

Attachment 4.6

Consistency of the proposed Maritime Usage with the objectives of the Marine Strategy Framework Directive (MSFD)

Introduction

The proposed site investigation surveys in Liscannor Bay will provide essential baseline environmental data to inform the design and siting of a new marine outfall associated with required improvement works to wastewater infrastructure in the region. Full details of the Proposed Maritime Usage are described in Attachment 3.1. These site investigation surveys are temporary and local in scale. The assessment below demonstrates how the proposed Maritime Usage is consistent with the objectives and targets of the Marine Strategy Framework Directive (MSFD) and Ireland's Marine Strategy, ensuring no risk to the achievement of Good Environmental Status (GES) within the Zone of Influence.

Before determining a MUL, MARA is required to have regard to Directive 2008/56/EC as amended by Directive (EU) 2017/845, the Marine Strategy Framework Directive, and the associated implementing national legislation, European Communities (Marine Strategy Framework) Regulations, 2011. The Marine Strategy Framework Directive establishes a framework within which Member States must take the measures necessary to achieve or maintain good environmental status in the marine environment by the year 2020 at the latest. The objective of the Directive is to protect and prevent deterioration of the marine environment and, where practical, restore marine ecosystems. Member States must prevent and reduce inputs in the marine environment, with a view to phasing out pollution, to ensure that there are no significant impacts on or risks to marine biodiversity, marine ecosystems, human health or legitimate uses of the sea. The Directive applies to waters, the seabed and subsoil on the seaward side of the baseline from which the extent of territorial waters is measured extending to the outmost reach of the area where a Member State has and/or exercises jurisdictional rights.

There are eleven categories by which good environmental status is measured and monitored. These are:

- D1 Biological diversity
- D2 Non-indigenous species
- D3 Population of commercial fish / shellfish
- D4 Elements of marine food webs
- D5 Eutrophication
- D6 Sea floor integrity
- D7 Alteration of hydrographical conditions
- D8 Concentration of contaminations
- D9 Contaminants in fish / seafood for human consumption
- D10 Marine Litter

- D11 Introduction of energy including underwater noise.

Ireland has developed targets and indicators with respect to measuring and monitoring these 11 descriptors, to ensure good environmental status. These are set out in Ireland's Marine Strategy Framework Directive Marine Strategy.

MSFD assessment methodology

For the Zone of Influence (the area over which the proposed Maritime Usage could have had an ecological or other relevant impact), the current status of the 11 MSFD descriptors was assessed with reference to the indicators and targets set out in Ireland's Marine Strategy. The potential effects of the proposed Maritime Usage on the achievement of these targets were then evaluated for each of the 11 descriptors.

Zone of Influence

The Zone of Influence (Zoi) for the proposed site investigation surveys encompasses Liscannor Bay, classified as a coastal water body under the Water Framework Directive (WFD). Under Irish MSFD implementation, transitional and coastal waters are assessed using existing WFD monitoring programmes, in line with MSFD Article 11 requirements to build on established monitoring networks. Accordingly, the ecological and chemical status of Liscannor Bay as reported under the WFD provides an important baseline for assessing the achievement of GES under relevant MSFD descriptors (See Attachment 4.5 Compliance with Objectives of the WFD for more information).

MSFD Status

The 2025 assessment of Ireland's Marine Strategy Framework Directive (MSFD) status indicated variable progress across the descriptors, with several achieving Good Environmental Status (GES) while others remained only partially achieved or unknown. Biodiversity (D1) and commercial fish and shellfish (D3) continued to present challenges, as biodiversity was constrained by uncertainties in marine mammal status and by the poor condition of many fish populations, while less than half of assessed commercial fish stocks attained GES. In contrast, non-indigenous species (D2), eutrophication (D5), hydrographical conditions (D7), contaminants in the environment (D8), contaminants in seafood (D9), and underwater noise (D11) had achieved GES, reflecting effective management of these pressures. Seafloor integrity (D6) was found to be largely in good condition, with 74% of the assessed areas achieving GES, although gaps in assessment remained and 11% of the seabed did not meet the required thresholds. Marine litter (D10) represented the most prominent area of concern, as beach litter exceeded acceptable levels and knowledge gaps persisted for seafloor litter and microplastics. The status of food webs (D4) remained unknown, highlighting a significant knowledge gap. Nearly all descriptors are relevant to the proposed site investigation surveys, particularly

biodiversity, seafloor integrity, contaminants, underwater noise, and marine litter. See Table 4.6.1 for relevant to the proposed Maritime Usage.

Table 4.6.1 MSFD Cycle 3 status of Descriptors and relevance to Maritime Usage

MSFD Descriptor	MSFD Status in Ireland (2025)	Relevance to Maritime Usage	Justification
D1 – Biological Diversity	GES partially achieved. Most marine bird species achieved GES. Most marine mammal GES unknown. GES Not Achieved for most fish species. Incidental bycatch remains a major issue	Relevant	Potential interaction with marine flora and fauna.
D2 – Non-Indigenous Species	GES achieved	Relevant	Potential for impacts to non-indigenous species due to marine nature of proposed activity.
D3 – Commercial Fish & Shellfish	GES partially achieved. GES achieved for 29 stocks. GES Not Achieved for 46 stocks and GES status is unknown for 99 stocks	Relevant	Potential interaction with inshore fishery grounds based on overlap with proposed MUL boundary.
D4 – Food Webs	GES status is unknown	Not relevant	Survey techniques will not involve alteration to existing food webs. No interaction identified.
D5 – Eutrophication	GES achieved	Not relevant	Surveys will not impact water quality or nutrient levels in Liscannor Bay.
D6 – Seafloor Integrity	GES has been achieved for 74% of seafloor, 15% remains either not assessed or unknown, 11% is not in good status.	Relevant	Some survey techniques involve interaction with the seafloor.
D7 – Hydrographical Conditions	GES achieved	Not Relevant	No potential changes/alteration in hydrography due to the proposed activities.
D8 – Contaminants in Environment	GES achieved (most contaminants below thresholds)	Relevant	Potential for unintentional introduction of contaminants (accident, collision, leakage).
D9 – Contaminants in Seafood	GES achieved (levels below EU food safety standards)	Relevant	Potential for unintentional introduction of contaminants (accident, collision, leakage).

MSFD Descriptor	MSFD Status in Ireland (2025)	Relevance to Maritime Usage	Justification
D10 – Marine Litter	GES not achieved (beach litter). Seafloor macro litter unknown. Microplastics remain unassessed.	Relevant	Potential for unintentional littering.
D11 – Underwater Noise	GES achieved	Relevant	Almost all proposed survey techniques generate some underwater noise

MSFD Indicators

Forty indicators were used for the third cycle of the MSFD assessment to evaluating progress towards Good Environmental Status across all 11 MSFD descriptors. These indicators allow complex ecological processes and pressures to be measured effectively, allowing comparability across regions and reporting cycles, enabling the identification of trends, and helps distinguish between natural variability and human-induced change. Indicators also serve a practical management function, providing policymakers with clear benchmarks against which the effectiveness of measures can be judged (Table 4.6.2).

Table 4.6.2 Indicators used to assess criteria for each MSFD descriptor for the 3rd MSFD cycle.

Descriptor	Criterion	Indicator(s)
D1 Biodiversity	D1C1 Mortality from incidental bycatch	Bycatch Mortality Indicator (ACS-IE-BycatchMortality2024)
	D1C2 Population abundance	Abundance of Marine Bird Species (ACS-IE-BirdAbundance2024); Seal Abundance Indicator (ACS-IE-SealAbundance2024); Cetacean Abundance Indicator (ACS-IE-CetaceanAbundance2024); Turtle Abundance Indicator (ACS-IE-TurtleAbundance2024); Fish Abundance Indicator (ACS-IE-FishAbundance2024)
	D1C3 Population demographic characteristics	Population Demographics Indicator (ACS-IE-PopDemographics2024)
	D1C4 Distributional range	Distributional Range Indicator (ACS-IE-Distribution2024)
	D1C5 Habitat for species	Habitat Extent and Condition Indicator (ACS-IE-Habitat2024)
D2 Non-indigenous species	D2C1 Newly introduced NIS	Newly Introduced NIS Indicator (ACS-IE-NewNIS2024)
	D2C2 Established NIS	Established NIS Abundance Indicator (ACS-IE-EstablishedNIS2024)
D3 Commercial fish & shellfish	D3C1 Fishing mortality (F)	Fishing Mortality Indicator (ACS-IE-F2024)
	D3C2 Spawning Stock Biomass (SSB)	SSB Indicator (ACS-IE-SSB2024)
	D3C3 Population age/size distribution	Age/Size Distribution Indicator (ACS-IE-AgeSize2024)
D4 Food webs	D4C1 Diversity of trophic guilds	Diversity of the Trophic Guild Indicator (ACS-IE-TrophicGuildDiversity2024)
	D4C2 Balance of abundance among trophic guilds	Abundance Balance Indicator (ACS-IE-TrophicGuildAbundance2024)
	D4C3 Size distribution within trophic guilds	Size Distribution Indicator (ACS-IE-TrophicGuildSize2024)
	D4C4 Productivity of trophic guilds	Productivity Indicator (ACS-IE-TrophicGuildProductivity2024)
D5 Eutrophication	D5C1 Nutrient concentrations	Nutrient Concentrations Indicator (ACS-IE-Nutrients2024)
	D5C2 Chlorophyll-a concentrations	Chlorophyll-a Indicator (ACS-IE-Chlorophyll2024)



Descriptor	Criterion	Indicator(s)
	D5C5 Dissolved oxygen	Dissolved Oxygen Indicator (ACS-IE-DO2024)
D6 Sea-floor integrity	D6C1 Physical loss of seabed	Seabed Loss Indicator (ACS-IE-SeabedLoss2024)
	D6C2 Physical disturbance of seabed	Seabed Disturbance Indicator (ACS-IE-SeabedDisturbance2024)
	D6C3 Adverse effects from disturbance	Benthic Community Condition Indicator (ACS-IE-BenthicCondition2024)
	D6C4 Benthic habitat extent	Habitat Extent Indicator (ACS-IE-BenthicExtent2024)
D7 Hydrographical changes	D6C5 Benthic habitat condition	Habitat Condition Indicator (ACS-IE-BenthicCondition2024)
	D7C1 Permanent alteration of hydrographical conditions	Hydrographical Alteration Indicator (ACS-IE-HydroAlteration2024)
D8 Contaminants	D7C2 Adverse effects from alteration	Hydrographical Effects Indicator (ACS-IE-HydroEffects2024)
	D8C1 Concentrations of contaminants	Contaminant Concentrations Indicator (ACS-IE-Contaminants2024)
	D8C2 Adverse effects of contaminants	Biological Effects of Contaminants Indicator (ACS-IE-ContamEffects2024)
D9 Contaminants in seafood	D8C3 Acute pollution events	Acute Pollution Events Indicator (ACS-IE-AcutePollution2024)
	D9C1 Levels of contaminants in seafood	Contaminants in Seafood Indicator (ACS-IE-SeafoodContam2024)
D10 Marine litter	D10C1 Litter on coast & seafloor	Coastal Litter Indicator (ACS-IE-CoastalLitter2024); Seafloor Litter Indicator (ACS-IE-SeafloorLitter2024)
	D10C2 Micro-litter	Micro-litter Indicator (ACS-IE-MicroLitter2024)
D11 Underwater noise	D11C1 Impulsive noise	Impulsive Noise Indicator (ACS-IE-ImpulsiveNoise2024)
	D11C2 Continuous low-frequency sound	Continuous Noise Indicator (ACS-IE-ContinuousNoise2024)

Impact of Proposed Maritime Usage on each MSFD descriptor within the ZoI

Table 4.6.3 sets out how the proposed site surveys in Liscannor Bay and Inagh River are consistent with the MSFD and Ireland's Marine Strategy:

Table 4.6.3 Assessment of MSFD Targets and the Potential Impacts of proposed activities.

Descriptor	Target Code	Description	Linked Descriptors	How proposed survey surveys are consistent with achieving target
D1	D1T1	The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long-term viability is ensured.	D1, D3, D4	Site investigation surveys do not involve fishing gear or cause bycatch.
D1	D1T2	The population abundance of the species is not adversely affected due to anthropogenic pressures.	D1, D3, D4	Site investigation surveys are short-term, small in scale, and non-extractive. Faunal samples (grabs/cores) are limited in number and spatial extent (<0.01% of ZOI) and will not affect population abundance. The site investigation surveys will not affect the conservation status of species protected under the EU Habitats Directive.
D1	D1T4	The species distributional range and, where relevant, pattern is in line with prevailing physiographic, geographic and climatic conditions.	D1, D4	Site investigation surveys cause no alteration in distributional ranges and do not create barriers. Acoustic equipment is used with soft-start procedures and timing controls to prevent disturbance of marine mammals or birds.
D1	D1T5	The habitat for the species has the necessary extent and condition to support the different stages in the life history of the species.	D1, D4	Site investigation surveys methods (grabs, cores, drop-down video) create negligible, localised disturbance to benthic habitats. Natural recovery is rapid and habitats remain functionally intact.
D1	D1T5-1 (All species groups)	By 2030, ensure that Ireland's network of marine protected areas achieves 30% coverage of the maritime area, is ecological coherent and representative and contributes to sustaining ecosystem services, including climate change resilience and mitigation.	D1, D3, D4	Site investigation surveys do not influence Ireland's network of marine protected areas and do not create barriers to movement.
D1	D1T5-3 (All species groups)	By 2030, ensure that Ireland's marine Natura 2000 sites designated for listed species under the EU Birds and Habitats Directives have a system of management measures developed and in place, in order to ensure that the species' habitat extent and	D1, D3, D4	The proposed site investigation surveys have been subject to Appropriate Assessment; Surveys will comply fully with Natura 2000 safeguards; AA screening ensures no adverse effect on site integrity (see Attachment 4.3).

		condition at all sites achieve and maintain a favourable status.		
D2	D2T1	The number of non-indigenous species which are newly introduced via human activity into the wild, per assessment period is minimised and where possible reduced to zero.	D2, D1, D4	The proposed site investigation surveys do not involve the movement or relocation of materials and therefore present no pathway for the introduction or spread of non-indigenous species (NIS). All vessels engaged in the surveys will comply with the International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Management Convention, 2004) and the International Convention on the Control of Harmful Anti-Fouling Systems on Ships (AFS Convention, 2001). Vessels are operated in accordance with MARPOL requirements and relevant EU and national legislation, including Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species. Consequently, no new NIS introductions are expected as a result of the proposed activities.
D2	D2T1-1	By 2026, endeavour to minimise the number of newly introduced non-indigenous species to Ireland through the development of a management plan for NIS and implementation of actions in that plan for coastal and marine areas.	D2, D1, D4	Site investigation surveys will not interfere with management plans. Vessels comply with antifouling and ballast water regulations, ensuring no new non-indigenous species. Vessels are compliant with MARPOL, and Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species.
D2	D2T1-2	Continue to reduce the risk of introduction and spread of non-indigenous species linked to ballast water and hull fouling through the implementation of the Ballast Water Convention.	D2, D1, D4	Vessels comply with antifouling and ballast water regulations, ensuring no new non-indigenous species. Vessels are compliant with MARPOL, and Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species.
D3	D3T1	The Fishing mortality rate of populations of commercially exploited species is at or below levels which can produce the maximum sustainable yield (MSY).	D3, D1, D4	Site investigation surveys do not involve fishing mortality. Any temporary displacement from vessel activity is negligible and does not impact MSY of regional fish stocks.
D3	D3T2	The Spawning Stock Biomass of populations of commercially-exploited species are above biomass levels capable of producing maximum sustainable yield (MSY).	D3, D1, D4	Site investigation surveys do not involve fishing mortality. Any temporary displacement from vessel activity is negligible and does not impact MSY of regional fish stocks.

D4	D4T1	The diversity (species composition and their relative abundance) of the trophic guild is not adversely affected due to anthropogenic pressures.	D4, D1, D3	Benthic sampling is minimal, designed for scientific characterisation. No long-term changes to trophic diversity or food web functioning are expected.
D4	D4T2	The balance of total abundance between the trophic guilds is not adversely affected due to anthropogenic pressures.	D4, D1, D3	Benthic sampling is minimal, designed for scientific characterisation. No long-term changes to trophic diversity or food web functioning are expected.
D5	D5T1	Nutrient concentrations are not at levels that indicate adverse eutrophication effects.	D5, D1, D4	Site investigation surveys do not introduce nutrients. Water quality sampling is observational only, with no effect on background nutrient concentrations.
D5	D5T2	Continue to ensure that chlorophyll a concentrations are not at levels that indicate adverse effects of nutrient enrichment.	D5, D1, D4	Site investigation surveys do not add organic matter or nutrient loading. No mechanism exists for algal blooms to be triggered.
D5	D5T3	Continue to ensure that the concentration of dissolved oxygen is not reduced, due to nutrient enrichment.	D5, D1, D4	Site investigation surveys have no effect on dissolved oxygen levels; minor seabed disturbance is negligible compared to natural background variability.
D6	D6T1	The structure and functions of the ecosystems, and benthic ecosystems, in particular, are not adversely affected due to the spatial extent and distribution of physical disturbance or physical loss on the seabed.	D6, D1, D3, D4	Grab and core samples represent a negligible seabed footprint and do not alter seafloor integrity. Benthic habitats are resilient to small-scale natural disturbance and will recover rapidly.
D6	D6T1-1	Continue to maintain existing low levels of seabed physical loss at less than 2% of the seabed in each benthic broad habitat type.	D6, D1, D3, D4	Grab and core samples represent a negligible seabed footprint and do not alter seafloor integrity. Benthic habitats are resilient to small-scale natural disturbance and will recover rapidly.
D6	D6T2	The extent of adverse effects from anthropogenic pressures on the condition of the habitat type, including alteration to its biotic and abiotic structure and its functions, does not exceed a specified proportion of the natural extent of	D6, D1, D3, D4	Temporary, spatially restricted sampling will not compromise overall habitat quality or ecological functioning. Grab and core samples represent a negligible seabed footprint and do not alter seafloor integrity.

D7	D7T1	<p>the habitat type in the assessment area.</p> <p>The spatial extent and distribution of permanent alteration of hydrographical conditions to the seabed and water column, is at a level that ensures that the structure and functions of the ecosystems are safeguarded and that benthic ecosystems, in particular, are not adversely affected.</p> <p>Within coastal and territorial waters, continue to ensure the</p>	D7, D1, D4, D3, D6	Site investigation surveys cause no permanent alteration of currents, salinity, or seabed morphology. Vessel operations are transient and minor.
D8	D8T1a	<p>concentrations of contaminants do not exceed the threshold values set in accordance with Directive 2000/60/EC.</p> <p>Concentration of contaminants in marine matrices assessed in accordance with OSPAR Coordinated Environmental Monitoring Programme (CEMP) do not exceed OSPAR Environmental Assessment Criteria (EAC) and concentrations are not increasing.</p>	D8, D9	Site investigation surveys do not introduce contaminants. Sediment and water samples are collected for analysis only and do not alter contaminant status.
D8	D8T1b	<p>The degree of biological or ecological effects that can be specifically attributed to contaminants continues to be below the agreed OSPAR criteria. At present, this is limited to evaluation of reproductive impairment in marine gastropods associated with tributyltin (TBT).</p>	D8, D9	Site investigation surveys do not introduce contaminants. Sediment and water samples are collected for analysis only and do not alter contaminant status.
D8	D8T2	<p>Spatial extent and duration of significant acute pollution events are minimised.</p>	D8, D1	No pathway exists for surveys to increase biological contaminant effects. Samples are removed in small volumes and not reintroduced.
D8	D8T3	<p>Levels of contaminants in fish and shellfish caught or harvested for</p>	D8, D1, D3, D4	Site investigation surveys are regulated under the MUL and environmental best practice. Risk of pollution events (e.g. fuel spills) is negligible and mitigated through standard protocols.
D9	D9T1		D9, D8	Site investigation surveys do not influence contaminant pathways into seafood; no discharges occur.

		human consumption comply with maximum limits listed in EU Regulation 1881/2006 (as amended).		
D10	D10T1a	The composition, amount and spatial distribution of litter in the coastline, and on the seabed, are at levels that do not cause harm to the coastal or marine environment.	D10, D1	The proposed site investigation surveys will not generate marine litter. All waste materials, including any consumables or packaging, will be managed in accordance with vessel waste management procedures and returned to shore for appropriate disposal. Waste handling will comply with MARPOL Annex V (Prevention of Pollution by Garbage from Ships) and relevant national waste legislation, ensuring no release of litter to the marine environment.
D10	D10T1b	By 2030, Ireland will reduce from a baseline of 2016 by at least 75% the prevalence of the most commonly found single-use plastic items and of maritime related plastic items on beaches in order to contribute to the achievement of relevant regional and EU threshold values building upon requirements for EU Member States in the EU Single Use Plastics Directive (Directive 2019/904). The spatial distribution, temporal extent, and levels of anthropogenic impulsive sound sources do not exceed levels that adversely affect populations of marine animals.	D10, D1	Site investigation surveys will not generate litter. All waste is returned to shore under waste management procedures as response to D10T1a above.
D11	D11T1		D11, D1	Acoustic surveys (multibeam, side-scan, sub-bottom profiler) are of limited duration. Soft-start procedures, MMOs, and PAM will ensure noise remains below levels that could cause population-level effects on marine mammals. The duration of the site investigation surveys are temporary and will not result in long-term effects.

It is clear from Table 4.6.3 that the proposed site investigation surveys are consistent with the objectives of the Marine Strategy Framework Directive and Ireland's Marine Strategy. All survey activities are designed to reduce adverse effects on the marine environment. No measurable effect on Ireland's achievement of Good Environmental Status under any of the 11 MSFD descriptors is anticipated. The proposed site investigation surveys therefore fully comply with the Directive's overarching objectives to protect, preserve, and where practicable restore the marine environment.

Statement of Authority

This report has been prepared by Alanna Mitchell (B.Sc., M.Sc.), the primary author. Alanna is a marine consultant ecologist with two years of experience in marine environmental consultancy. She holds a First-Class Honours degree in Marine Science (B.Sc.) from the National University of Ireland, Galway, where she contributed to intertidal shore studies in Galway. These studies aimed to establish baseline data for future monitoring, focusing on species assemblages, biodiversity, and habitat types (JNCC). Alanna also earned a First-Class Honours Master's degree in Marine Biology (M.Sc.) from University College Cork, where she was involved in a research project supported by the Marine Institute. Alanna's professional background emphasizes environmental impact assessment and management within marine ecosystems, with particular expertise in aquaculture, offshore renewables, and wastewater. Her extensive experience includes working on Environmental Impact Assessments (EIAs), Appropriate Assessments (AAs), Marine Usage Licences, and Sanitary Surveys. She has led and managed complex multidisciplinary projects across sectors, including fisheries and environmental monitoring, leveraging her advanced skills in Geographical Information Systems (GIS). Alanna's solid understanding of EU and Irish environmental policies allows her to provide a comprehensive evaluation of the project's alignment with the goals of the Marine Strategy Framework Directive.

This report has been reviewed by Dr. A. Long. He is a Principal Marine Consultant with over nine years of experience across consultancy, government, and academia, with a PhD in marine ecology from the University of Galway. His career has focused on the assessment and management of environmental impacts in the marine environment. He has successfully managed and delivered complex multidisciplinary projects for high-profile clients in Ireland, Australia, and Brazil in sectors including fisheries, aquaculture, offshore renewables, ports, and wastewater, authoring over 40 major technical reports. His background includes detailed ecological and environmental quality assessments, monitoring programme design, and statistical analysis, supported by peer-reviewed publications and international research collaborations. Drawing on this expertise and his in-depth knowledge of EU and Irish environmental legislation, Dr. Long is suitably qualified to provide a robust consideration of the project's consistency with the objectives of the Marine Strategy Framework Directive.