19/062 - WO064 Marine Modelling Studies - Lot 4 Galway Bay

Assessment of Impacts of the Maritime Usage (AIMU) Report

Uisce Éireann

December 2024

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Quality Information

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1. Introduction

1.1 Background

AECOM was commissioned by Uisce Éireann to prepare an Assessment of Impacts of the Maritime Usage (AIMU) report on their behalf. The report will support a Maritime Usage Licence under Schedule 7 Section 110 of the Marine Area Planning Act 2021 in relation to a Marine Modelling Study (MMS) being carried out in Galway Bay (Lot 4 Project). The licence is required to carry out marine surveys in Galway Bay within the Proposed Licence Areas shown in Appendix A, Maps A-D. The specific areas that will be subject to marine surveys (bathymetry surveys and Acoustic Doppler Current Profilers (ADCPs)) that are considered in this application are shown in Figures 1 – 8.

Uisce Éireann are responsible for many continuous or intermittent discharges into the marine environment. Within the Galway Bay area, there are over 50 wastewater discharge points into the marine environment. At present, there are no hydrodynamic marine water quality models developed to support water quality assessments in the Proposed Licence Areas and Uisce Éireann now require this model to be developed, which is the purpose of the Lot 4 Project. The model will support the assessment of water quality for all discharges against environmental legislation criteria.

This Lot 4 Project will include four phases: scoping, marine surveys, calibration and validation and scenario analysis. The marine surveys will collect the necessary hydrodynamic data. This data will then be used for the calibration of a hydrodynamic model to support a water quality assessment in Proposed Licence Areas. This SISAA report is prepared in relation to the scoping phase of the Lot 4 Project. The scoping phase includes three Work Packages (WPs) which will be carried out sequentially. This AIMU report specifically fulfils WP 3 – Maritime Usage Licence (see below). All work packages are due to be completed in 2024.

- Work Package 1 - Phase 1 Environmental Scoping Report;
- Work Package 2 - Data Manual; and
- Work Package 3 - Maritime Usage Licence.

1.2 Purpose of the Report

This AIMU report considers the potential for significant effects from the marine surveys of the Lot 4 Project on marine receptors, which include benthic habitats, fish and shellfish, aquaculture and marine mammals. This report has examined the potential for marine survey related impacts on the environment, including the following elements:

- Assessment of impact on the environment with respect to the Environmental Impact Assessment (EIA) Directive.
- Assessment of conformity relative to the key objectives of the Water Framework Directive (WFD)
- Assessment of conformity relative to the key objectives of the Marine Strategy Framework Directive (MSFD)
- Assessment of consistency with the National Marine Planning Framework (NMPF).

1.3 Quality Assurance and Statement of Authority

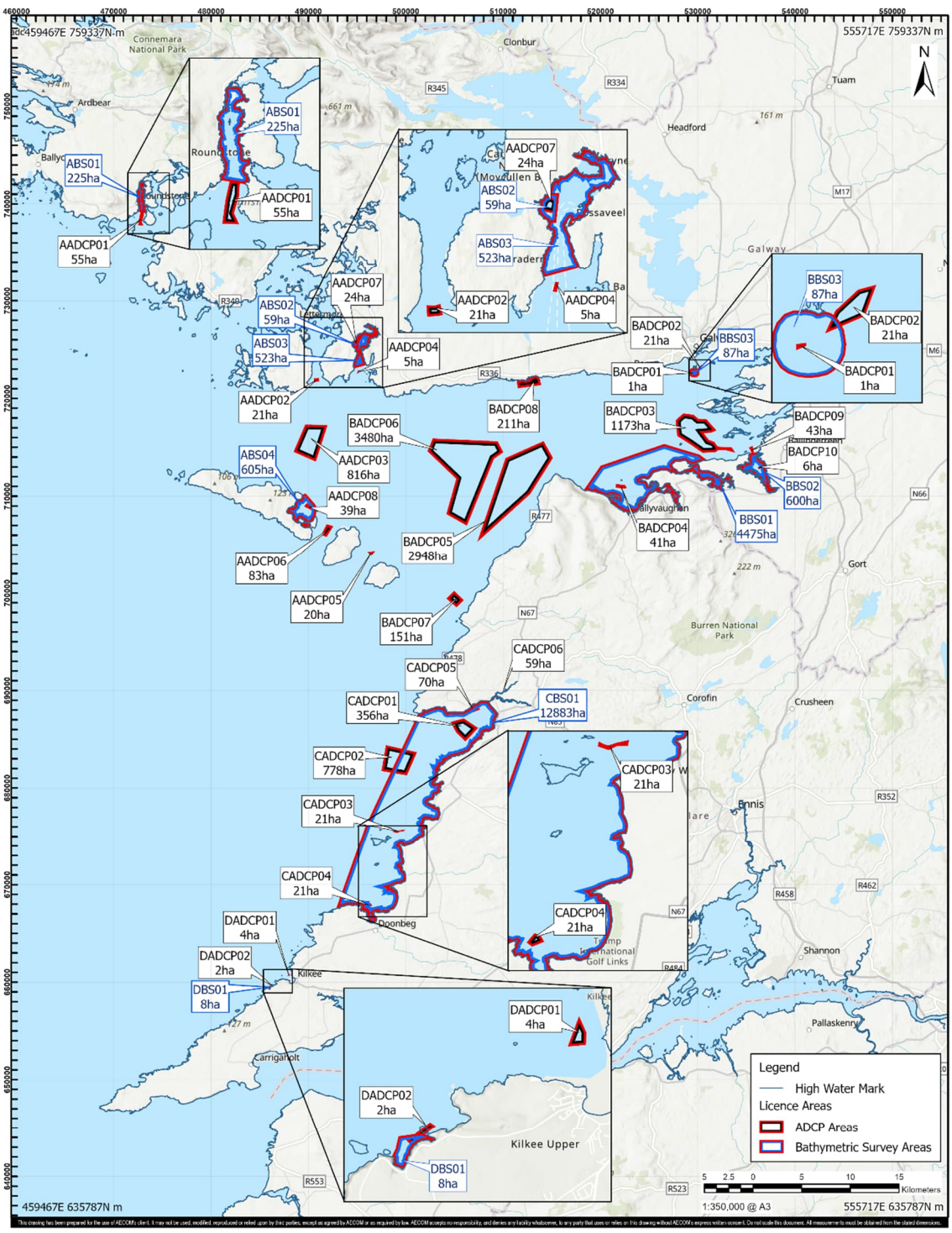
This report, and the assessment described within it, has been completed in accordance with the AECOM Integrated Management System (IMS). AECOM's IMS places emphasis on professionalism, technical excellence, quality, as well as covering health, safety, environment and sustainability management. All AECOM staff members are committed to maintaining this accreditation to those parts of BS EN ISO 9001:2015 and 14001:2015, as well as BS OHSAS 18001:2007 that are relevant to the provision of consultancy services.

2. Project Description

The Lot 4 Project involves conducting marine surveys within certain areas of the Proposed Licence Areas (Figure 1). These marine surveys will include ADCP surveys, bathymetric surveys and other passive water quality surveys (e.g. water sample collection from shore or vessel via a handheld passive sonde and/or Niskin bottle, water level/tidal monitoring using tide gauges fixed to an existing structure and CTD measurements from vessel or fixed to a tide gauge or ADCP). The passive water quality surveys are undertaken by extremely minimally disturbing/non-intrusive methods which will not impact any protected marine species and are therefore not considered further in this assessment.

The other marine survey activities will involve deploying, operating, and recovering ADCPs and a tidal gauge and the bathymetric surveys will use vessel mounted single beam or multibeam echo sounders (SBES/MBES) within certain areas of the Proposed Licence Areas.

The surveys are scheduled to commence at some point within a 60-month period from 1st April 2025. The survey duration will be a minimum of 35-days and a maximum 60 days (survey period). Within that survey period there will be 13-hour surveys over a spring tide and a neap tide. The bathymetric surveys may be undertaken during that survey period or as separate surveys but not before 1st April 2025. The data collected will be used for calibrating a hydrodynamic model. The locations of the ADCP surveys and bathymetric surveys are shown on Figure 1.



CLIENT
Uisce Éireann Irish Water

TITLE
Proposed Licence Area Map
Lot 4 Licence Area

DRAWING NUMBER
Figure 1

REVISION
Revision No 1

Date
22/11/2024

PROJECTION
Irish Transverse Mercator (ITM)

MARA FILE REFERENCE
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DATA SOURCES
High Water Mark (HWM) as defined by the CBS was sourced as recommended in the MARA Technical Guidance V5: Tailte Eireann Surveying Open Data Portal https://data-osi.opendata.arcgis.com/

Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, TomTom, Garmin, Foursquare, , METI/NASA, GeoTechnologies, Inc.

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Figure 1. Proposed Surveys

2.1 ADCP Surveys

These surveys will be carried out in shallow waters, less than 100 m in depth, only. The ADCP surveys will contain no more than a single ADCP within each survey area (ADCP Area). The ADCP Areas total 10,452.12 ha. Conservatively, the individual footprint of each ADCP is considered to be less than 1 m^2. The ADCPs are placed on the seabed in order to measure water current velocities over a depth range using the doppler effect of sound waves scattered back from particles within the water column. There will be up to 26 ADCPs deployed, with 23 ADCPs being deployed on the seabed for the survey period. Three ADCPs will be suspended in the water column, via a vessel mounted method or alternatively via a passive impeller due to unsuitable seabed habitats present (Table 1) for the two 13-hour surveys.

The exact make and model of the ADCP equipment is not known at the time of writing this report. However, the operating frequency of any ADCP deployed will be >200 kHz (typically around 500 kHz for many models). The instrument emits “pings” of sound at a sampling rate of 1-minute average every 10 minutes. The list of ADCPs and their areas are shown in Table 1.

For the purposes on this NIS report the construction phase is defined as the deployment of ADCPs on the seabed/vessel-mounted, the operational phase is the operation of the ADCPs, and the decommissioning phase is the recovery of the ADCPs from the seabed/vessel. These are described in further detail below.

2.1.1 Deployment of ADCP Instruments (Construction Phase)

ADCPs will be deployed from the vessel's deck onto the seabed at predetermined locations (one ADCP placed within each Area) in water depths less than 100 m only. However, the exact placement location within each site is not known at the time of writing this report as a location which is suitably level and avoiding any sensitive features will be determined during the survey.

Deployment onto the seabed is carried out by lifting the ADCP instruments from the vessel's deck using a deck crane or A-frame with a winch and then carefully placing them on the seabed. The single vessel based ADCP deployment is caried out by lowering from a vessel or bridge either manually or using a mechanical winch and will be vessel mounted (i.e. will not be placed on the seabed).

2.1.2 Operation of ADCP Instruments (Operation Phase)

During operation, the ADCPs will be left in place on the seabed/vessel for an approximate duration of the survey period to collect necessary data for calibrating the hydrodynamic model. To collect these data during operation, the ADCP survey instruments will emit periodic "pings" of sound into the water column. For the Lot 4 Project, the pings will have operating frequencies between 200 kHz to 500 kHz. The instrument is contained within a trawl resistant housing. A Conductivity Temperature Depth (CTD) sonde may be placed inside the housing.

2.1.3 Recovery of ADCP Instruments (Decommissioning)

To facilitate recovery, a hydrostatic release mechanism will be employed. When activated, it sends a ranging ping to the release mechanism. If successful, this mechanism releases a buoy connected to a recovery line. The vessel can then manoeuvre into position over the buoy and retrieve the ADCPs onto the boat using the crane. In cases where the hydrostatic release fails, the ADCPs are equipped with acoustic pingers that can be activated to assist in locating the ADCP instruments. Another attempt can then be made to activate the acoustic release. If this attempt also fails, the ADCP will be recovered using a grapple recovery method. If required, this involves dragging a line with a grapple attached across the seabed in the deployment area to catch the grapple line between the ADCPs and the grapple anchor.

Table 1. List of ADCP areas within the Proposed Licence Areas

Site Reference	Site Name	Area (ha)	Comments
AADCP01	Roundstone	55.23	
AADCP02	Greatman's Bay Approaches	20.70	Vessel based survey (i.e. the ADCP will not be placed on the seabed).
AADCP03	North Sound	816.25	Deeper water -40 mCD to -50 mCD, exposed location.
AADCP04	Rossavel Harbour Approaches	4.90	
AADCP05	Foul Sound	20.00	

AADCP06	Gregory Sound	82.74	
AADCP07	Carraroe	23.70	Likely to be a vessel-based survey if the seabed is mud and not suitable for placing an ADCP on the seabed.
AADCP08	Killeany Bay	38.76	
BADCP01	Galway Outfall	1.01	Location of the largest Uisce Éireann outfall in the Proposed Licence Areas
BADCP02	Galway Approaches	20.82	
BADCP03	South Bay	1,173.85	
BADCP04	Ballyvaughn Bay	40.58	
BADCP05	Black Head	2,948.81	
BADCP06	Inverine Bank	3,481.60	
BADCP07	South Sound	151.13	
BADCP08	Spiddal	211.41	
BADCP09	Kinvarra 1	42.96	Vessel based survey (i.e. the ADCP will not be placed on the seabed).
BADCP10	Kinvarra 2	5.70	
CADCP01	Liscannor Bay	356.34	
CADCP02	Mal Bay	778.54	
CADCP03	Kilmurray Ibrickane	21.13	
CADCP04	Doonbeg	20.92	
CADCP05	Lahinch & Ennistymon 1	69.82	
CADCP06	Lahinch & Ennistymon 2	58.88	Vessel based survey (i.e. the ADCP will not be placed on the seabed).
DADCP01	Kilkee Bay	3.96	
DADCP02	Kilkee (Intrinsic Bay)	2.39	

2.2 Bathymetric Surveys

The bathymetric surveys will include the use of SBES and/or MBES within the Proposed Licence Areas. These surveys will be carried out in shallow waters only, less than 100 m in depth. At the time of writing this report the exact number, make and models are not known but the operating characteristics for shallow water are well understood. It is therefore assumed that survey equipment will have an operating frequency of 200 kHz to 700 kHz for MBES and 200 kHz for SBES. The SBES/MBES will be vessel-mounted for a period of up to 28 days. The total area of bathymetric surveys is 19,487.16 ha. The list of bathymetric surveys and their areas are shown in Table 2.

Table 2. List of Bathymetric survey areas within the Proposed Licence Areas

Site Reference	Site Name	Area (ha)
ABS01	Roundstone	225.29
ABS02	Carraroe Inner	59.49
ABS03	Carraroe Outer	522.63
ABS04	Killeany Bay	604.36
BBS01	Ballyvaughn and Aughinish	4,483.16
BBS02	Kinvarra	600.09
BBS03	Mutton Island	87.27
CBS01	Mal and Liscannor Bays	12,888.57

DBS01	Kilkee	7.89

2.3 Tide Gauges

Of the eighteen tide gauges within the Lot 4 Proposed Licence Areas A-D, it is anticipated that all will be attached to existing fixed structures such as navigation marks or quaysides. The proposed tide gauge within the Inagh River Estuary SAC (CTG02) will ideally be fixed to the Falls Hotel quayside, or the thrust block of the wastewater treatment plant outfall. However, if this is not possible then it may be necessary to install a thin metal pole (<100 mm diameter) into the bank / bed of the river close to the wastewater treatment plant and fix the tide gauge to that pole. The approximate location of this is shown in Table 3, which is located in the River Inagh but is beyond any saltmarsh habitat that is specifically protected as a qualifying feature of this SAC (NPWS, 2017). Installation of the tide gauge by this method will be avoided, but if it is necessary then care will be taken during removal to minimise any disturbance to the bank / bed of the river.

Table 3 River Inagh tide gauge location

Site Reference	Site Name	Easting	Northing
CTG02	River Inagh	112484	188598

2.4 Survey Vessels

Survey vessels will be selected by the survey contractor. The vessels will be selected based on suitability as a survey platform for the deployment and recovery of the different equipment. It is envisioned that two small vessels (up to 25 m in length) moving (i.e., survey speeds of 4 knots and 10 – 15 knots whilst in transit) will be used at any one time during the marine surveys. The vessels may maintain their position either using an anchor dynamic positioning depending on the size and type of vessel. Note, that dynamic positioning will not be used in shallow areas or when a vessel is close to the shore except for berthing operations at suitable docking facilities.

2.5 Needs and Alternatives

The marine surveys are needed to inform hydrodynamic marine water quality models for 50 wastewater discharge points in the marine environment of the Lot 4 Project. At this stage, no other project alternatives have been identified, due to the short-term, temporary and non-intrusive nature of the proposed marine surveys. Additionally, alternatives for this type of data collection are sparse due to the need for specific and tailored methods.

3. Methods

Two other reports have been completed to support this Maritime Usage Licence application. These reports are: Supporting Information for Screening for Appropriate Assessment (SISAA) (AECOM, 2024a) and an Annex IV Risk Assessment (AECOM, 2024b). Both reports were referenced during the preparation of this AIMU report.

This AIMU report has been prepared with reference to the following European Directives, national legislation, and guidance on the provisions of, among others, the Environmental Impact Assessment Directive:

- Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (EIA Directive);
- European Communities (Birds and Natural Habitats) Regulations 2011. SI No. 477 of 2011;
- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. European Commission 2018. 7621 final. Office for Official Publications of the European Communities, Luxembourg;
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022);
- Technical Guidance note: Obtaining a licence to carry out specified maritime usages in the Maritime Area under the Maritime Area Planning Act 2021. MARA, 2024 Ver 5. (MARA, 2024); and
- Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Department of Arts, Heritage and the Gaeltacht, 2014 (DAHG, 2014).

3.1.1 Desk Study

A desk study was carried out to identify nature conservation designations and records of habitats / species potentially relevant to the proposed works and to inform the environmental appraisal. A stratified approach was taken during the desk study, based on the likely zone of influence (ZoI)[1] of the proposed works on different ecological and environmental features. The following data sources were used to inform the existing environmental conditions baseline characterisation:

- Mapping of Protected Sites in Ireland online at National Parks and Wildlife Service (NPWS) mapper (https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=8f7060450de3485fa1c1085536d477ba) (accessed June 2024);
- Marine mammal ecology, fish ecology information, benthic habitat data, fishing activity, seascape and landscape information, heritage information, other relevant projects or plans from Marine Plan Irelands Spatial Planning Portal (https://marineplan.ie/) (accessed June 2024);
- Environmental Protection Agency (EPA) rivers and water quality data and Water Framework Directive (WFD) status at EPA map viewer (https://gis.epa.ie/EPAMaps/) (accessed June 2024);
- SISAA Report (AECOM, 2024a);
- Annex IV Risk Assessment (AECOM, 2024b); and
- Publicly available literature regarding the marine environment in Galway Bay.

Accordingly, the desk study identified:

- International nature conservation designations (i.e. SACs, SPAs and Ramsar sites) covered in the SISAA Report, or beyond where a potential link was identified;
- National nature conservation designations (i.e. Natural Heritage Areas (NHAs) and Proposed NHAs (pNHAs)) overlapping with the Lot 4 License Areas; and
- Records of protected and notable habitats and species within the Study Area that are designated under international sites covered in the SISAA report and protected under other designations.

The area covered by the desk study is herein referred to as the 'Study Area'.

[1] The 'zone of influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed works and associated activities.

4. Environmental Report (EIA Directive)

4.1 Background

The objective of the EIA Directive is to ensure that projects that are likely to have a significant effect on the environment are adequately assessed before they are approved. An EIA is required for all projects detailed in Annex I of the EIA Directive and for all projects detailed in Annex II where the proposed project is likely to have significant effects on the environment. The proposed marine surveys do not fall within the classes defined under Annex I or Annex II of the EIA Directive. Therefore, it is not subject to the provisions of the EIA Directive.

Notwithstanding the fact that the marine surveys are not subject to mandatory EIA, this AIMU has assessed the works relative to its potential to impact the receiving marine environment. As such the following elements have been assessed and an analysis of the assessment is given in Appendix B of this report.

- Land & Soils
- Water
- Biodiversity
- Fisheries and Aquaculture
- Air Quality
- Noise & Vibration
- Landscape/Seascape
- Traffic & Transport (including navigation)
- Cultural Heritage (including underwater archaeology
- Population & Human Health
- Major Accidents & Disasters
- Climate
- Waste
- Material Assets
- Interactions

4.2 Impact Assessment

Potential impact pathways from the marine surveys to the receiving environment have been assessed in this section. A summary of the impact pathways being considered are also shown Appendix B Table B-1.

4.2.1 Land and Soils

The marine surveys will be carried out in the maritime only. However, several Licence Areas fall adjacent to land along the west coast of Ireland. The coast features cliffs, including the Cliffs of Moher and numerous bays and inlets, including the large, sheltered Galway Bay itself. There are numerous beaches along the west coast including along Salthill and Connemara. The dominant geology of the west coast of Ireland around Galway is characterised by a diverse mix of limestone, sandstone, and granite formations, shaped by glacial and karst processes. The Burren, located to the south in County Clare, is a vast karst landscape primarily composed of exposed limestone pavements, fissures, and cave systems. In Connemara, to the west and northwest of Galway city, the terrain is dominated by older metamorphic rocks like schists and gneisses, along with quartzite in the Twelve Bens mountain range and significant granite intrusions from the Devonian period. Glacial features such as drumlins, eskers, and erratics are scattered throughout the region, while the karst areas feature extensive cave systems and underground rivers. The marine surveys will be carried out in the maritime area only and therefore no effect are predicted to occur to land and soils and these are therefore not considered further.

4.2.2 Water

The Licence Areas fall within several coastal Water Framework Directive (WFD) waterbodies (Environmental Protection Agency, 2024a):

- Inner Galway Bay South;
- Ballyvaghan Bay;
- Outer Galway Bay;
- Aughinish Bay;
- Shannon Plume;
- The Aran Islands, Galway Bay and Connemara;
- Casla Bay;
- Kilkieran Bay;
- Bertraghboy Bay;
- Liscanoor Bay; and
- Doonbeg Bay.

These waterbodies were all classed as having a 'high' status in the latest monitoring period of 2016 – 2021, with the exception of Aughinish Bay, Liscannor Bay and Doonbeg Bay which are of 'good' status (Environmental Protection Agency, 2024b). A status of 'high' indicates that the water is unpolluted and supports the normal functioning of ecological processes, with a 'good' status indicating only a slight change from the reference condition.

The marine surveys within the Proposed Licence Areas are not expected to result in a deterioration of the waterbodies. Several protocols will be implemented to reduce the risk of accidental spills and pollution events of fuel and oils from the survey vessel. Only one vessel will be required for the marine surveys, in an area with several ports and a large commercial fishing industry. Therefore, the addition of one extra vessel during the marine surveys is not expected to increase the risk of pollution events from accidental spills above baseline conditions. Furthermore, with mitigation measures in place, such as compliance with the International Convention for the Prevention of Marine Pollution from Ships (MARPOL), spills are considered to be highly unlikely to occur, with any spills that do occur expected to be small-scale and rapidly diluted and dispersed by surround water currents. Therefore, no adverse effects are expected, and this has not been considered further.

4.2.3 Biodiversity

4.2.3.1 Designated Sites

A total of 30 relevant European sites are located within the Study Area (Table 4). Of these, 21 (eight SACs and 13 SPAs) are located within Proposed Licence Areas (Figure 2). Further information on the SACs and SPAs has been provided in the Galway Bay Lot 4 SISAA and Natura Impact Statement (NIS) which concluded that the marine surveys will result in no adverse effects on the integrity of any European site (s).

Several natural heritage areas (NHAs) are also present in the Study Area (Table 4). NHAs are primarily in place for the protection of terrestrial habitats, but do also offer some protection for marine features, particularly birds. Also present in the Study Area are proposed NHAs (pNHAs). Publicly available information regarding the protected features of all pNHAs in the Study Area is lacking, however they all overlap with European site designations and therefore protected features (shown in Table 4) are expected to be aligned.

Table 4. Designated Sites in the Study Area

Site	Protected Marine Features
Designated Sites	
Black Head-Poulsallagh Complex SAC	Reefs
Carrowmore Dunes SAC	Reefs
Carrowmore Point to Spanish Point and Islands SAC	Reefs and coastal lagoons
Connemara Bog Complex SAC	Reefs and coastal lagoons
Galway Bay Complex SAC	Reefs, coastal lagoons, large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, Mediterranean salt meadows, harbour seal *Phoca vitulina*

Site	Protected Marine Features
Inagh River Estuary SAC	Salicornia and other annuals colonising mud and sand and Atlantic salt meadows
Inisheer Island SAC	Reefs and coastal lagoons
Inishmaan Island SAC	Reefs
Inishmore Island SAC	Reefs and coastal lagoons
Kerry Head Shoal SAC	Reefs
Kilkee Reefs SAC	Reefs, large shallow inlets and bays, Submerged or partially submerged sea caves
Kilkieran Bay And Islands SAC	Reefs, coastal lagoons, large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, mediterranean salt meadows, harbour seal
Kingstown Bay SAC	Large shallow inlets and bays
Lough Corrib SAC	Atlantic salmon *Salmo salar*, brook lamprey *Lampetra planeri*, sea lamprey *Petromyzon marinus*
Lower River Shannon SAC	Atlantic salmon, sea lamprey, brook lamprey and river lamprey *Lampetra fluviatilis*;
Slyne Head Peninsula SAC	Coastal lagoons [1150]. Large shallow inlets and bays [1160]. Reefs [1170]. Annual vegetation of drift lines
West Connacht Coast SAC	Common bottlenose dolphin *Tursiops truncatus*
Cliffs of Moher SPA	Various waterbirds and seabirds
Connemara Bog Complex SPA	
Cregganna Marsh SPA	
Dingle Peninsula SPA	
Illaunonearaun SPA	
Inishmore SPA	
Inner Galway Bay SPA	
Kerry Head SPA	
Loop Head SPA	
Magharee Islands SPA	
Mid-Clare Coast SPA	
River Shannon and River Fergus Estuaries SPA	
Slyne Head To Ardmore Point Islands SPA	
Natural Heritage Sites	
Illaunonearaun	Marine habitats and species (non-specific)
Moycullen Bogs	Curlew *Numenius arquata* and lapwing *Vanellus vanellus*
Proposed Natural Heritage Sites	
Galway Bay Complex	Reefs, coastal lagoons, large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, mediterranean salt meadows, harbour seal
Black Head-Poulsallagh Complex	Reefs
Inisheer Island	Reefs and coastal lagoons
Inishmaan Island	Reefs
Inishmore Island	Reefs and coastal lagoons
Cliffs of Moher	Fulmar *Fulmarus glacialis*, kittiwake *Rissa tridactyla*, guillemot *Uria aalge*, razorbill *Alca torda*, puffin

Site	Protected Marine Features
	Fratercula arctica and chough *Pyrrhocorax pyrrhocorax*
Inagh River Estuary	Salicornia and other annuals colonising mud and sand and Atlantic salt meadows
Carrowmore Point to Spanish Point And Islands	Reefs and coastal lagoons
Loop Head	Kittiwake, guillemot
Eagle Rock	Reefs, coastal lagoons, large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, mediterranean salt meadows, harbour seal
Inishmuskerry	Reefs, coastal lagoons, large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, Mediterranean salt meadows, harbour seal
Finish Island Machair	Reefs, coastal lagoons, large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, Mediterranean salt meadows, harbour seal
Mweenish Island Machair	Reefs, coastal lagoons, large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, mediterranean salt meadows, harbour seal
Mason Island Machair	Reefs, coastal lagoons, large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, mediterranean salt meadows, harbour seal
St Macdara's Island	Barnacle goose *Branta leucopsis*, sandwich tern *Thalasseus sandvicensis*, arctic tern *Sterna paradisaea*, little tern *Sterna albifrons*
Geabhrog Island	Reefs, coastal lagoons, large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, mediterranean salt meadows, harbour seal
Oilean Na Ngeabhrog (Illaungurraig)	Reefs, coastal lagoons, large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows, Mediterranean salt meadows, harbour seal
Mace Head Islands	Barnacle goose, sandwich tern, arctic tern, little tern

A full assessment of the effects of the marine surveys on designated sites has been conducted in the SISAA Report, which has concluded likely significant effects to two European sites. However, a full Appropriate Assessment (AA) was conducted in a NIS (AECOM, 2024c) which concluded that there will be no adverse effect on the integrity of any European site.

There is the potential for temporary physical disturbance to marine features of NHAs and pNHAs resulting from the marine surveys. However, due to the short-term, temporary nature of the surveys and the small footprint of each ADCP (less than 1 m^2), any disturbance is considered to be negligible and therefore no significant impacts are likely.

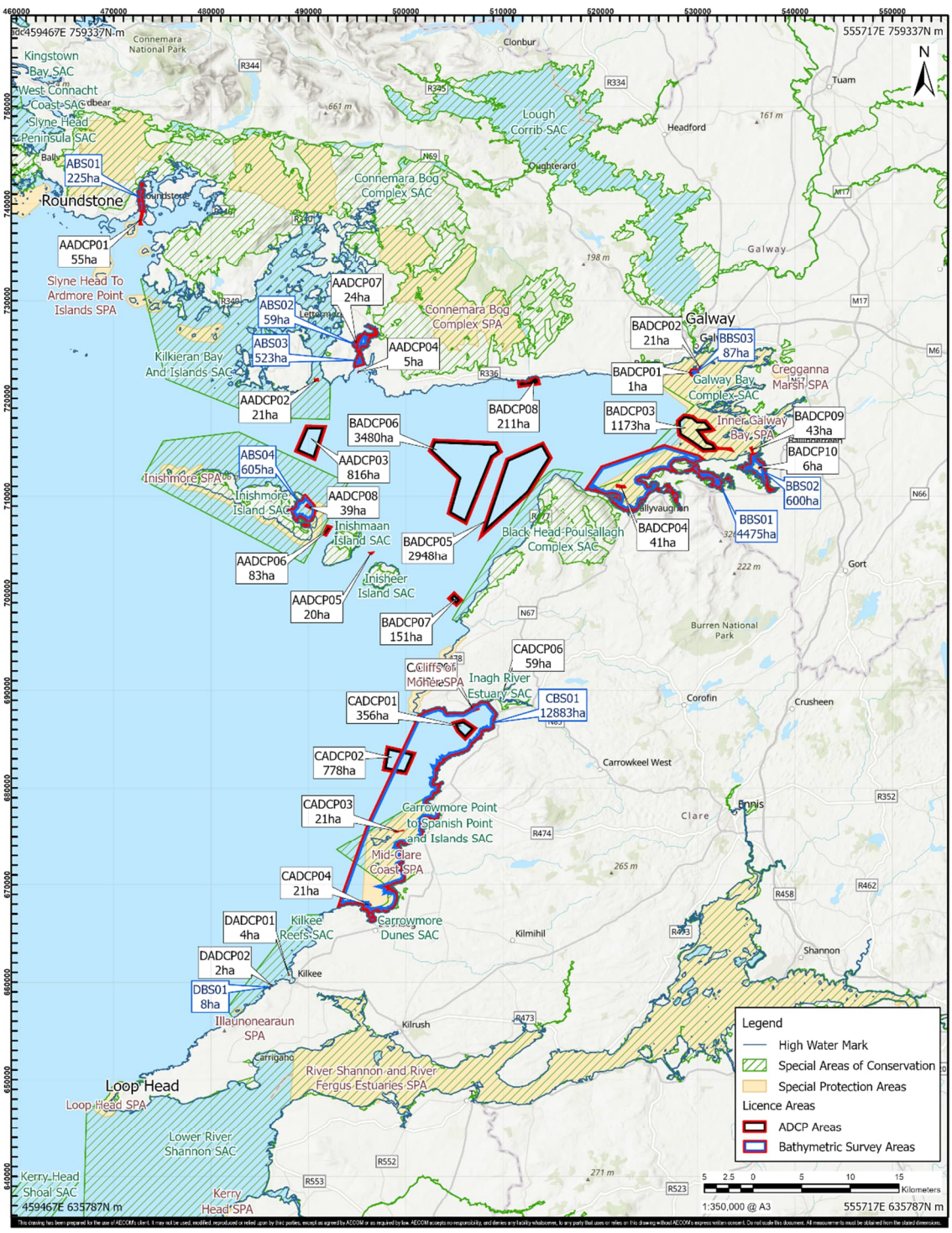


Figure 2. Proposed Surveys and Relevant European Sites

4.2.3.2 Benthic Habitats and Species

Several benthic habitat types, consisting of a mixture of mud, sand, coarser sediments and rock, exist in the Study Area (Figure 3). The broadscale habitats present in Galway Bay (Department of Housing, Local Government and Heritage, 2023) and the typically associated species can be found in Table 5.

Table 5. Broadscale Habitat Types Present in the Study Area and Associated Species

Habitat Type	Location in Study Area	Commonly Associated Species
Infralittoral rock and biogenic reef	ABS03, BBS01, BBS02 and CBS01	Characterisation is dependent on level of wave exposure, but commonly characterised by the kelps *Laminaria hyperborea* in exposed habitats and *Laminaria saccharina* in less exposed conditions. In the lower shore, dabberlocks *Alaria esculenta* or the kelps *Laminaria digitata* or *Laminaria saccharina* can also be present, depending on exposure (EEA,2019a).
Infralittoral mixed sediment	AADCP02 and BBS01	Support infaunal and epifaunal species including polychaetes, bivalves, echinoderms, anemones, hydroids and bryozoa (EEA, 2019b).
Circalittoral mixed sediment	AADCP02	Characterised by polychaetes, bivalves, echinoderms, burrowing anemones, species including hydroids can become established on hard substrata (EEA, 2019c).
Circalittoral rock and biogenic reef	AADCP02, BBS01, CADCP02 and CBS01	Can be dominated by red algae, the character of fauna varies widely depending on wave action, salinity etc (EEA, 2019d).
Infralittoral coarse sediment	AADCP02, BADCP03, BBS01 and BBS02	Characterised by infaunal polychaetes (e.g., *Chaetozone setosa* and *Lanice conchilega*), crustaceans such as *Iphinoe trispinosa* and *Diastylis bradyi* and several bivalve species. Habitats including the lancelet *Branchiostoma lanceolatum* can also occur (EEA, 2019e).
Circalittoral coarse sediment	AADCP02, BADCP03, BBS01 and AADCP05	Characterised by polychaetes, crustaceans and bivalves. Some sea cucumber species, such as *Neopentadactyla,* could also be present and also the lancelet (EEA, 2019f).
Circalittoral mud	AADCP03, BADCP06, BADCP05, BADCP02, BADCP01, BADCP03, BBS01, AADCP06 and BADCP07	Seapens such as *Virgularia mirabilis* and *Pennatula phosphera*, anemone species including *Cerianthus lloydii*, starfish such as *Amphiura* spp., burrowing megafauna such as *Nephrops norvegicus* (European Environment Agency (EEA), 2019g)
Infralittoral sand	BADCP02, BADCP03, BADCP04, BBS01 and BBS02	Dominated by polychaetes e.g., shovelhead worm *Magelona mirabilis*, bivalves e.g., bean-like tellin *Fabulina fibula*, urchins e.g., sea potato *Echinocardium cordatum* and some amphipods (EEA, 2019h).
Infralittoral mud	BADCP02, BBS01 and BBS02	Dominated by polychaetes, oligochaetes and echinoderms, particularly including brittlestars *Amphiura* spp. (EEA, 2019i).
Circalittoral sand	BADCP02, BADCP03, BBS01, AADCP05, CADCP02 and CBS01	Characterised by a wide range of echinoderms, polychaetes and bivalves, also sometimes including the sea urchin *Echinocyamus pusillus*. This habitat can support a diverse community (EEA, 2019j).
Unclassified habitat	ABS01, AADCP01, ABS02, ABS03, AADCP04, BBS01, CADCP01,	N/A

Habitat Type	Location in Study Area	Commonly Associated Species
	CADCP02, CBS01, CADCP03, CADCP04, DADCP01, DADCP02 and DBS01	

Sea cliff habitats are also present around the coastline, which form the Annex I habitat 'vegetated sea cliffs of the Atlantic and Baltic coasts' (European Environment Agency, 2019k). Sea cliffs in the Study Area are present in Rusheen and Carrowmore in country Galway. Sea cliffs are also present in Aughinish, Aghaglinny, Murrooghtoohy, Crumlin, Ballyryan, Glasha More, Ballycahan, Doonmacfelim, the Cliffs of Moher, Cloghaundine, Rineen, Fintra More, Breaffy, Annagh, Emlagh, Ballard, Corbally, Moveen to Bridge of Ross, Loop Head, Kilbaha, Kilcloher, Moyarta and Lisheencrony in County Clare.

The coastline of Galway Bay is also covered in patches of saltmarsh, with the habitat consisting of mosaics of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) and Mediterranean salt meadows (*Juncetalia maritime*), both of which are Annex I habitats. Several communities can be associated with these habitat types including *Puccinellia maritima* saltmarsh community, *Halimione portulacoides* saltmarsh community, and *Juncus maritimus* (JNCC, 2023; European Environment Agency, 2019l).

Annex I estuaries are also present in the Study Area and include the Corrib River Estuary, Oranmore Bay Estuary, Dunbulcaun Bay Estuary, Kinvarra Bay, Aille Clare Estuary, Inagh and Dealagh Rivers Estuary, Liscannor Bay, Doonbeg Estuary, and Casla Estuary (Department of Housing, Local Government and Heritage, 2023).

The deployment and operation of the ADCP instruments on the seabed in the Study Area have the potential to result in temporary disturbance, loss or damage to benthic habitats and species in the direct vicinity of chosen locations.

A large proportion of the Proposed Licence Areas consists of dynamic sediments such as mud and sand which are highly mobile due to ocean currents and wave action. Consequently, these sediments are expected to return to their normal baseline conditions once operations cease and the ADCP instruments are removed from the seabed. Additionally, these sediments and habitats host mobile species that can temporarily relocate from the affected area and return after the instruments are removed.

Given the small footprint of each individual ADCP instrument (less than 1 m²) relative to the overall habitat coverage, the reduction in available habitat for associated species in the Licence Areas is expected to be negligible. The bathymetric surveys are not expected to have contact with the benthic environment and therefore no direct benthic disturbance is expected.

Furthermore, while current mapping indicates the presence of geogenic and/or biogenic Annex I reef within some of the ADCP Areas (Table 5; Figure 3), deployment of ADCPs on such habitats will not occur as they will only be placed on sediment habitats. Site investigations at the time of deployment will ensure reef habitats are avoided by reference to vessel soundings at the time of deployment.

Several other Annex I habitats are present in the wider Study Area. Annex I saltmarsh habitats and sea caves are not considered further in this assessment as they are located in the intertidal zone and the instruments will be required to remain fully submerged throughout the tidal cycle.

There is potential for the instruments to be placed in several Annex I estuaries in the Study Area. However, the amount of estuarine habitat which could be disturbed, lost or damaged is considered to be negligible (1 m^2 per each individual ADCP instrument) compared to the overall area of estuaries. These habitats are highly mobile in nature and any instruments being placed within the habitats during the marine surveys are not considered to result in significant effects.

Therefore, the effect of temporary disturbance, direct loss of or damage to benthic habitats and species due to the deployment, operation and removal of ADCP instruments is considered to be minor with a negligible magnitude, and therefore not significant.

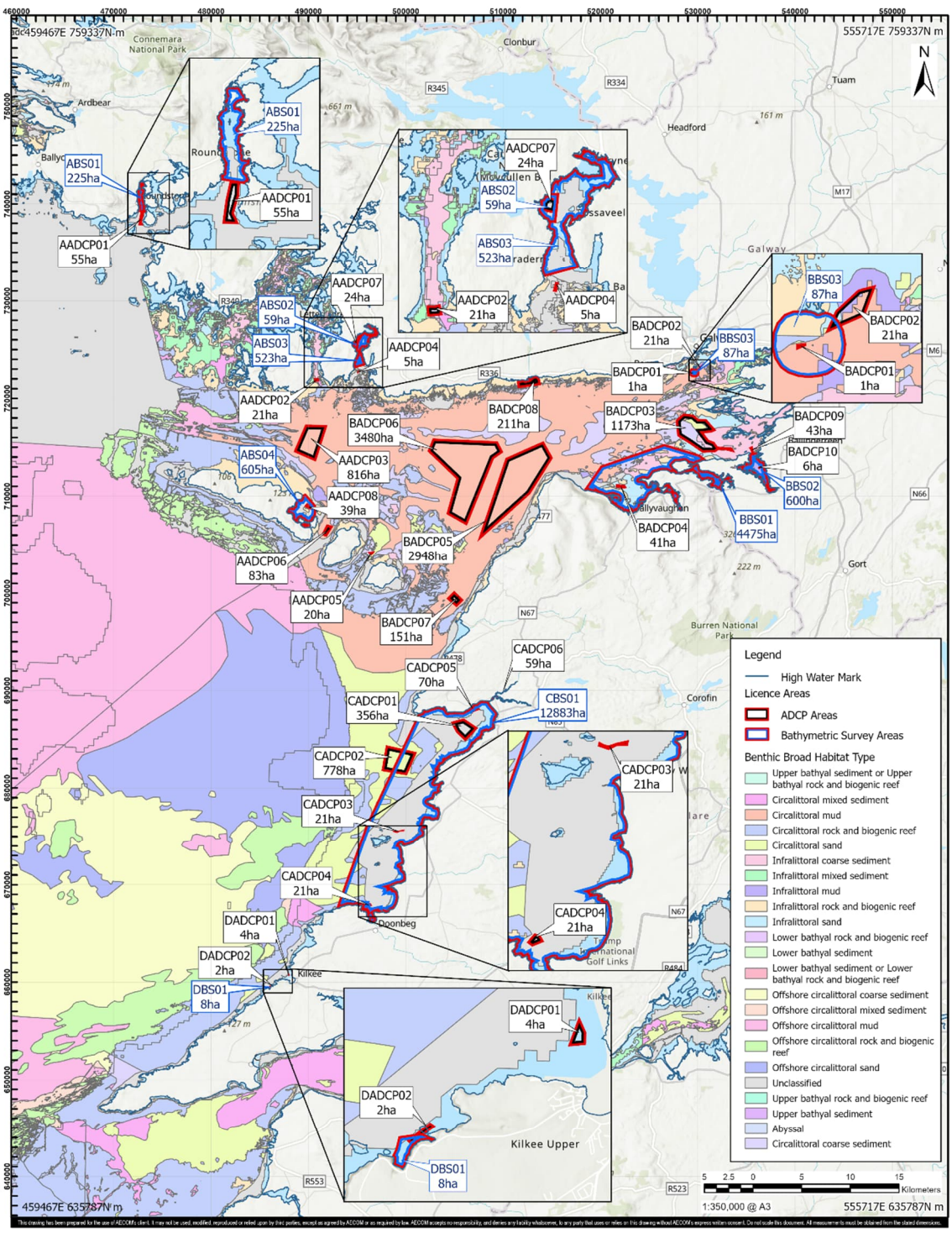


Figure 3. Proposed Surveys and Broadscale benthic habitats

4.2.3.3 Marine Mammals

Cetacean species which are commonly found off the west coast of Ireland and therefore have the potential to occur in the vicinity of the marine surveys are:

- Harbour porpoise *Phocoena phocoena*;

- Bottlenose dolphin *Tursiops truncatus*;
- Common dolphin *Delphinus delphis*; and
- Minke whale *Balaenoptera acutorostrata*.

There are also two species of seal likely to be present in the Licence Areas

- Grey seal *Halichoerus grypus*; and
- Harbour seal *Phoca vitulina*.

The cetacean species listed above are all included under Annex II and Annex IV of the Habitats Directive. Harbour seal and grey seal are included under Annex II only. The designated sites under which these species are protected, and which are at risk of impact from the marine surveys, are determined based on the species-specific Marine Mammal Management Units (MMMUs), published by the Inter Agency Marine Mammal Working Group (IAMMWG) (IAMMWG, 2022) (see Figure 2 in Galway Bay Lot 4 Annex IV Risk Assessment).

The operation of the ADCPs and the vessel used for ADCP deployment and recovery will both produce underwater sound. In addition, the use of SBES and/or MBES during the bathymetric surveys will also produce underwater sound. The effects of underwater sound on marine mammals have been considered further in Section 4.2.7.

Further information on marine mammals can be found in the SISAA Report, NIS and Annex IV Risk Assessment. The Annex IV Risk assessment concluded that the marine surveys will not significantly affect the favourable conservation status of any Annex IV species as defined by the Habitats Directive and is therefore considered to be not significant. The NIS concluded that the marine surveys would not adversely affect the integrity of any European site designated for these species.

4.2.3.4 Birds

There are several nationally and internationally important species of bird in Ireland which inhabit areas of coastal sea cliffs, estuaries and offshore islands, many of which are designated as SPAs.

The temporary use of one vessel during the marine surveys may result in the temporary displacement of birds when foraging at sea or loafing. The surveys may include the use of vessels within or close to SPAs in the Study Area.

Birds are highly mobile species and therefore are considered to be able to move away from the disturbance to other suitable habitat, returning once the disturbance has stopped. In addition, there are several ports located in the Study Area and commercial fishing activities and therefore birds are expected to have some habituation to the presence of vessels in the Study Area. Furthermore, the vessel will only be operational for a short period of time.

Therefore, any impacts to birds are expected to be negligible, and not significant.

Further information on marine ornithology can be found in the SISAA Report, which concluded no significant impacts to SPAs as a result of the marine surveys.

4.2.4 Fish

Annex II Fish Species

There are three Annex II migratory fish species which are qualifying features of European sites within the Study Area. These are Atlantic salmon, sea, brook and river lamprey. Further information has been provided in the SISAA Report.

The operation of the ADCPs, the use of SBES and/or MBES during the bathymetric surveys and the vessels themselves, will all produce underwater sound which could affect fish species within the Lot 4 Licence Area. The effects of underwater sound on fish have been considered further in Section 4.2.7.

The temporary presence of one vessel during the marine surveys may result in the temporary displacement of fish and shellfish, which could also affect aquaculture and the local commercial fishing industry. However, fish are highly mobile species and are likely to quickly relocate to nearby areas and resume their normal activities once the disturbance subsides. Shellfish will be located near the seafloor and therefore are not considered to be at risk of vessel activity on the surface of the water column. Additionally, the disturbance is confined to the immediate vicinity of the deployment vessel, which means the overall impact on fish species is expected to be minimal. Furthermore, there are several ports located in the Study Area and commercial fishing activities and therefore fish are expected to have some habituation to the presence of vessels in the Study Area.

Therefore, impact of disturbance to fish due to vessel presence and survey activity is considered to be negligible, and not significant.

Other Important Fish Species

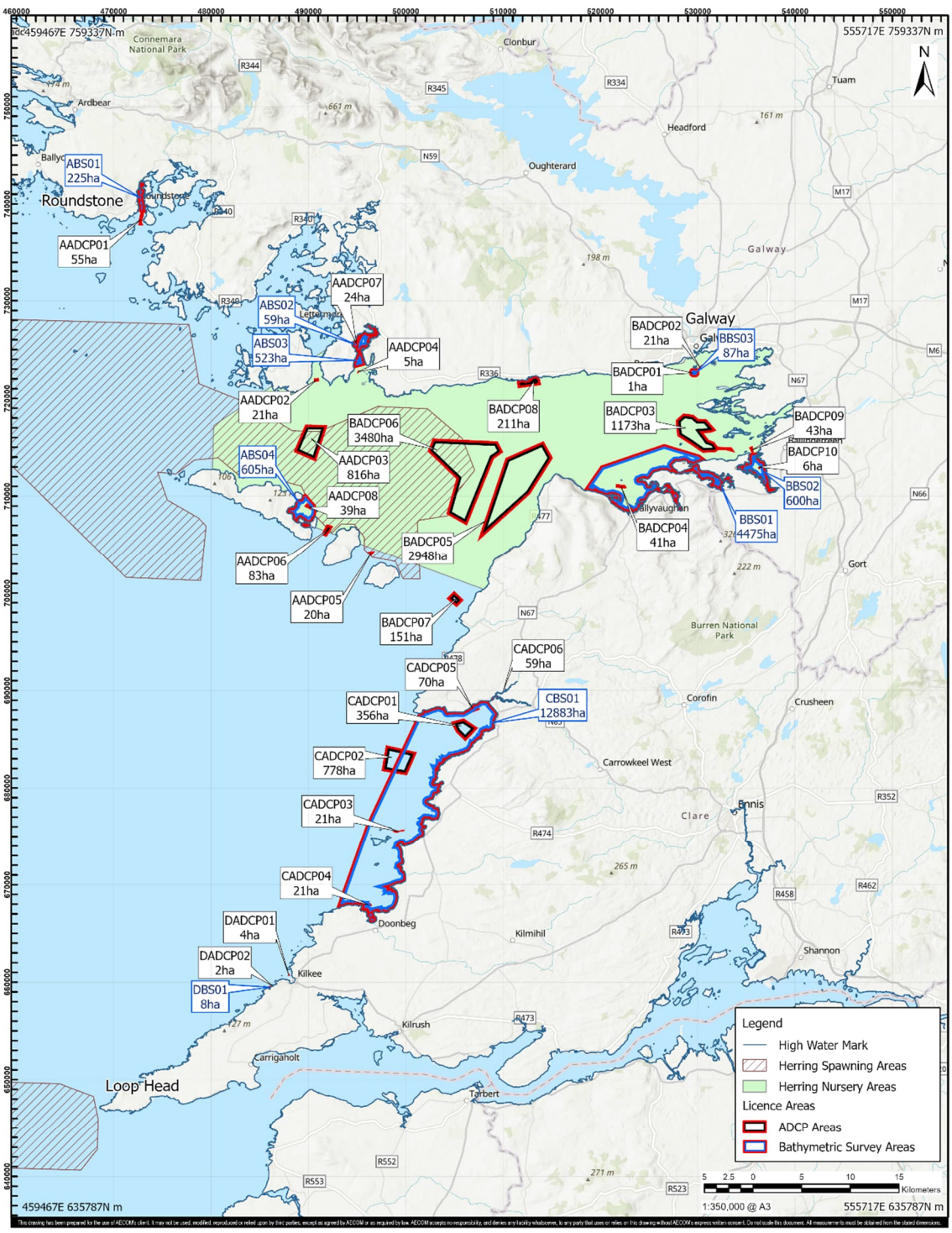
Herring

Atlantic herring *Clupea harengus* is an important commercial species in Irish waters (O'Sullivan *et al*., 2013). Herring is a demersal spawner and the eggs have a high association with the sea floor as they are laid onto gravel, coarse sediment, sand shells and small stones forming a dense mat (ICES, 2006; Ellis *et al*., 2012).

Spawning grounds for Atlantic herring cover the outer Galway Bay up to the north-eastern coastline of the Aran Islands (Department of Housing, Local Government and Heritage, 2023; Figure 4). A smaller spawning ground is also present off the coast of Aill Na Brun on the south-western tip of County Clare. Nursery grounds are considered to cover the entirety of Galway Bay but do not extend southwards beyond the Aran Islands.

The nearest herring stock to Galway Bay is the Northwest Ireland stock, which are considered to spawn between August and September (Ellis *et al*., 2012). Therefore, this is considered to be representative of the spawning season for herring in the Study Area.

Some of the ADCP Areas fall within spawning and nursery grounds for herring. However, the ADCPs are expected to cover a very small amount of habitat compared to the total spawning and nursery areas shown in Figure 3. Therefore, there are expected to be no adverse effects to herring spawning or nursery grounds, and this has been scoped out of further consideration.



CLIENT
Uisce Éireann Irish Water

TITLE
Proposed Licence Area Map
Herring spawning and nursery grounds in the Lot 4 Licence Area

DRAWING NUMBER
Figure 4

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DATA SOURCES
High Water Mark (HWM) as defined by the CBS was sourced as recommended in the MARA Technical Guidance V5: Tailte Eireann Surveying Open Data Portal https://data-osi.opendata.arcgis.com/

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Herring data supplied by the Marine Institute.

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Figure 4. Proposed Surveys and herring spawning and nursery grounds in the Study Area

4.2.5 Fisheries and Aquaculture

4.2.5.1 Aquaculture

The Study Area contains licenced aquaculture sites for fish, shellfish and seaweed species (Department of Housing, Local Government and Heritage, 2023; Figure 5 and Figure 6). There are 19 of these licenced aquaculture sites located within the Lot 4 Licence Area, all of which are aquaculture sites for shellfish with the exception of one site in Area BBS01 which is for seaweed. In Ireland, these aquaculture sites are licensed under the Fisheries (Amendment) Act, 1997 (No. 23 of 1997) and its associated Regulations.

The licensed aquaculture sites located in waters close to the coastline in Galway Bay consist of:

- One seaweed aquaculture site in Ballyvaughan/Poulnaclough Bay;
- Two finfish aquaculture sites in waters to the east of Carraroe South;
- Two shellfish aquaculture sites in a bay on the eastern coastline of Inishmore Island (part of the Arran Islands);
- One shellfish aquaculture site on the coast of Keeraunnagark South;
- Four shellfish aquaculture sites off the coast of Carrigaholt; and
- A further 43 shellfish aquaculture sites located on the coastline of inner Galway Bay.

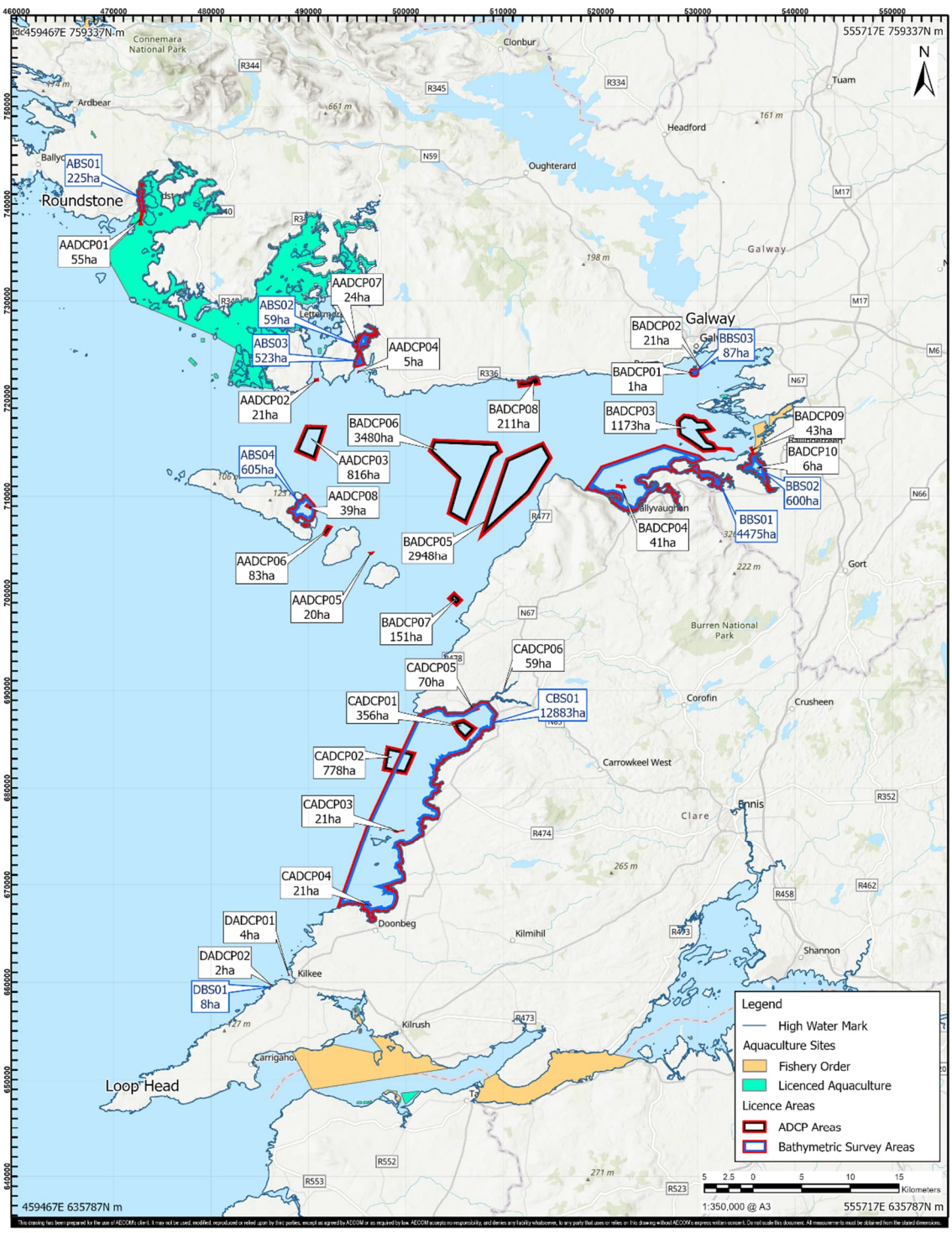
Finfish aquaculture in Ireland is predominantly salmon, with shellfish aquaculture consisting of several species including oysters and mussels (An Taisce, 2020).

In seaweed aquaculture, knotted wrack (*Ascophyllum nodosum*) is Ireland's most commercially important seaweed (Monagail and Morrison, 2020). Farms in county Galway are one of the top three harvesters of knotted wrack in Ireland alongside counties Mayo and Donegal, which together produce 75% of the landed harvested biomass of seaweed. Other commercially important seaweed species include brown kelp (*Laminaria hyperborea*), Irish moss (*Chrondus crispus*), false Irish moss (*Mastocarpus stellatus*) and dulse (*Palmaria palmata*).

There are also several Fishery Order Sites present in the Study Area (Department of Housing, Local Government and Heritage, 2023), including three sites which intersect with BBS02 and BBS01 (Figure 6). Fishery Order Sites are fishing areas assigned to private individuals or local co-operatives (Department of Agriculture, Food and the Marine, 2022). These consist of three large sites for shellfish on the coastline in the inner Galway Bay, and one smaller site also for shellfish.

Bivalve production waters are also present in the southern and eastern areas of inner Galway Bay, which support the production of clams, mussels, oysters (Department of Housing, Local Government and Heritage, 2023). These areas are also designated shellfish waters, with the addition of another area of designated shellfish water in Outer Galway Bay Indreabhán.

As discussed in Section 4.2.4, vessel presence and temporary survey activity in the Lot 4 Licence Area may result in minor disturbance to aquaculture. However, the addition of one additional vessel is not expected to result in a deviation from baseline conditions and therefore effects are expected to be negligible and not significant.



CLIENT
Uisce Éireann Irish Water

TITLE
Proposed Licence Area Map
Aquaculture sites in the Lot 4 Licence Area

DRAWING NUMBER
Figure 5

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Aquaculture sites supplied by the Marine Institute.

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Figure 5. Aquaculture sites in the Study Area

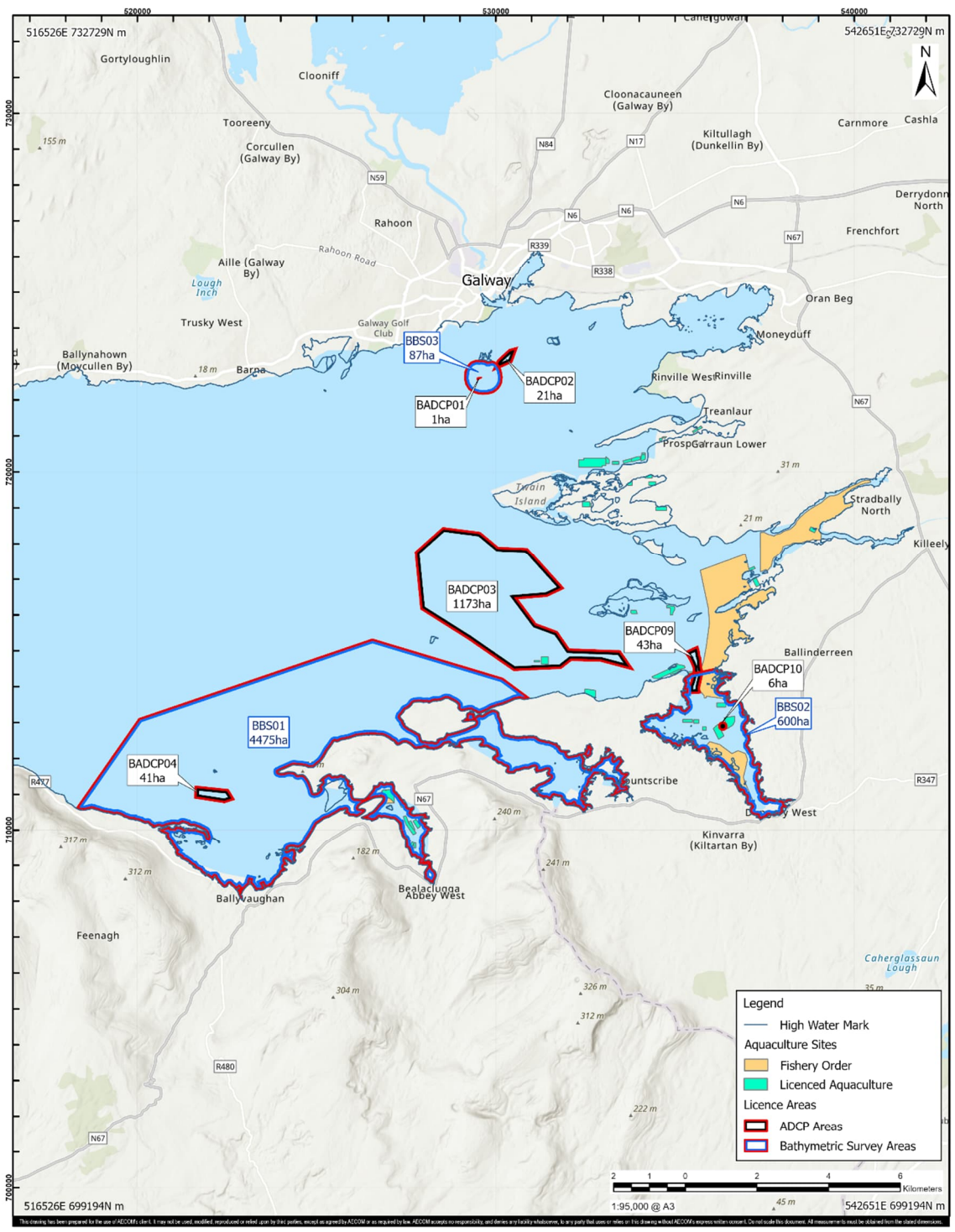


Figure 6. Aquaculture sites in Galway Bay

4.2.5.2 Commercial Fisheries

The following information is derived from the Ireland Marine Plan web portal (Department of Housing, Local Government and Heritage, 2023).

Several commercial fishing operations occur within the Study Area including dredging, pelagic trawling, long-line fishing, pot fishing, seine fishing, gill netting and otter trawling. Fishing effort shows that all vessels used are >12 m. The most heavily fished locations (hectares per square kilometre per year) in the Study Area include a bay located off the eastern coast of Inishmore in the Arran Islands, where shellfish aquaculture farms are also based (see Section 4.2.5.1) (near to AADCP06), Galway Estuary, off the coast of Mullach, and off the coast of Carrigaholt.

A large proportion of Galway Bay is used for pot fishing, with several techniques and gear types used including creel and crab pots to target lobsters (e.g. *Nephrops norvegicus*) and/or crabs (e,g, velvet swimmer crab *Necora puber*), and shrimp pots. Pot fishing occurs in Licence Areas C and D. Long line fishing is also commonly used in the outer Galway Bay and around the Aran Islands (overlapping with ABS01, AADCP01, ABS02, AADCP03, BADCP06 and BADCP05), using troll lines to target pollack and mackerel. Net fishing is also common around the coastline of Galway Bay targeting bait species (overlapping with ABS01, AADCP01, ABS02, AADCP03, BADCP06 and BADCP05).

Various areas of dredging are also present in the Study Area (overlapping with ABS02), with scallop *Pectinidae* spp. dredging both along the coastline and in deeper waters, hydraulic dredging for razor clams *Ensis magnus* on the northeast coasts of Inisheer and Inishmaan islands and on the coast of Barna and Ballinderreen, and oyster dredging for native oyster *Ostrea edulis* also off the coast of Ballinderreen. Bottom (otter) trawling is also common across a large proportion of the marine environment in the Study Area which targets mixed demersal species, including whiting *Merlangius merlangus* and lemon sole *Microstomus kitt* (King *et al*., 2006).

Consequently, there are also several commercial fishing ports located in the Study Area, including one on each of the Aran Islands (Inishmore, Inishmaan and Inisheer), one in Rossaveel for which the predominant landings are pelagic and demersal shellfish and seasonal salmon, one in the city of Galway for which pelagic and demersal shellfish are also the predominant landing, and one in Carrigaholt.

The marine surveys may result in minor disturbance to commercial fishing, from the presence of the survey vessel and the placement of ADCPs within fishing areas. However, the vessel will only be present for a short period of time and is not expected to result in a deviation from baseline conditions. Additionally, the ADCP placement will also be temporary and has a small footprint of less than 1 m^2. A notice to mariners will also be published to ensure fishers are aware of the marine surveys. Therefore, the effect on commercial fishing is considered minor and not significant.

4.2.6 Air Quality

Environmental Protected Agency Air Quality Zones have been defined in Ireland. However these only cover terrestrial areas and do not include the marine environment. There will be no releases of emissions or airborne pollutants from the equipment during the deployment, operation or recovery of the ADCPs or during the bathymetric survey.

Small amounts of airborne pollutants may be released by vessels used conduct during the marine surveys. However, it is envisioned that only one vessel will be used at any one time. Due to the fishing and aquaculture activity which occurs within and around Galway Bay (see Section 4.2.5), and the presence of Galway Bay docks, the addition of one survey vessels is not expected to make a detectable change in air quality. Therefore, air quality has not been considered further as part of this assessment.

4.2.7 Noise and Vibration

The marine surveys are not expected to produce airborne sound above baseline conditions from vessel traffic.

Underwater sound and vibration will be generated by the marine survey instruments, including deployment, operation and recovery of ADCPs and MBES/SBES. Man-made sound sources, particularly if of high intensity or long duration have the potential to result in permanent and temporary injury and auditory effects and can result in masking and behavioural disturbance in fish and marine mammals. However, the operating frequency of the instruments is presumed to be 600 kHz to 1 mHz for ADCPs, 200 to 400 kHz for MBES and 200 kHz for SBES.

For most fish species, sensitivity to sound occurs from below 100 Hz to several hundred hertz, or several thousand hertz in a few species (Mann *et al*., 1997; 2001). The hearing range of marine mammals is between 7 kHz to 160 kHz (NPWS, 2014) which is outside the operating frequency of the marine surveys (**Table** 6).

Therefore, there is no pathway to effect and noise and vibration are not considered further in this assessment.

Table 6. Hearing Frequency Range of Marine Mammals

Functional Hearing Group	Auditory Band Width	Species found in Ireland
Low frequency cetaceans	7 Hz to 35 kHz	• Humpback whale *Megaptera novaeangliae;* • Minke whale*;* • Blue whale *Balaenoptera musculus*; • Fin whale *Balaenoptera physalus*; and • Sei whale *Balaenoptera borealis.*
Mid-frequency cetaceans	150 Hz to 160 kHz	• Sperm whale *Physeter macrocephalus*; • Killer whale *Orcinus orca*; • Long-fine-pilot whale *Globicephala melas*; • Beaked whale species *Hyperoodontidae spp.*; and • Dolphin species (including bottlenose dolphin and common dolphin)
High frequency cetaceans	275 Hz to 160 kHz	• Harbour porpoise; and • Pygmy sperm whale *Kogia breviceps.*
Pinnipeds in water	50 Hz to 86 kHz	• Grey seal*;* and • Harbour seal*.*

Source: Southall et al. (2007); NMFS (2018); and Southall et al. (2019).

However, during the use of any single beam or multibeam echo sounding activities, a set of industry-standard mitigation measures, as outlined by DHLGH (2014), are recommended to further minimise the risk of injury to marine mammals during marine surveys, applicable to all SBES, MBES, side scan sonar and sub-bottom profilers surveys within bays, inlets or estuaries and within 1,500 m of the entrance of enclosed bays/inlets/estuaries. These mitigation measures, described in further detail in Annex IV Risk Assessment, are:

- Pre-start monitoring – monitoring conducted by a qualified and experience marine mammal observer (MMO) at least 30 minutes before sound-producing activity commences;
- Ramp-up procedure – the gradual increase in power output over a predetermined duration;
- Breaks in sound output – all pre-start monitoring and ramp-up procedures recommence prior to restarting where breaks in sound output occurs for a period of 5-10 minutes; and
- Reporting – full reporting from MMOs on the operation and mitigation.

4.2.8 Landscape / Seascape

The marine surveys will consist of the placement of several ADCPs fully submerged and the use of underwater equipment. Additionally, it is envisioned that only one vessel will be required. Therefore, this is not expected to result in negative effects to the landscape or seascape. As a result, landscape and seascape have not been considered further as part of this assessment.

4.2.9 Traffic and Transport (including navigation)

Galway Bay and the surrounding waters are already characterised by a high level of marine traffic due to the location of Galway Port, resulting in the passage of cargo and tanker vessels, and passenger vessels including the use of multiple ferry ports (Department of Housing, Local Government and Heritage, 2023). Therefore, the addition of a single survey vessel is not expected to result in a deviation from baseline marine traffic conditions.

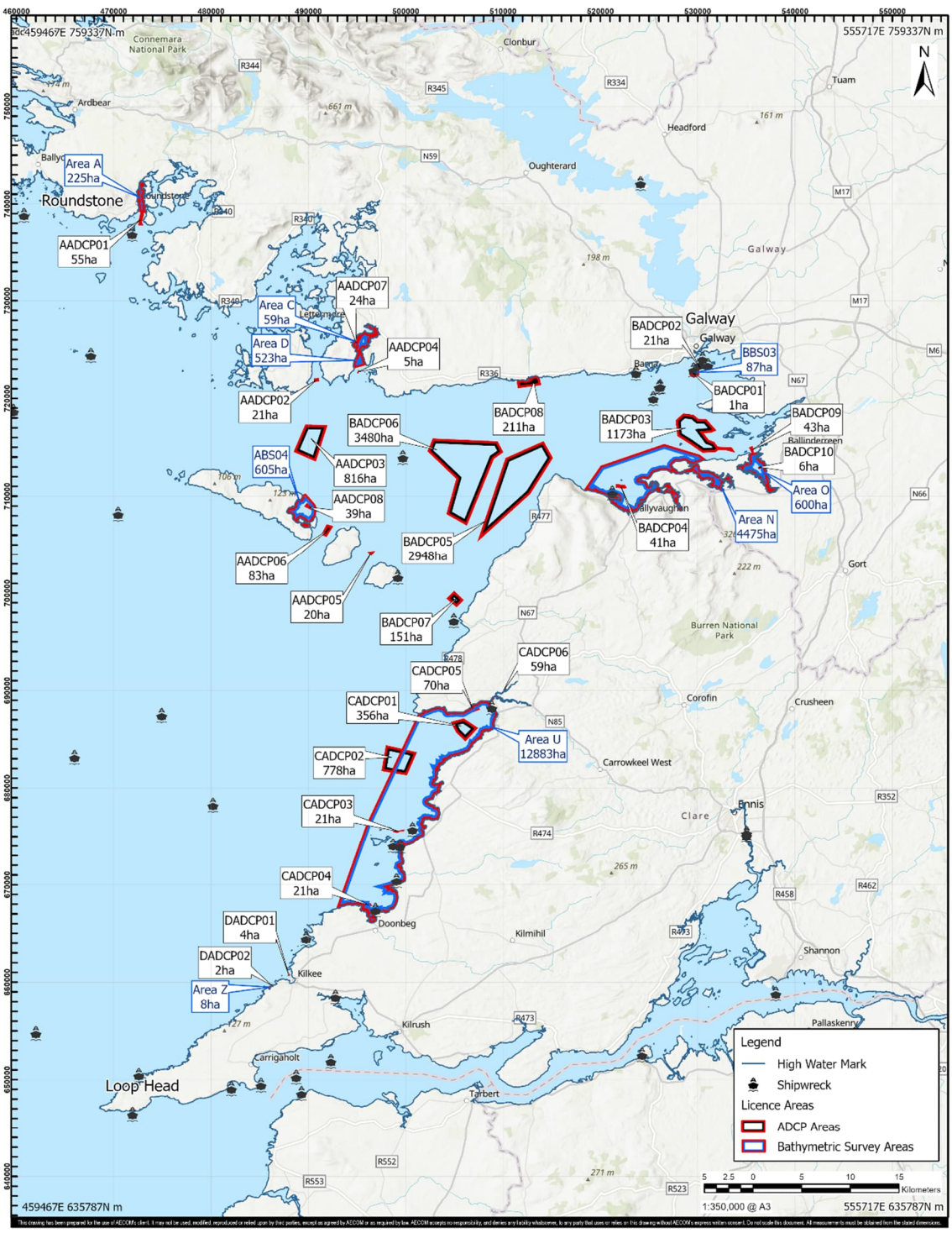
Additionally, the placement of fully submerged ADCPs in the Lot 4 Licence Area and the short-term nature of the bathymetric surveys, are not expected to pose a significant risk to navigation. There are also no anchorage points within the L Lot 4 Licence Area or traffic separation schemes (MarineTraffic, 2024). Therefore, traffic and transport (including navigation) have not been considered further as part of this assessment.

4.2.10 Cultural Heritage (including underwater archaeology)

There are 18 shipwrecks located in the Study Area in total, with most occurring close to the coastline of the mainland (Department of Housing, Local Government and Heritage, 2023; Figure 7). The earliest shipwreck recorded in the Study Area occurred in the year 1588 and was the San Estaban lost off the coast of Doonbeg. The most recently recorded shipwreck occurred in 1994 and was the Marie ship, also lost near Doonbeg.

Several shipwrecks fall within bathymetric Licence Areas. However, the bathymetric surveys are not expected to have any interaction with the seabed. ADCP area BADCP02 and BADCP01 also overlap with several shipwrecks. However, ADCP will only be placed on suitable flat sediment and will therefore not be placed on any shipwrecks. Thus, avoiding damage to the wrecks and to facilitate the safe deployment and recovery of the equipment.

Furthermore, any pollution from vessels is likely to be small-scale and will likely be rapidly dispersed and diluted before reaching any shipwrecks. Therefore, the effects on cultural heritage from the proposed works are considered to be negligible and not significant.



CLIENT
Uisce Éireann Irish Water

TITLE
Proposed Licence Area Map
Shipwrecks in the Lot 4 Licence Area

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Shipwreck data sourced from the National Monuments Service's Wreck Inventory of Ireland Database (WIID).

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Figure 7. Shipwrecks in the Study Area

4.2.11 Population and Human Health

The marine surveys will be carried out entirely within the marine environment. Several bathymetric survey areas border the coastline. However, none of these areas are expected to restrict public access to the beach or coastal waters and they are not located next to heavily populated areas. The most significant settlement in the Study Area is the City of Galway, located in Galway Bay where BADCP02, BADCP01, BADCP03, BADCP04, BBS01 and BBS02 are also located.

The survey activities, including the deployment of survey equipment, will not require access to public areas including beaches for deployment or operation, and vessels will comply with all major international shipping conventions required by the International Maritime Organisation. Bathymetric survey areas BADCP04 and CBS01 overlap with bathing waters, but due to the short-term and temporary nature of the bathymetric survey, disturbance to the public using these bathing waters is expected to be minimal.

Therefore, the surveys are not expected to result in negative effects to the local population or human health and these have not been considered further in this assessment.

4.2.12 Major Accidents and Disasters

The marine surveys will be short term (maximum of 60 days for ADCP surveys and 28 days for bathymetric surveys) and temporary and will not influence any natural disasters including earthquakes, flooding or landslides.

Due to the use of only one vessel and short-term, temporary nature of the surveys, they are not expected to result in a major accident. As part of mitigation measures, the survey vessel will be required to comply with International Regulations for Preventing Collisions at Sea, and International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78). The vessel will also be expected to comply with measures for the safety of shipping and navigation, including displaying navigation lights.

Therefore, the potential for major accidents and disasters has not been considered further in this assessment.

4.2.13 Climate

The ADCPs will be in place for a maximum of 60 days, with the bathymetric survey expected to last 28 days. Due to the short period of time in which these activities will occur, and the nature of the activities, they are not expected to have an impact on the local climate. The vessel used for the surveys may release small amounts of emissions, however due to the short time period in which the vessel will be operational, effects which contribute to climate change are not expected. Therefore, the climate has not been considered further in this assessment.

4.2.14 Waste

The marine surveys are not expected to produce any waste. Bathymetric survey areas ABS02 and ABS03 (see Figure 1) are located within chemical monitoring points at Rossaveel Harbour. However, the bathymetric surveys are short-term and are not expected to interfere with monitoring. Therefore, waste has not been considered further in this assessment.

4.2.15 Material Assets

There are no existing oil and gas production facilities or pipelines expected within the Lot 4 Licence Area. The marine surveys are not expected to interfere, or cause damage to, any material assets. Therefore, material assets have not been considered further in this assessment.

4.2.16 Interactions

There is the potential for the survey vessel to interact with fishing or recreational activity that may be occurring within the Lot 4 Licence Area. However, due to the short-term, temporary nature of the marine surveys, any interaction is expected to be minor. Therefore, interaction has not been considered further in this assessment.

4.2.17 Mitigation Summary

Although the operating frequency of survey equipment is below the hearing frequencies for marine mammals and fish, several mitigation measures will be put in place (see Section 4.2.7):

- Pre-start monitoring;

- Ramp-up procedure for equipment where that is possible;
- Breaks in sound output; and
- Reporting.

4.3 Conclusion of the EIA Directive

The marine surveys do not fall within a class of the EIA directive requiring a mandatory EIA. However, projects which do not meet the threshold may still require an EIA if the project is likely to have significant effects on the environment. This AIMU report has assessed the implications of the marine surveys, alone and in-combination with other projects on the receiving environment. It concludes that, based on the scale and scope of the marine surveys and mitigation measures proposed, no significant impact on the receiving environment is likely. **Therefore, EIA is not required.**

5. Water Framework Directive (WFD)

The key objectives of the WFD are set out in Article 4 of the Directive, these are:

- To protect and where necessary to improve the quality of all our inland and coastal waters, groundwater and associated wetlands, and to prevent their further deterioration;
- To achieve 'good status' for all these waters by 2015 (extended to 2027);
- To promote the sustainable use of water;
- To reduce the pollution of water by particularly hazardous 'priority' substances; and
- To lessen the effects of flooding and drought.

The WFD requires Member States to use their River Basin Management Plans and Programmes of Measures to protect and, where necessary, restore water bodies in order to reach good status, and to prevent deterioration. Thereby ensuring good qualitative and quantitative health, i.e. on reducing and removing pollution and ensuring that there is enough water to support wildlife at the same time as human needs.

This AIMU report has assessed the implications of the marine surveys on the receiving environment. As described in Section 4.2.2, the waterbodies within the Study Area were all classed as 'high' or 'good' and the assessment concludes that, based on the scale and scope of the proposed project, no impact on the any receiving waterbody will occur. The conclusion is also based on the fact that the vessel proposed for the surveys will be MARPOL compliant and therefore is unlikely to have the potential to cause a deterioration in water quality. Additionally, accidental spills and collisions vessels are considered unlikely, however the volumes of fuel expected to be used during the project will be low and therefore any spillages which may occur (accidental or resulting from collision) are expected to be small. Therefore, no other project related activity has been identified that could lead to a deterioration in water quality.

6. Marine Strategy Framework Directive (MSFD)

The EU MSFD promotes an ecosystem-based approach to the management of human activities that impact the marine environment, ensuring that the collective pressure of such activities is kept within levels compatible with the achievement of good environmental status (GES).

To assist EU countries in attaining GES, the MSFD specifies 11 qualitative descriptors. To achieve GES, the MSFD has devised a programme consisting of 28 measures to address stressors that impede progress. These measures predominantly aim to reduce pressures by improving water quality and preventing environmental harm. The MSFD highlights various negative impacts, such as pollution, loss of biodiversity, seabed damage, overfishing, the introduction of non-native species, marine litter, underwater noise, and the effects of ocean warming and acidification.

This AIMU report has assessed the implications of the marine surveys on the receiving environment (Section 4.2). It concludes that due to the small scale and temporary nature of the marine surveys, there will be no permanent or lasting change of the marine environment the Lot 4 Licence Area, or wider Study Area.

7. National Marine Planning Framework (NMPF)

The *National Marine Planning Framework (NMPF)* 2021 for Ireland is the country's first comprehensive spatial planning framework which brings together all marine-based human activities and outlines the Irish Government's vision, objectives and marine policies for each marine activity, including policies for protecting biodiversity and marine protected sites (Department of Housing, Local Government and Heritage, 2021). By using the NMPF, the government hopes to:

- Set out a clear direction for the management of seas around Ireland;
- Clarify the objectives and priorities for managing Ireland's seas; and
- Be able to direct the decision makers, sea users and stakeholders towards plan-led, strategic and efficient use of marine resources in Ireland.

The NMPF sets out Overarching Marine Planning Policies (OMPPs) that will apply to all marine activities or development. These include policies in relation to, inter alia, co-existence with biodiversity, coastal and island communities, and infrastructure.

Statement of Consistency with the NMPF

The development of water quality models to support water quality assessments through marine surveys supports and enhances the policy objectives of the NMPF, by providing the ability to assess water quality against environmental legislation. The conclusion of which, is that the proposed marine surveys are fully compliant with the overall objectives and policies of the NMPF.

8. Conclusion

This AIMU report has been undertaken based on the available schedule of works, SSIAA report, NIS, Annex IV Risk Assessment report and the implementation of mitigation measures. Due to the nature, scale and location of the marine surveys, there is expected to be no significant effects on marine receptors as a result of the marine surveys (see Appendix B Table B-1).

It is the conclusion of this AIMU report that:

- An EIA is not required as no significant effects are likely;
- Underwater sound levels are expected to fall outside the hearing range of fish and marine mammals, however the recommended mitigation measures will still be adopted during the marine surveys;
- The marine surveys will not have a significant effect on the marine environment with respect to the EIA Directive;
- The marine surveys will conform to the key objectives of the WFD and MSFD; and
- The marine surveys are consistent with the NMPF.

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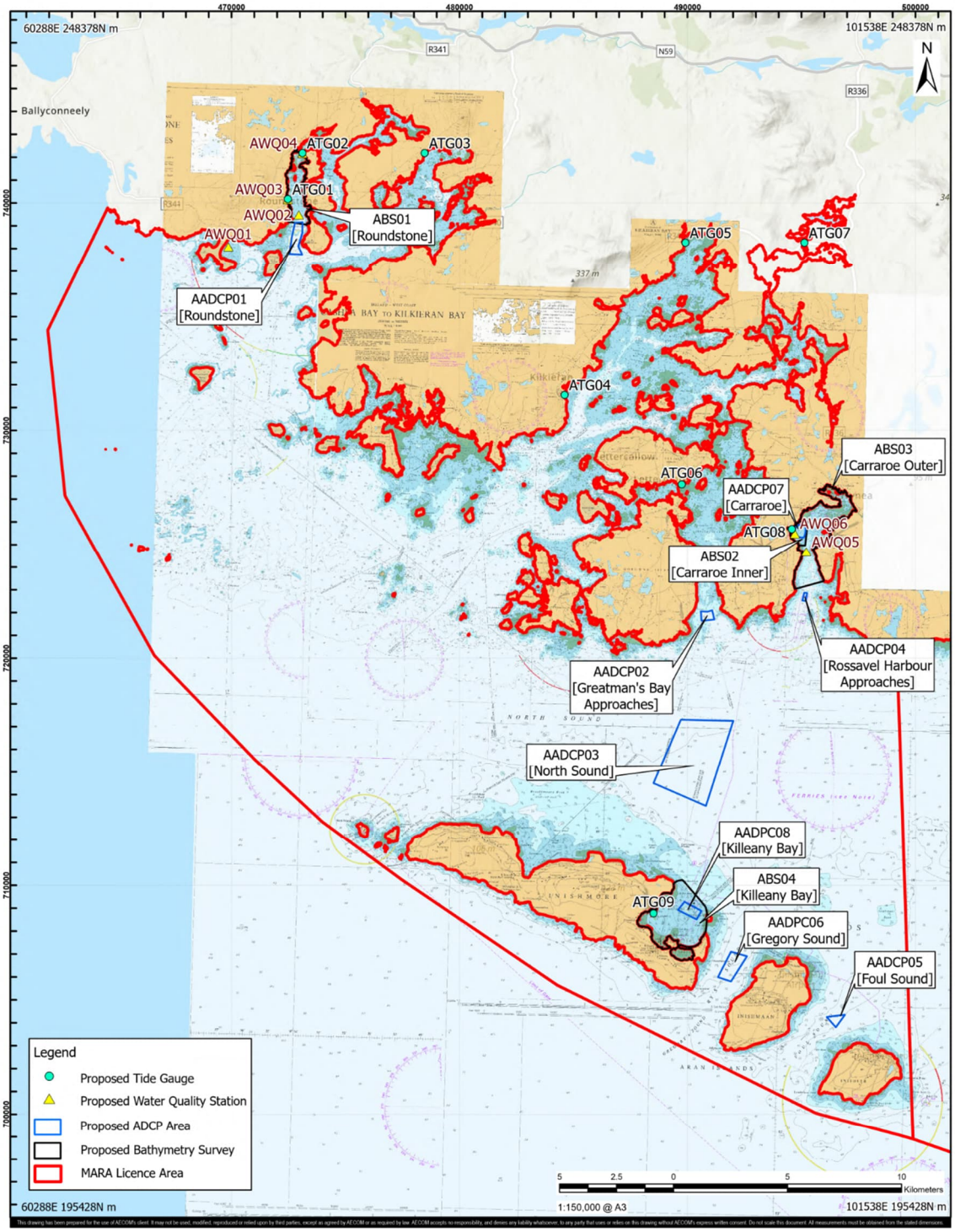
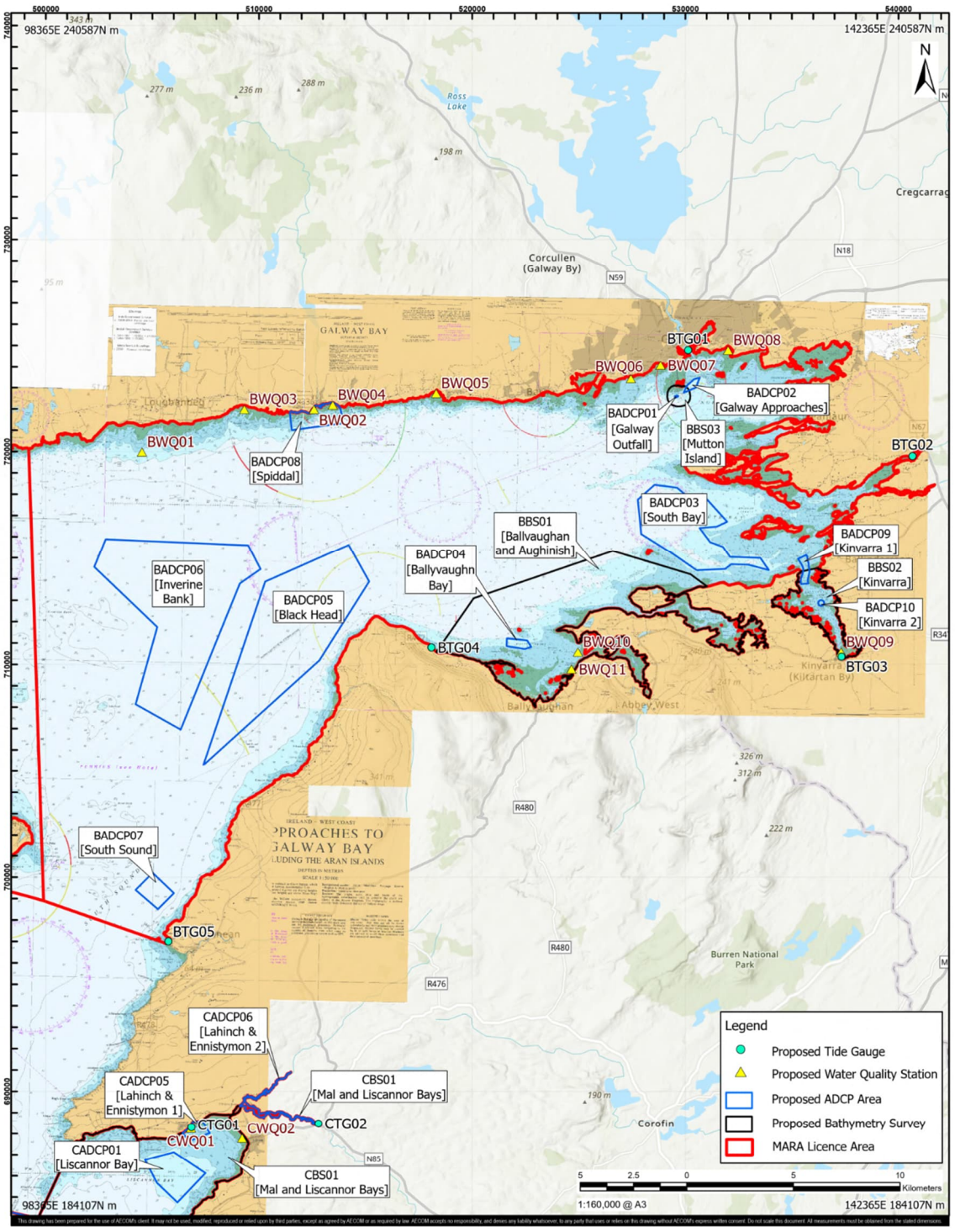
Appendix A Site Layout Plans



Map A Site Layout Plan



CLIENT
Uisce Éireann Irish Water

TITLE
Site Layout Map B

DRAWING NUMBER
MUL240033-202

REVISION
Revision No 1

Date
09/12/2024

PROJECTION
Irish Transverse Mercator (ITM)

MARA FILE REFERENCE
MUL240033

DATA SOURCES
Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, TomTom, Garmin, Foursquare, , METI/NASA, GeoTechnologies, Inc.

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[redacted]
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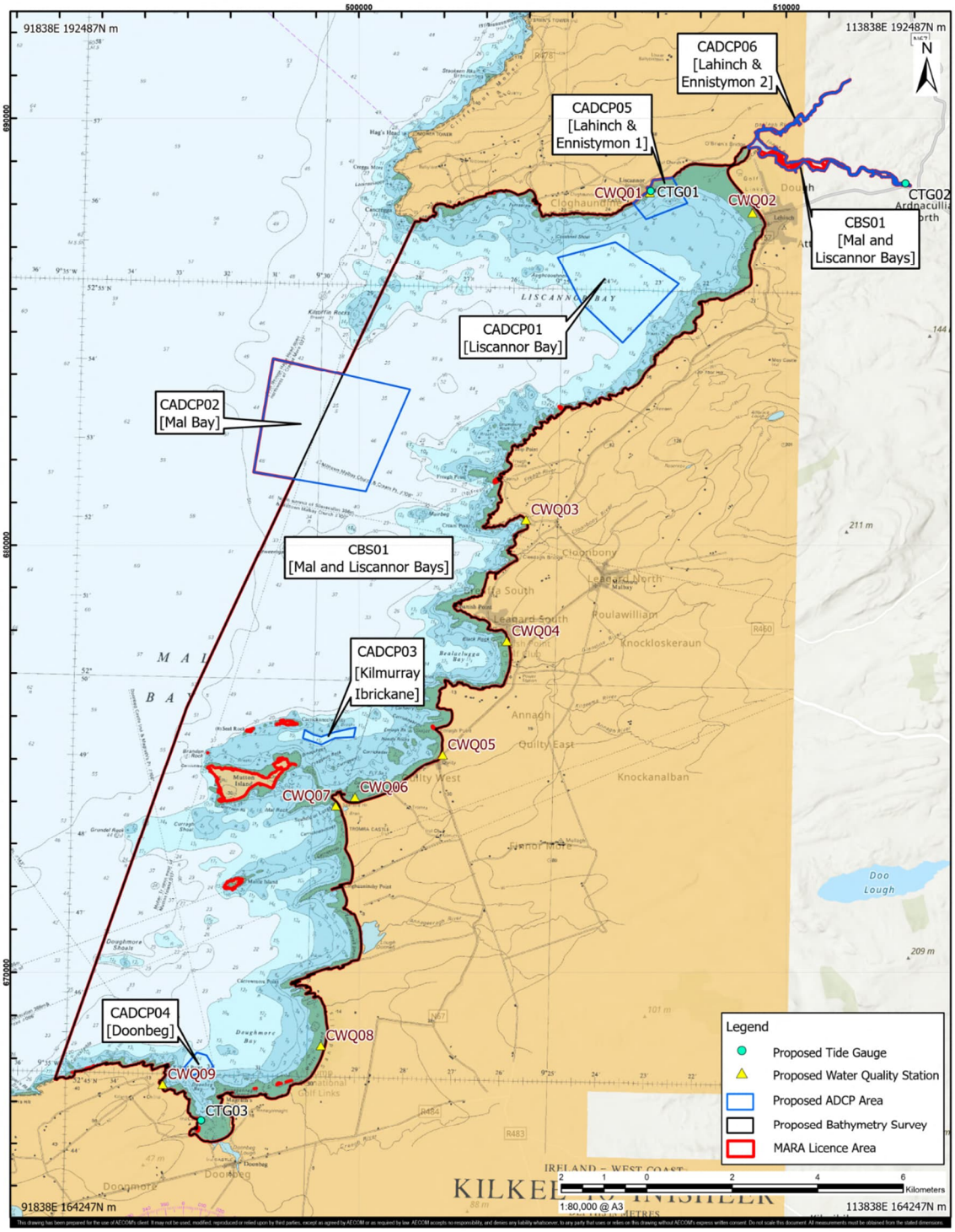
Map B Site Layout Plan



CLIENT
Uisce Éireann Irish Water

TITLE
Site Layout Map C

DRAWING NUMBER
MUL240033-203

REVISION
Revision No 1

Date
09/12/2024

PROJECTION
Irish Transverse Mercator (ITM)

MARA FILE REFERENCE
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DATA SOURCES
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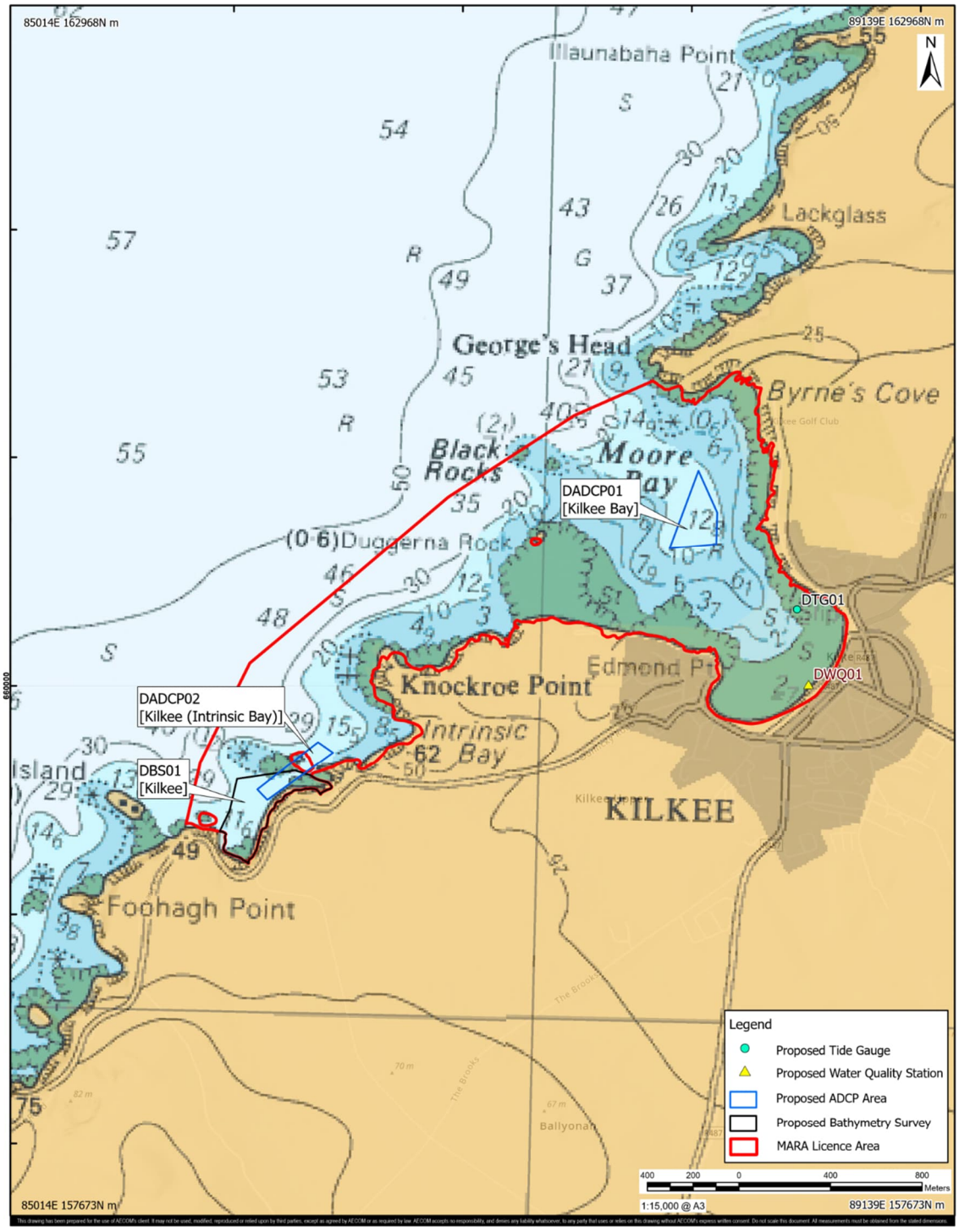
Map C Site Layout Plan



CLIENT
Uisce Éireann
Irish Water

TITLE
Site Layout Map D

DRAWING NUMBER
MUL240033-204

REVISION
Revision No 1

Date
09/12/2024

PROJECTION
Irish Transverse Mercator (ITM)

MARA FILE REFERENCE
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DATA SOURCES
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Map D Site Layout Plan

Appendix B Summary of Assessment of Impacts

Table B-1. Assessment of Environmental Impacts Considered in the Report

Environmental Conditions	Potential Impacts	Assessment Conclusion
Designated Sites	For a full assessment of impacts to European Sites, please see the SISAA and NIS.	The environmental impacts to European designated sites with marine qualifying features resulting from the marine survey have been fully assessed in the SISAA and NIS Report, which concluded **no adverse effects**
	Temporary physical disturbance to marine features of relevant NHAs and pNHAs	Negligible and **not significant**
Benthic Habitats and Species	Temporary physical disturbance, to direct loss of or damage to benthic habitats and species	Negligible and **not significant.**
Fish (including aquaculture and commercial fisheries	Temporary physical disturbance to fish species in the immediate vicinity of the deployment vessel and the deployment, operation and recovery of ADCP instruments	Negligible and **not significant**.
Marine mammals	See Annex IV Risk Assessment Report and SISAA	The environmental impacts to marine mammals resulting from the proposed works have been fully assessed in the Annex IV Risk Assessment Report and SISAA, which concluded **no significant effects**.
Birds	Temporary disturbance to birds due to the presence of vessels in the Study Area during deployment and recovery, interrupting foraging and loafing activities.	Negligible and **not significant**. The environmental impacts to birds with resulting from the proposed works have been fully assessed in the SISAA, which concluded **no significant effects**.
Cultural heritage	Damage or disturbance to heritage and archaeological features in the Study Area including shipwrecks from the deployment and recovery of ADCP instruments, and due to pollution of water from vessels associated with the proposed works	Negligible and **not significant**.