise generated by disposal of dredge material on marine mammals.

### 5.3.2 Noise associated with shipping

Shipping produces low broadband and “tonal” narrowband sounds. The primary sources are propeller cavitation and singing and propulsion of other machinery (Richardson *et al.* 1995). For large and medium vessels, tones dominate up to around 50Hz and broadband components may extend to 100Hz.

Many odontocetes show considerable tolerance to vessel traffic. Sini *et al.* (2005) showed bottlenose dolphins resident in the Moray Firth generally exhibited a positive reaction to medium (16-30m) and large vessels (>30m) and showed some evidence of habituation. Buckstaff (2004) suggested an exposure level of 110-120 dB from vessel noise solicited no observable effect on bottlenose dolphins. A similar exposure level solicited minor changes in orientation behaviour and locomotion changes in minke whales (Palka and Hammond 2001). Harbour porpoise are frequently observed near vessels but tend to change behaviour and move away and this avoidance may occur up to 1-1.5km from a ship but is stronger with 400m (cited from Richardson *et al.* 1995). Seals show considerable tolerance to vessel activity but this does not exclude the possibility that it has an effect.

### 5.3.3 Disturbance during transit

The presence of a dredger and associated craft in the harbour will lead to a very slight increase in vessel traffic and associated noise. Back-hoe dredgers produce largely low frequency sounds, however, given the use of Ballycotton Harbour by vessels, creating ambient noise already experienced at this site, the presence of an additional vessel and associated noise, is extremely unlikely to be significant. The increased noise above ambient levels generated by the activity will be of relatively short duration (8 weeks).

### 5.3.4 Disturbance during disposal of dredged material

The disposal site has been used previously for the dumping of dredged material. Increased noise from dredging soft sediment is restricted to <100m from dredging operations during disposal (McKeown 2016), thus increased sound pressure associated with spoil disposal will be above ambient noise levels within a very small area (radius <100m). It might be expected to be slightly higher for sand dredging and disposal.

Marine mammals are tolerant of shipping noise, being repeatedly exposed to many vessels, small and large. Pinnipeds also exhibit much tolerance and often haul out on man-made structures where there is considerable human activity. This exposure may lead to some chronic exposure to man-made noise, with which they tolerate. Ecological or physiological requirements may leave some marine mammals with no choice but to remain in these areas and continue to become chronically exposed to the effects of noise. In areas with repeated exposure, mammals may become habituated with a decline in avoidance responses and thus become less sensitive to noise and disturbance (Richardson *et al.* 1995). Thus, dredging seems to have less effect on marine mammals than moving sound sources although avoidance behaviour of whales exposed to high levels of activity have been documented. Reactions, when measured have only occurred when received sound levels are well above ambient levels.



### 5.3.5 Physical Disturbance

The risk of injury or mortality is considered extremely low as marine mammals are exposed to considerable vessel traffic on a daily basis and would be aware of their presence. The towing vessel is slow moving and not able to turn quickly thus any animals in the area would have sufficient time to avoid any collisions and thus injury or mortality. The chance of actually releasing dredged material on top of a marine mammal is extremely unlikely. The duration of the release of dredged material is very short (<1 minute) and the vessel slows down during spoil release.

### 5.3.6 Collision Risk

Collisions are extremely unlikely due to the slow speed of the tug and barge. Dredging is unlikely to cause damage to marine mammal auditory systems, but masking and behavioural changes are possible (Todd *et al.* 2015). Sediment disturbance and any increases in turbidity are unlikely to affect marine mammals that use echolocation, or pinnipeds since research indicates that vision is not essential to pinnipeds' survival or ability to forage (McConnell *et al.* 1999). It is unlikely that vessels will encounter many marine mammals during operations and those in the vicinity will have time to avoid the towing vessel and barge.

### 5.3.7 Indirect impacts on preferred prey

No adverse effects on fish species are expected from dredging and disposal operations.

### 5.3.8 Potential disturbance to life-cycle

The dumping of dredged material will not cause any adverse effects on cetaceans or seals in the area providing mitigation measures are in place but may affect prey availability. Small shoaling fish that occur regularly in the diet of seals and small cetaceans and are likely to be affected during operations. Any displacement resulting from indirect impacts on available prey will be short-term and local, with fish returning to the area at the completion of dumping activity.

Increased turbidity will result from dumping spoil within the disposal site. Increased turbidity is unlikely to have a direct effect of marine mammals but may have an indirect effect through impacts on prey (Todd *et al.* 2015). There is limited evidence for an effect of increased turbidity on marine mammals. Harbour porpoise use echolocation to navigate and locate prey and thus would not be affected by increased turbidity. Even when increased turbidity has been shown to substantially reduce visual acuity in seals, which are not known to use sonar for prey detection, there is no evidence of reduced foraging efficiency (Todd *et al.* 2015).

### 5.3.9. Cumulative Effects

The use of the disposal site by Port of Cork could lead to cumulative effects oif dredging at Ballycotton and in Cork Harbour occurred at the same time. The Port of Cork have recently applied for a Disposal at Sea licence to cover the period 2021 to 2029 for maintenance dredging. The proposed maintenance dredging campaigns may occur throughout the year excluding November and February. This is a change to previous dredging campaigns, which was restricted to the autumn period (September – October). Thus it is important that dreging at Ballycotton does not coincide with dredging campaign in Cork Harbour with both using the same disposal site simultaneously.



## 6 | Identification of Relevant Natura 2000 sites with marine mammals as a qualifying interest

Marine mammals are highly mobile and range far outside those sites designated to protect them. Grey seals are known to travel up to 75 and 100 km day$^{-1}$ (McConnell et al. 1999). There are two SAC with marine mammals as qualifying interests along the south coast, within approximately 100km of the activity.

**Table 2. Special Areas of Conservation, which list marine mammals as a Qualifying Interest, with reasonable foraging range of Ballycotton Harbour and the proposed disposal site**

| Site | Qualifying Interest | | | Distance to Dredging Sites | |
|---|---|---|---|---|---|
| | Grey seal | Harbour seal | Harbour porpoise | nmls | km |
| Saltee Islands SAC (Site Code 000707) | X | - | - | 54 | 100 |
| Roaringwater Bay and Islands SAC (Site Code 000101) | X | - | X | 58 | 106 |

The two closest SACs with grey seals as qualifying interests are presented in Table 2. The Saltees Islands SAC off Co Wexford is an important breeding site for grey seals and occurs 100km to the east of the site, while the Roaringwater Bay and Islands SAC is 106km from the site, in the other direction (west). Despite this distance, individual grey seals from these sites could potentially forage at the dredging and dumping sites (Cronin *et al.*

2016). Roaringwater Bay and Islands SAC is also designated for harbour porpoise and individuals using this SAC are part of a wider population that also occur off east Cork.

The Conservation Objectives of these two SACs (NPWS 2011a; 2011b) are to maintain their favourable conservation condition, which is defined by a number of attributes and targets:

Access to suitable habitat

i) Species range within the site should not be restricted by artificial barriers to site use.

Breeding behaviour

ii) The breeding sites should be maintained in a natural condition.

Moulting behaviour

iii) The moult haul-out sites should be maintained in a natural condition.

Resting behaviour

iv) The resting haul-out sites should be maintained in a natural condition.

Population composition

v) The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually

Disturbance Level of impact

vi) Human activities should occur at levels that do not adversely affect the grey seal population

The only attribute which could potentially be impacted is attribute vi) disturbance. It is extremely unlikely that any disturbance associated with dredging or disposal of spoil would lead to any likely significant effects and thus this conservation objective will not be compromised.

No artificial barriers will be created and disturbance, if it occurs at all will be temporary and very local and have no significant effect on seals or harbour porpoise or the conservation objectives of either SAC.



## 5 Mitigation Measures

Potential mitigation measures during the dumping operation are limited. Similar activities both nationally and internationally have been monitored through the provision of a Marine Mammal Observer (MMO) who ensures that there are no marine mammals within a pre-agreed distance prior to dredging and disposal during daylight hours. The MMO can also record any reaction to the dumping operation. However, this mitigation measure will only be effective during daylight hours and in favourable weather conditions.

The National Parks and Wildlife Service recommend a distance of 500m radial distance of the dredging sound source in water depths of <200m (NPWS 2014) on commencement. If a significant negative change in behaviour is recorded such as rapid movement away from vessel or distress then the MMO should have the authority to cease operations. If marine mammals enter the buffer zone during dredging. Marine mammals should not be within 50m of the dredger when it is dumping.

### 6.1 Disturbance

The most effective way of mitigating the potential effects of disturbance is through the provision of an MMO ensuring no marine mammals are present within an agreed buffer zone.

### 6.2 Collision, injury and mortality

The most effective way of mitigating the potential effects of collision, injury and mortality is through the provision of an MMO ensuring no marine mammals are present within an agreed buffer zone.

### 6.3 Disruption of normal behaviour

Dredging activity is of short duration and displacement will be short term. Pre, during and post dredge monitoring would allow for an assessment of any disruption and if it is evident then the level can be quantified. Post-dredge monitoring would also provide a means to establish if disruption occurred and how long it takes for animals to return to an area and resume site usage.

While sound exposure levels from such operations are thought to be below that expected to cause injury to a marine mammal, disturbance, from the noise generated by dredging, from the physical presence of the dredger, and associated vessels, and possibly from the increased water turbidity in the area of operations have the potential to cause, for example, low level disturbance, masking or behavioural impacts (NPWS, 2014). The activities of a long reach excavator will lead to a very localised increase in noise levels and the use of seagoing vessels such as barges to a very slight increase in vessel traffic and associated noise. Small work vessels produce low frequency sounds (Table 2). The presence of an additional small vessel and the associated noise produced, is very unlikely to have a significant impact on marine mammals, though it may discourage seals from using the immediate area of the operations.

**Table 2. Estimated noise emissions from small workboat / tug (Wyatt, 2008)**

| Vessel Type | Displacement Tonne | Length m | Propulsion | Activity | Measurement | Measurement band kHz | Extrapolation dB re 1 µPa m peak to peak | Reference |
|---|---|---|---|---|---|---|---|---|
| Tug with Barge[55] | Tug Gross tonnage 104 | 19.5 (64 ft) | Main engine 1095 hp diesel | Unloaded Speed 7.4 knots | 173 dB re 1 µPa @ 1 m Source level | 0.01 to 20 | 182 Broadband 10 to 2500 Hz with broad peak between60 and 600Hz | (Zykov and Hannay 2006) |



## 5.3 | NPWS Assessment Criteria

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

There are a variety of marine mammal species recorded in the area, especially bottlenose and common dolphin, harbour porpoise and minke, fin and humpback whales. All are part of a larger population and very mobile.

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

The project will not cause injury or death but could lead to local disturbance, from noise associated with the project.

Noise Impact

The activities proposed during this project consist of dredging and disposal operations. It is extremely unlikely any noise generated will be capable of causing permanent or temporary hearing injury to a marine mammal. Localised disturbance to marine mammals in the works area may occur during operations, but is limited by:

- The location of the dredging site, within and adjacent to Ballycotton harbour. Any marine mammals in the harbour will be accommodated to human activities. Noise transmission to the wider bay is very unlikely.
- The very shallow nature of the dredging site.
- The regular transit of fishing and recreational vessels.
- The relatively short duration of the planned activity of 8 weeks
- If dredging takes place during summer months the species most likely exposed to disturbance include bottlenose dolphin, harbour porpoise and minke whale while dredging and disposal during winter will expose common dolphin and fin and humpback whales. Then breeding and pupping seasons for grey seals lies between August to November.

Physical Impact

The risk of injury or mortality is considered low as marine mammals in the in the immediate vicinity of the site are exposed to human activity on a daily basis and would be accommodated. The dump vessel is slow moving and thus any animals in the area would have sufficient time to avoid any collisions and thus injury or mortality.

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

No abundance estimates for cetaceans are available but it's likely that the numbers in the area for each species are <50. Great Saltee Island may have up to 300 seals hauled out during the grey seal pupping season and moult period and up to 150 grey seals in the Roaringwater Bay and Islands SAC.

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

The proposed dredging will be carried out between September and October. This coincides with the grey seal pupping and breeding season and during the start of the peak period for common dolphins and fin and humpback whales.

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

There are no data to suggest that any particular seal or cetacean gender or age group predominates in the around Ballycotton Harbour and adjacent disposal site. Both adult and juvenile grey seals have been recorded on the Saltee Islands and in Roaringwater Bay as it is a pupping and breeding site. All ages of harbour porpoise have been recorded in the Roaringwater Bay and Islands SAC (O'Brien and Berrow 2020).

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

While bottlenose and common dolphins, harbour porpoise and grey seals frequently and regularly occur in the area in small numbers, there may be temporary disturbance to these but they are accommodated to human activities and are likely to not be affected. Large baleen whales occur during winter and roam over a much wider area during this period.

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

While there may be temporary disturbance all marine mammals in the area are accommodated to human activities and are likely to recover from any temporary disturbance within hours or days.

**5.4 | Mitigation**

*Timing of Dredging and Disposal at Sea*

Both grey seals and bottlenose dolphins, and to a lesser extent harbour porpoise, can potentially be affected by the proposed operations and are listed on Annex II of the EU Habitats Directive. Harbour porpoise are considered as being particularly sensitive species to noise from demolition and dumping operations. Baleen whales are more sensitive to the low frequency noise generated by an additional vessel and dredging in the area.

Dredging will place during late summer/early autumn (September to October). The species most likely exposed to any temporary disturbance include bottlenose dolphin, harbour porpoise and minke whale. This period is also at the start of the peak period for common dolphin and fin and humpback whales. The breeding and pupping seasons for grey seals lies between August to November, which coincides with the dredging period. Given the proximity of the SAC for grey seals and the possibly presence of fin and humpback whales, both species considered Endangered under the IUCN Conservation status criteria, there is potential for dredging and dumping impact on these marine mammals. To accommodate dredging at this time of year we recommend adoption of the NPWS Guidelines for minimising impacts of man –made sounds in Irish waters.

*Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters*

The mitigation measures recommended by the NPWS are for the presence of a trained and experienced Marine Observer (MMO) and the use of "ramp up" procedures for noise and vibration emitting operations. The proposed mitigation measures (Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters) recommended by the Department of Arts, Heritage and the Gaeltacht in 2014 are designed to mitigate any possible effects.



The following mitigation measures are proposed to minimise the potential impacts on marine mammals and to allow animals move away from the area of dredging operations:

1. All personnel will be appropriately trained about environmental issues prior to the start of the operation.
2. All equipment will be in good condition to avoid spillage or discharge of oil, smoke and excessive noise.
3. Refuelling will be carried out by competent and trained people away from any environmentally sensitive areas; and dredger to be moored up securely.
4. An appropriate waste container will be placed to collect waste before the final disposal by authorised company and hazardous material storage areas will be identified, labelled, and properly marked and fitted with spill containment systems;
5. Excavators and barges will be checked for any fuel / oil leaks on a regular basis by the crew.
6. Any spills we be reported immediately to the site agent/authorities
7. In the event of a major spill due to damage to the dredger. Locate and isolate, inform harbour authorities, Project manager and environmental agency.
8. A dedicated Marine Mammal Observer will conduct a 30 minute watch for marine mammals within 500m of the excavator prior to start up. If a seal or cetacean (or otter) is sighted within 100m of the excavator, start-up must be delayed until the animals is observed to move outside the mitigation zone or the 15 minutes has passed without the animal being sighted within the mitigation zone.

9. A dedicated Marine Mammal Observer will conduct a watch for marine mammals prior to disposal at sea. If a seal or cetacean (or otter) is sighted within 50m of the vessel once it has reached the dump site, disposal must be delayed until the animal(s) are observed to move outside this mitigation zone or the 15 minutes has passed without the animal(s) being sighted within the mitigation zone.
10. The excavator will be started at lowest revs of the pump, with pump revs increased over a 15 minute period to allow wildlife an opportunity to move further away from the vessel prior to the pumps reaching full power.

### 5.5 | Residual Impacts

With implementation of the above mitigation measures, it is very unlikely that there will be negative residual impacts from the proposed dredging works on marine mammals in the area. It is also very unlikely that any animals will be injured or killed as a result of the proposed works. Seals using the area are likely to be tolerant of vessel noise and any animals which might be displaced from the vicinity of the excavator or barge can be expected to quickly re-establish use of the area following cessation of the works.

## 6 | SUMMARY

The waters around Ballycotton Harbour are important for marine mammals including the regular occurrence of bottlenose and common dolphins, harbour porpoise and minke, fin and humpback whales as well as being within foraging range of SACs for breeding grey seals. Dredging and disposal is planned for September-October which coincides with the grey seal pupping and breeding season and during the start of the peak period for common dolphins and fin and humpback whales.

We recommend the NPWS Guidelines to minimise the acoustic impacts of dredging be implemented to enable a dredging campaign to be carried out during the autumn, which will result in no significant impacts to marine mammals.

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