		from depth below MSL [m]	to depth below MSL [m]	vertical thickness [m]
Quaternary		**- 2.6**	**6.8**	**9.4**
	undifferentiated	- 2.6	6.8	9.4
Triassic		**6.8**	**1,546.3**	**1,539.6**
	Mercia Mudstone Group	**6.8**	**957.7**	**951.0**
	Knocksoghey Fm.	6.8	134.1	127.4
	Knocksoghey Fm. (u. p.)	6.7	103.3	96.6
	Coolmaghra Skerry	103.3	110.0	6.7
	Knocksoghey Fm. (l. p.)	110.0	134.1	24.1
	Glenstaghey Fm.	134.1	471.5	337.4
	Glenstaghey Fm. (u. p.)	134.1	257.0	122.9[1]
	Larne Halite	257.0	460.9	203.9[2]
	L. Glenstaghey Fm. (l. p.)	460.9	471.5	10.6
	Craiganee Fm.	471.5	902.5	431.0
	Craiganee Fm. (u. p.)	471.5	618.1	146.6
	Carnduff Halite	618.1	798.0	179.9
	Craiganee Fm. (m. p.)	798.0	861.7	63.7
	Ballyboley Halite	861.7	902.5	40.8
	Lagavarra Fm.	902.5	957.7	55.2
	Sherwood Sandstone Group	**957.7**	**1,606.0**	**648.3**
	U. Sherwood Sandstone	957.7	1,243.6	285.9
	Sherwood Upper Siliceous	1,243.6	1,546.3	302.7
	Sherwood Lower Siliceous	1,546.3	1,606.0	59.7
Permian		**1,606.0**	**2,870.3**	**1,264.3**
	Upper Permian	**1,606.0**	**1,813.0**	**207.0**
	Connswater Marl Fm.	1,606.0	1,672,1	66.1
	U. Permian Marls	1,606.0	1,672.1	66.1
	Anhydrite	1,672.1	1,676.7	4.6
	Belfast Harbour Fm.	1,676.7	1,813.0	140.9
	Siltstone	1,676.7	1,678.2	1.5
	Halite	**1,678.2**	**1,791.3**	**113.1**
	Magnesian Limestone	1,791.3	1,813.0	21.7[3]
	Lower Permian	**1,813.0**	**2,870.3**	**1,057.3**
	Lower Permian Sandstone	1,813.0	2,253.7	440.7[4]
	Lower Permian Volcanics	2,253.7	2,870.3	616.6[5]
Total Depth			**2,870.3**	

u. p.: upper part; m. p.: middle part; l. p.: lower part.

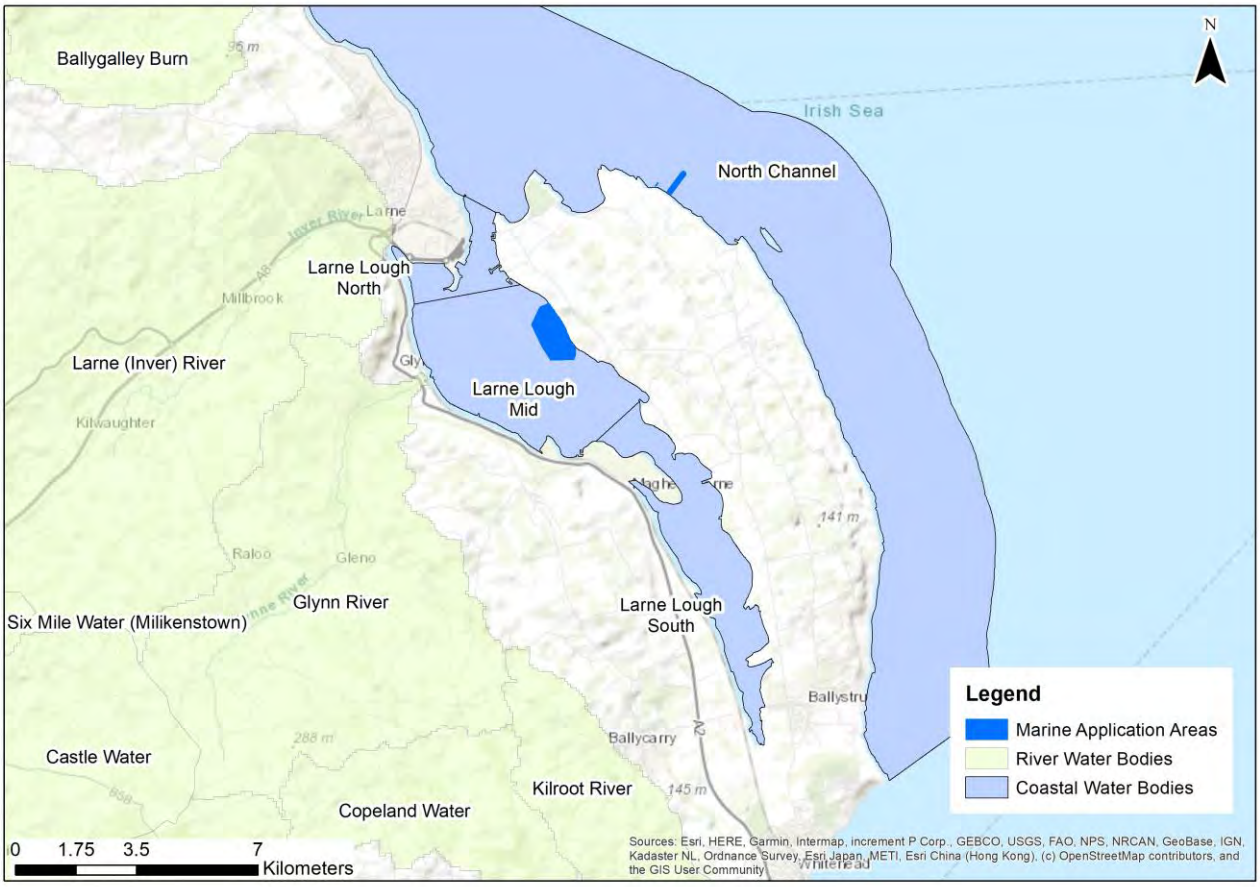
Contribution of Tertiary intrusive rocks to thickness: [1]25m, [2]14.3m, [3]7.6m, [4]9.8m, [5]4m.

Table 18-3: Impacts Proposed to be Scoped In (✓) / Out (x) for Land, Soils, Geology and Hydrogeology

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Loss of soils	x	x	Scoped out of the EIA. The Project is located within the marine environment, and thus, there is no pathway for terrestrial soils to be impacted. The impact of any terrestrial works has been assessed and approved as part of the extant planning permission.	N/A	N/A
Ground and/or groundwater contamination	x	x	Scoped out of the EIA. The Project is located within the marine environment, and thus, there is limited potential for ground or groundwater contamination. The impact of any terrestrial works has been assessed and approved as part of the extant planning permission.	N/A	N/A
Loss of geological features, changes in geomorphology	x	x	Scoped out of the EIA. Construction of the intake and outfall will have minimal impact on geological conditions, and there will be no change in geomorphology. The impact of any terrestrial works has been assessed and approved as part of the extant planning permission.	N/A	N/A
Subsidence of the seabed above salt caverns	x	x	The construction of caverns within the salt will cause a very gradual depression of the seabed and shoreline above the cavern area as the salt "creeps," with a maximum variation of 28cm from present-day levels. The rate and degree of this subsidence are considered to be non-significant.	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Potential effects arising from the offshore excavation and construction activities, e.g. installation of the seawater intake head on the seabed, construction of the brine discharge outfall	x	x	Construction of the intake and outfall will have minimal impact on geological conditions and seabed sediments, as trenchless techniques will be employed to minimise the impact upon bedrock and sediments. The tunnelling machine used for the construction of the intake tunnel will be advanced through Basalt bedrock, but this will have minimal impact upon this receptor's geological condition. There is limited potential for the contamination of seabed sediments despite drilling fluids being released into the marine environment during the construction of the brine outfall. This is because the HDD used to construct the brine outfall will use environmentally friendly, CEFAS-approved fluids, such as Pure-Bore®, which will be used to minimise the environmental impact of drilling fluids escaping to the sea. There will be no significant geological interactions during the operational phase and therefore no impact upon geological conditions.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).


Ballygalley Burn
Irish Sea
North Channel
Larne
Larne Lough North
Millbrook
Larne (Inver) River
Larne Lough Mid
Kilwaughter
Raloo
Glenoe
Glynn River
Six Mile Water (Milikenstown)
Larne Lough South
Ballycarry
Castle Water
Kilroot River
Copeland Water
Whitehead
N
Legend
Marine Application Areas
River Water Bodies
Coastal Water Bodies
0 1.75 3.5 7
Kilometers
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

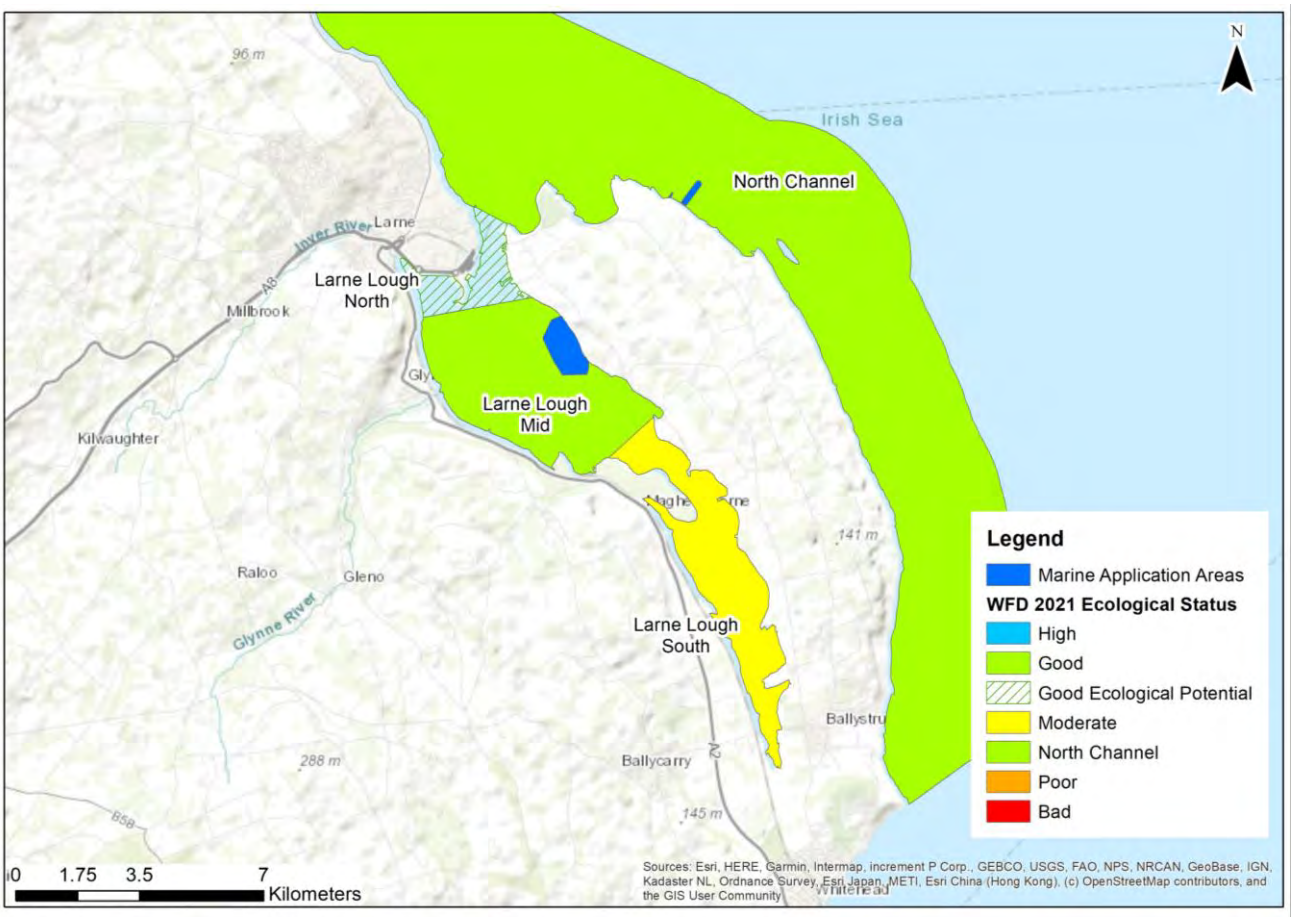

N
Irish Sea
North Channel
Larne Lough North
Larne Lough Mid
Larne Lough South
Larne
Inver River
Millbrook
Kilwaughter
Raloo
Gleno
Glynne River
Ballycarry
96 m
141 m
288 m
145 m
Legend
Marine Application Areas
WFD 2021 Ecological Status
High
Good
Good Ecological Potential
Moderate
North Channel
Poor
Bad
0 1.75 3.5 7
Kilometers
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Table 19-1: WFD Status (2009-2021)

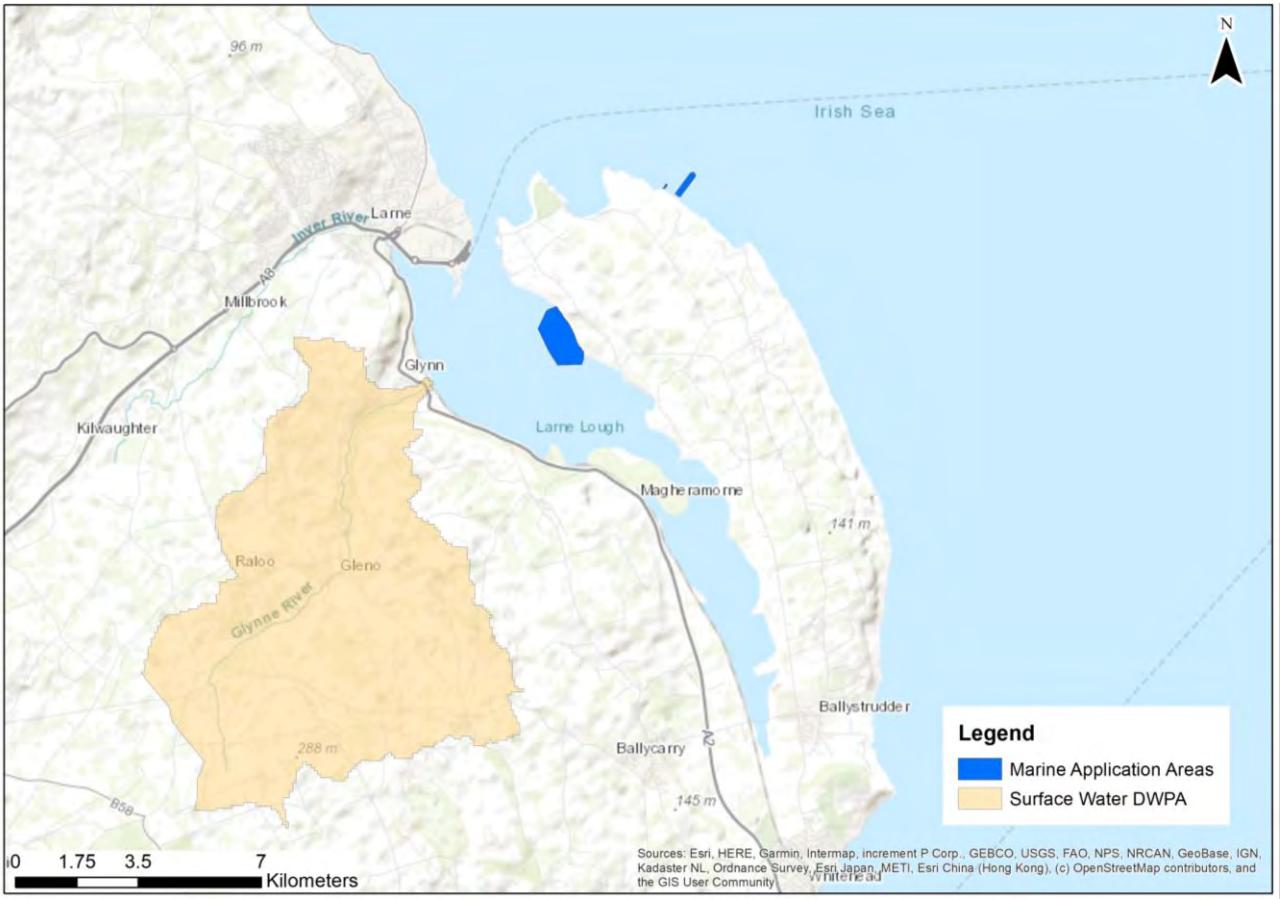
WFD Status (2009-2021)	North Channel (UKGBNI6NE030)	Larne Lough North (UKGBNI6NE050)	Larne Lough Mid (UKGBNI6NE060)	Laren Lough South (UKGBNI6NE070)
Overall WFD Status (2009)	Good	Good Ecological Potential	Moderate	Moderate
Overall WFD Status (2015)	Good	Moderate Ecological Potential	Moderate	Good
Overall WFD Status (2018)	Good	Moderate Ecological Potential	Moderate	Moderate
Ecological WFD Status (2021)	Good	Good Ecological Potential	Good	Moderate
Chemical (Subgroup A)[1] WFD Status (2021)	Good	Good	Good	Good

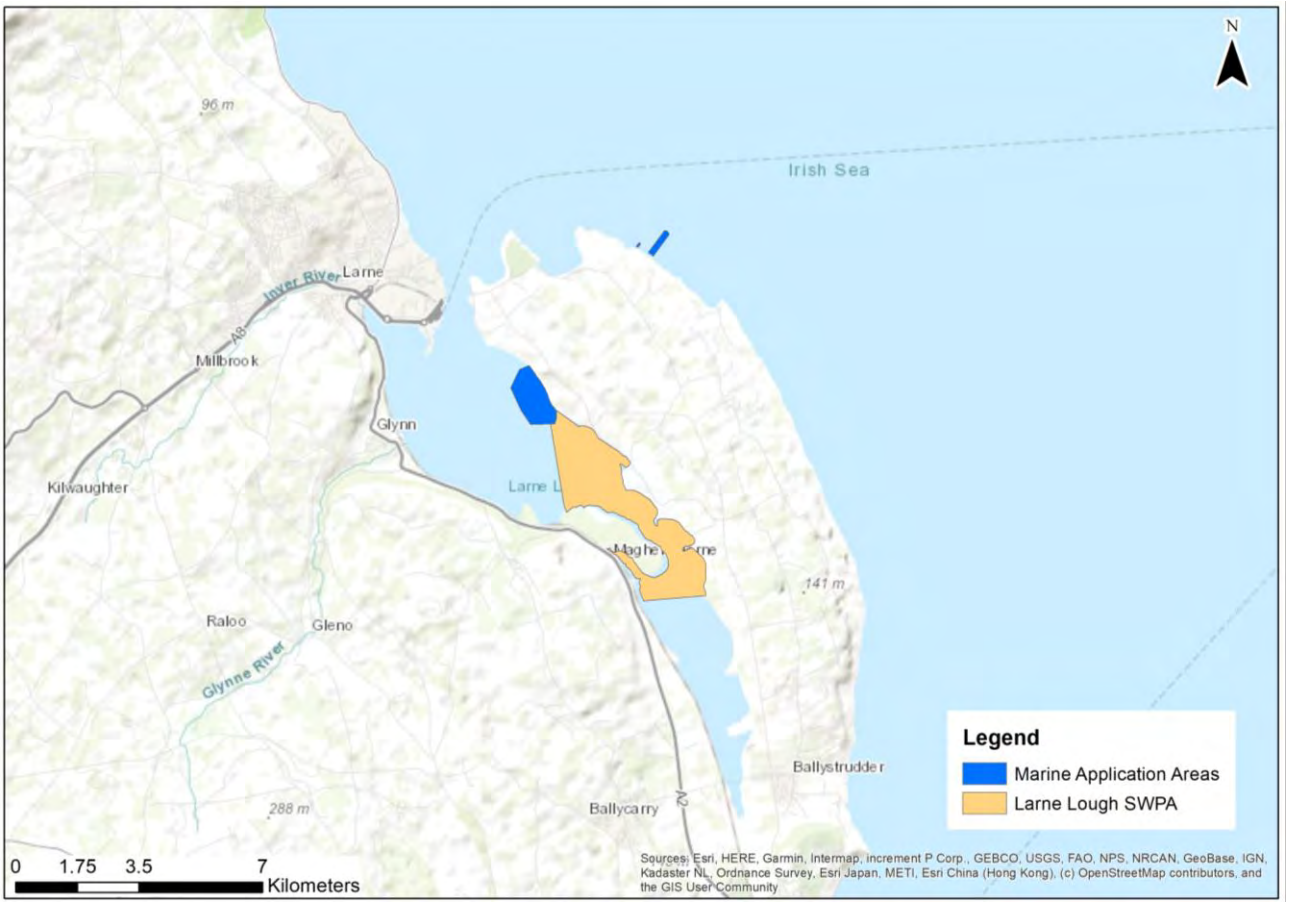
1 ubiquitous, persistent, bioaccumulative and toxic substances (UPBTs) not included.

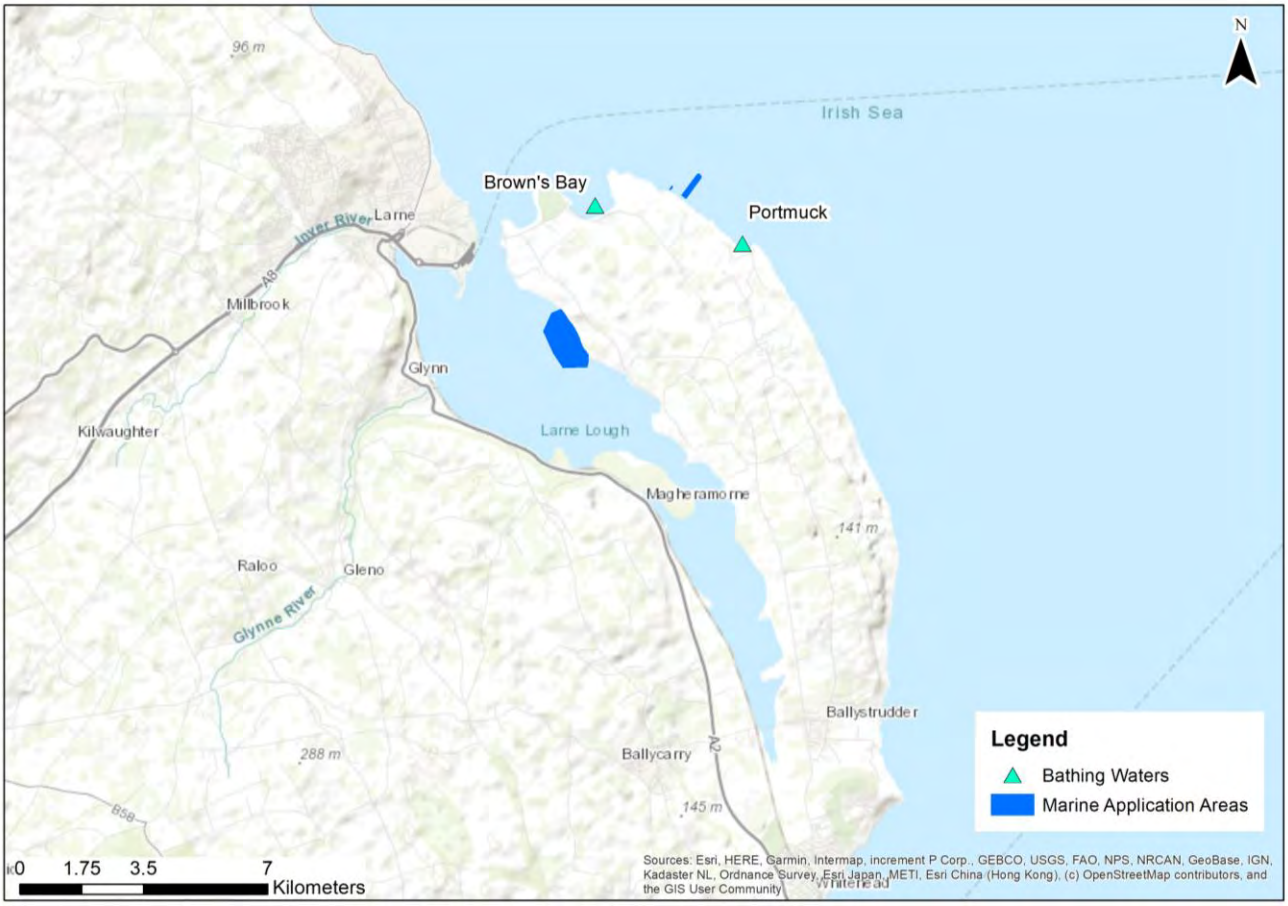
19.4.2 Protected Areas

A significant proportion of waters in the North Eastern River Basin District (RBD) are protected under existing European Union (EU) legislation requiring special protection due to their sensitivity to pollution or their particular economic, social or environmental importance. The WFD requires competent authorities to establish a register of these protected areas and ensure that they are adequately protected. A water body which otherwise meets the requirements of the WFD may have its status reduced to "less than good" if it does not meet the protected area objectives. All of the areas requiring special protection in the North Eastern RBD have been identified by the NIEA, mapped and listed in a Register of Protected Areas (required under Article 6 of the WFD Directive). The Register of Protected Areas includes:

- Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas (DWPAs));
- Areas designated for the protection of economically significant aquatic species, i.e. freshwater fish and shellfish;
- Bodies of water designated as recreational waters, including areas designated as bathing waters;


N
Irish Sea
96 m
Larne
Inver River
A8
Millbrook
Glynn
Kilwaughter
Larne Lough
Magheramorne
141 m
Raloo
Glenoe
Glynne River
288 m
Ballystrudder
Ballycarry
A2
145 m
B58
Whitehead
Legend
Marine Application Areas
Surface Water DWPA
0 1.75 3.5 7
Kilometers
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community


N
Irish Sea
96 m
Inver River
Larne
A8
Millbrook
Glynn
Kilwaughter
Larne L
Magher
rne
141 m
Raloo
Gleno
Glynne River
Ballystrudder
288 m
Ballycarry
A2
Legend
Marine Application Areas
Larne Lough SWPA
0 1.75 3.5 7
Kilometers
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community


N
Irish Sea
Brown's Bay
Portmuck
Larne
Inver River
A8
Millbrook
Glynn
Kilwaughter
Larne Lough
Magheramorne
141 m
Raloo
Gleno
Glynne River
Ballystrudder
288 m
Ballycarry
A2
145 m
B58
Waterhead
Legend
Bathing Waters
Marine Application Areas
0 1.75 3.5 7
Kilometers
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

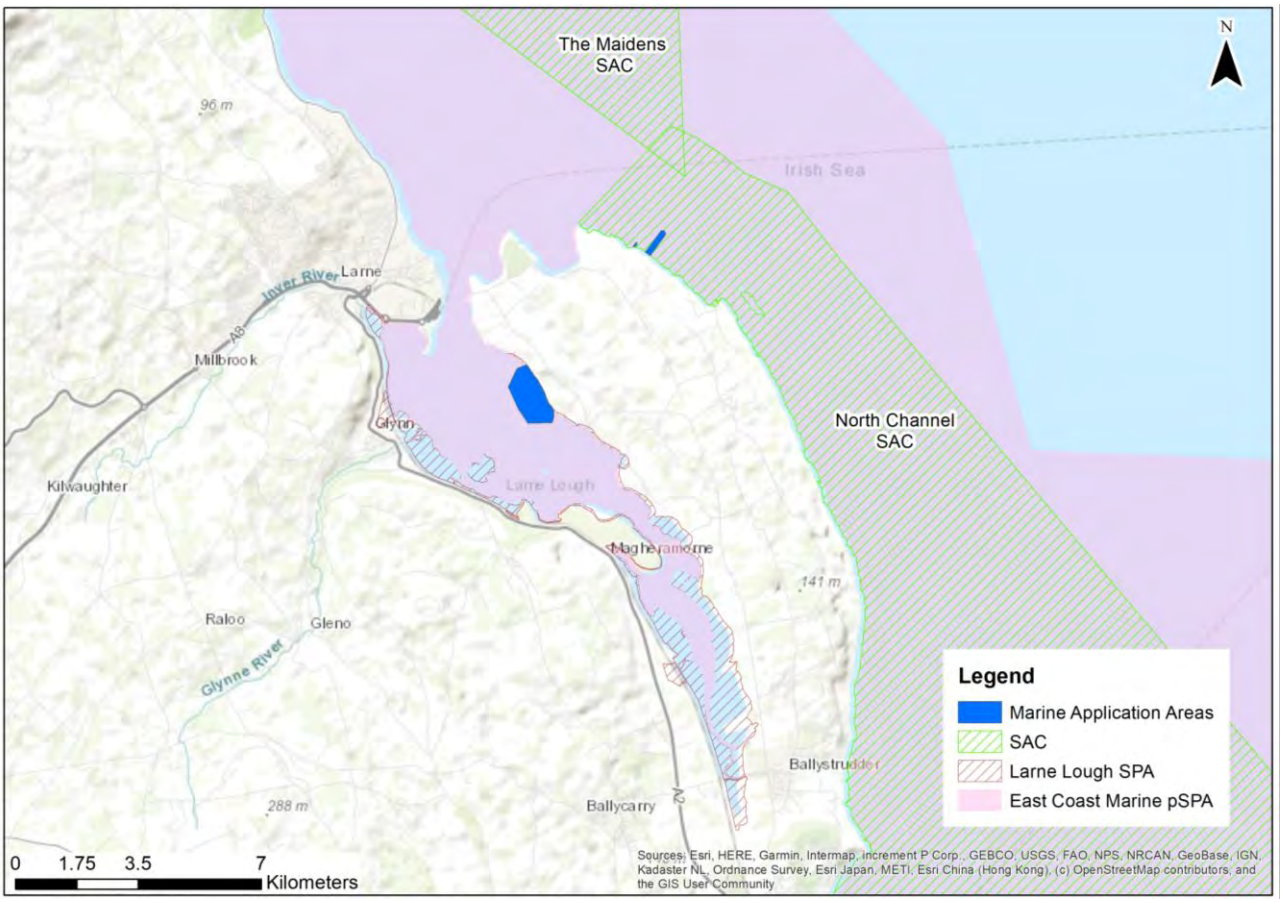

The Maidens
SAC
N
96 m
Irish Sea
Larne
Inver River
A8
Millbrook
Glynn
North Channel
SAC
Kilwaughter
Larne Lough
Magheramorne
141 m
Raloo
Gleno
Glynne River
Ballystrudder
288 m
Ballycarry
A2
Legend
Marine Application Areas
SAC
Larne Lough SPA
East Coast Marine pSPA
0 1.75 3.5 7
Kilometers
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Table 19-2: Impacts Proposed to be Scoped In (✓) / Out (x) for Water Quality

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Potential for increased suspended sediment to the North Channel during construction of the brine outfall and seawater intake	✓		The brine outfall will be constructed by horizontal directional drilling, rather than by conventional trenching. The saltwater intake structure is to be constructed using a closed full-face slurry machine with a combination of cutting knives and disc cutters. These techniques will reduce the discharge of suspended sediment into the water column to a single, short-term discharge of drilling mud and cuttings on final breakout. However, while mitigation measures will be in place, there is potential for short-term water quality impacts during construction/decommissioning, particularly at the punch-out stage when the drilling equipment breaks through the seabed or when assets are being removed from the seabed during decommissioning.	Information on sediment types within the area to determine characteristics of suspended sediment, WFD and water quality information for the North Channel.	The construction phase assessment will include a review of the sensitivity of the receiving environment to determine how this will affect the receiving water body.
		x	Once the construction phase is complete, there will be no operational activities undertaken which may create suspended sediments.	N/A	N/A
Potential for brine discharge to create a hypersaline environment within the North Channel	✓		Operation of the brine outfall is required for the construction of the gas storage caverns and will operate throughout the construction phase (approx. 5-10 years). The discharged brine will be denser than the surrounding seawater and so, without mitigation there will be a tendency for the brine plume to sink.	Information on discharge rates and, salinity and concentrations of release brine, water quality data and dispersion modelling for the brine outfall.	The construction phase assessment will include a review of the sensitivity of the receiving environment, the dispersion rates and concentrations and dispersion

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			The Brine outfall diffuser structure was sized to accommodate the maximum flow rate of 1,000m^3/hr. The proposed design that emerged from the FEED process is comprised of two diffuser ports pointing vertically upwards and fitted with duckbill diffuser valves to maximise the dispersion and mixing of the discharged brine. However, short to long term impacts of potential accumulated brine deposits should be assessed.		modelling to determine how this will affect the North Channel.
		x	Once the gas storage caverns are constructed and are operational, there will be no further requirement to discharge brine to the North Channel. Therefore, it is not expected that significant environmental effects associated with the brine outfall will occur during the operation phase.	N/A	N/A
General construction works	✓		The construction works will involve the use of plant and machinery, drilling fluids, oils, fuels and chemicals.	Water quality data for the North Channel and Larne Lough water bodies are required to assess any potential impacts.	The construction phase assessment will involve a review of construction materials to be used and how these may affect the receiving water body, accounting for embedded mitigation measures.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		x	Following completion of the Project, construction works will cease.	N/A	N/A
Changes to water flow dynamics and salinity within the North Channel due to seawater abstraction	x		Operation of the seawater intake is required for the construction of the gas storage caverns and will operate throughout the construction phase (approx. 5-10 years). The seawater intake is designed for the maximum flow rate of 1,000m^3/hr, at a maximum velocity of 0.15m/s to ensure the intake structure is 'hydraulically invisible'. All abstractions greater than 20m^3/day require an Abstraction Licence granted by the NIEA. Given the scale of the North Channel, these abstraction rates are not expected to result in significant environmental effects.	N/A	N/A
		x	Once the gas storage caverns are constructed and are operational, there will be no further requirement to abstract seawater from the North Channel. Therefore, it is not expected that significant environmental effects associated with the brine outfall will occur during the operation phase.	N/A	N/A
Changes to seabed morphology in the North Channel at the seawater intake and brine outfall.	x		Once secured in place, the seawater intake and brine outfall infrastructure may cause scouring of the seabed, altering seabed sediment dynamics and hydromorphology in the North Channel. However, due to the fact that the footprint of the infrastructure is of limited length and is limited to 0.5m above the seabed,	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			it can be expected that the impact on sediment dynamics and seabed morphology within the North Channel will be negligible. Therefore, this impact can be scoped out of further detailed assessment.		
		x	Once the construction phase is complete and the gas storage caverns are operational, the seawater intake and the brine outfall infrastructure will remain in situ for the lifetime of the facility. Similarly to the construction phase, it can be expected that the impact on sediment dynamics and seabed morphology within the North Channel will be negligible. Therefore, this impact can be scoped out of further detailed assessment.	N/A	N/A
Below seabed activities associated with the construction and operation of caverns within Larne Lough	x		The caverns will be constructed approximately 1,350m below the surface of the seabed by leaching seawater through the salt layer of the seabed. This process is anticipated to take 22 months for each cavern. The cavern roofs will be protected by implementing a non-leachable blanket medium with a lower density compared to the brine that is produced in the cavern. For this facility, nitrogen is planned to be used as blanket medium. Considering the depth below the seabed and embedded mitigation measures, it is not expected that the construction of the caverns will result in significant environmental effects.	N/A	N/A
		x	Before commencing gas storage operations, a pressure integrity or 'tightness' test will be performed	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			on the last cemented casing seat in order to verify the gas tightness and confirm the suitability of the cavern for gas storage. Similarly to the construction phase, due to the depth beneath the seabed, it is not expected that the operation of the caverns will result in significant environmental effects.		

* The Project phase refers to construction/decommissioning (C) and operation (O).

Table 19-3: Criteria for Rating Receptor Sensitivity (DMRB,2020)

Value (Sensitivity)	Typical Descriptors
Very High	**Very high importance and rarity, international scale, and very limited potential for substitution.** Examples: Water body protected area interests are of international importance and have been designated under the Habitats, Birds, Shellfish, Bathing Water or Freshwater Fish, Drinking Water or Nitrate Directives. High Status Water bodies.
High	**High importance and rarity, national scale, and limited potential for substitution.** Examples: Water body where the current status is good or better and no deterioration is permitted. National designation, e.g. ASSI.
Medium	**High or medium importance and rarity, regional scale, limited potential for substitution.** Examples: Moderate Status with an objective of good status by 2021, regionally important resource in terms of ecology or fisheries interest.
Low	**Low or medium importance and rarity, local scale.**
Negligible	**Very low importance and rarity, local scale.**

Table 19-4: Criteria for Rating the Magnitude of Impact (DMRB, 2020)

Magnitude	Type and scale of impact
High	Major alteration to water body status causing deterioration in either the ecological status, including supporting elements, i.e., physico-chemical, specific pollutants and hydromorphology, chemical status or protected area status, including downstream protected area interests within the same water body. Severe damage to key water body characteristics, features, or elements (Adverse). Large-scale or major improvement to water body status, extensive restoration, or enhancement of the Water body (Beneficial).
Medium	Water quality impact, but not adversely affecting the integrity or status of the water body, partial loss or damage of certain characteristics or water body attributes (Adverse). Benefit to or addition of key characteristics or features of the water body, improvement in water status (Beneficial).
Low	Some measurable change in water quality attributes, minor loss, or alteration to one (maybe more) key characteristics (Adverse). Minor benefit to one or more key characteristics, features, or elements of the water body (Beneficial).
Negligible	Very minor loss to water body characteristics, features, or elements (Adverse). Very minor benefit to or positive addition of one or more water body characteristics, features, or elements (Beneficial).
No change	No loss or alteration to water quality or water body status.

Table 19-5: Criteria for Rating the Significance of Environmental Impacts (DMRB, 2020)

Sensitivity of Attribute	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

19.7 Embedded Mitigation Measures

The following embedded measures are relevant to water quality. The embedded measures will evolve over the development process as the EIA progresses.

The requirement for and feasibility of any mitigation measures will be consulted upon with statutory consultees throughout the EIA process.

19.7.1 Construction Phase

A CEMP will be prepared to capture all mitigation measures within the EIA and to provide additional detail in order to develop a practical programme of measures for the Contractor. The CEMP will form part of the specification of the Contract Documents for the construction stage. The CEMP will include mitigation measures to safeguard the receiving waters, including:

- Waste Management Plan;
- Contamination Strategy;
- Water Quality Management Plan; and
- Establishment of lines of communication, reporting and actions.

The mitigation measures will include the requirements for best practice and adherence to relevant national and international guidelines, including:

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, 2001);
- Guidance for Pollution Prevention (GPP) documents developed by the Environment Agency for England and Wales, the NIEA and the Scottish Environment Protection Agency (SEPA). GPP have replaced the former series of guidance documents for pollution prevention, which were known as Pollution Prevention Guidelines (PPG).

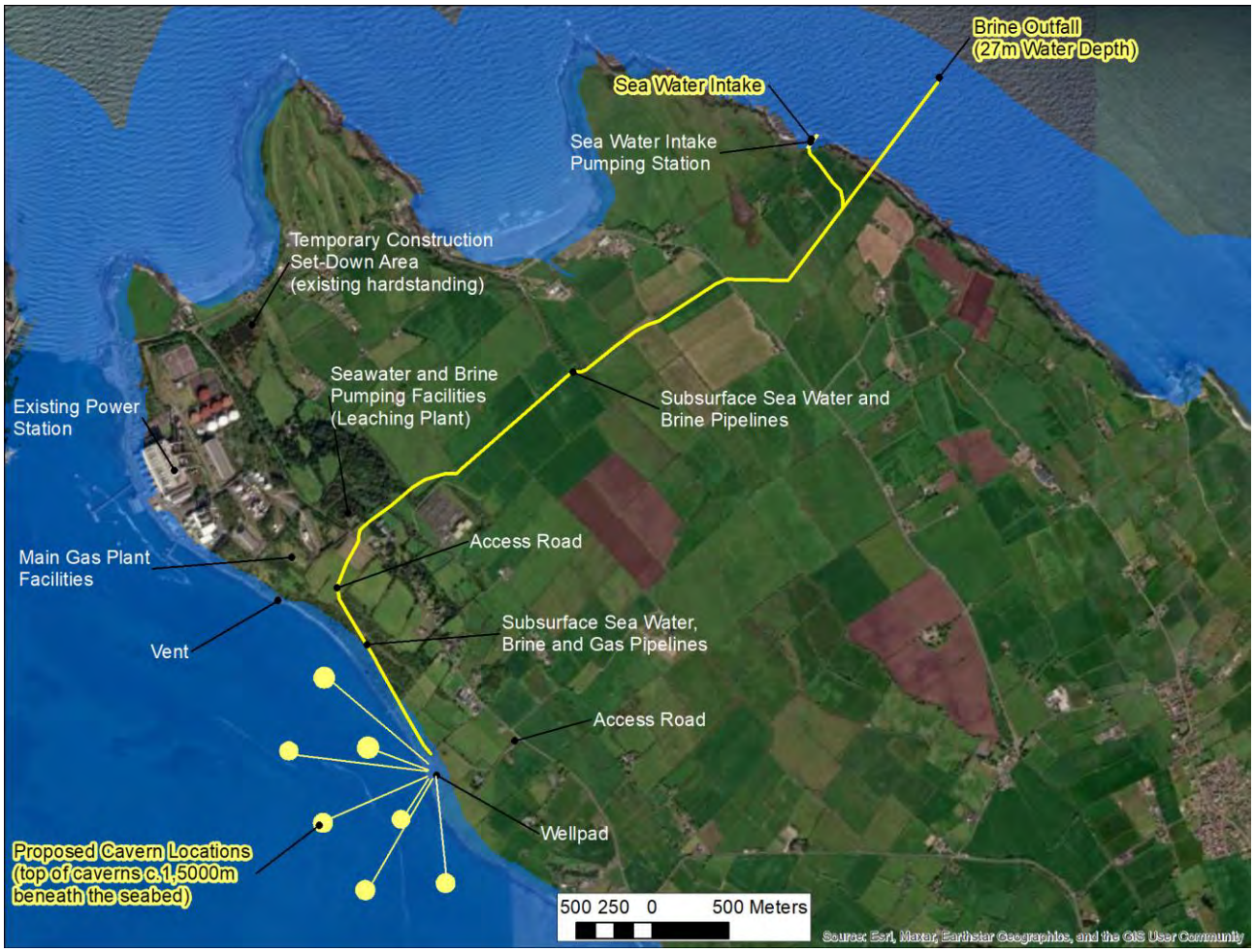

Brine Outfall
(27m Water Depth)
Sea Water Intake
Sea Water Intake
Pumping Station
Temporary Construction
Set-Down Area
(existing hardstanding)
Seawater and Brine
Pumping Facilities
(Leaching Plant)
Subsurface Sea Water and
Brine Pipelines
Existing Power
Station
Access Road
Main Gas Plant
Facilities
Vent
Subsurface Sea Water,
Brine and Gas Pipelines
Access Road
Wellpad
Proposed Cavern Locations
(top of caverns c.1,5000m
beneath the seabed)
500 250 0 500 Meters
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Table 20-1: Impacts Proposed to be Scoped In (✓) / Out (x) for flood risk

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Flooding to Project	x		Most of the construction works will take place beneath the seabed using trenchless techniques and will therefore not be affected by extreme tidal events. No works will be undertaken within the marine environment if extreme tidal events are predicted.	N/A	N/A
		x	The Mid and East Antrim Plan Strategy Policy FRD1 'Development within Floodplains' states that a proposal for development within the sea will not be permitted unless it constitutes an exception to the policy. The Project can be classified under the exception 'Development for utilities infrastructure, which for operational reasons has to be located within the floodplain'. The works have been designed for extreme tidal events.	N/A	N/A
	x		Construction of the works will not cause an increase in flood risk elsewhere.	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Increase in flood risk elsewhere		x	The Project will have a negligible effect on the extent of the coastal floodplain, now or in the future, considering the anticipated climate change.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).


Larne
Ballylumford Power Station
Islandmagee
Larne Lough
Legend
Red Line Boundary
Air Quality Study Area (250m Buffer)
0
0.75
1.5 km

21.3 Data Sources

21.3.1 Introduction

The baseline ambient air quality environment has been characterised through a desk study of publicly available data sources (refer to Table 21-1) which presents baseline ambient air quality monitoring undertaken by the local district council in the area of the Project.

Table 21-1: Data sources used for the Assessment of Air Quality

International Policy	European Policy and Legislation	NI National Policy, Legislation and Guidance
World Health Organization (WHO) WHO global air quality guidelines: Particulate Matter ($PM_{2.5}$ and PM_{10}), Ozone, Nitrogen Dioxide and Sulphur Dioxide (hereafter referred to as the WHO Air Quality Guidelines) (WHO 2021)	Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants ('the NEC Directive') as amended by Directive (EU) 2016/2284	The Air Quality Standards (Amendment) Regulations (Northern Ireland) 2017
		Mid and East Antrim Air Quality Screening and Assessment 2023
		Department for Environment, Food and Rural Affairs (DEFRA) Mapped Concentration Estimates

21.3.2 Legislation and Policy

Exposure to air pollution can have long-term effects on health, and it can also have negative impacts on the environment. The UK government's and devolved administrations' primary objective is to ensure that all members of the public have access to outdoor air without significant risk to their health, where this is economically and technically feasible. Key legislation and policy are summarised in Table 21-2.

Table 21-2: Legislation and Policy used for the Assessment of Air Quality

European Policy and Legislation	United Kingdom Policy and Legislation	NI National Policy, Legislation and Guidance
Cleaner air for Europe (CAFÉ directive – 2008/50/EC)	UK Air Quality Strategy	Air Quality Standards (Amendment) Regulations (Northern Ireland) 2017
Air quality 4th daughter directive	Local Air Quality Management Technical Guidance 2022	The Environment Order (Northern Ireland) 2002
The 2008 Ambient Air Quality Directive (2008/50/EC)	-	The Environment (2021 Act) (Commencement and Saving Provision) Order (Northern Ireland) 2022
Directive (EU) 2024/2881 of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast)	-	-



Figure 21-2: Non-Automatic Monitoring Locations (Islandmagee)

The annual mean concentration results of the nearest NO_2 diffusion tube data (2018 - 2022) are presented in Table 21-3.

Table 21-3: Annual Mean Concentrations Trends of NO_2 Diffusion Tube Data (2018-2022)

Site ID	Site Type	Within AQMA ?	Annual Mean Concentration (µg/m3) - Adjusted for Bias				
			2018 (Bias Adjustment Factor = 0.93)	2019 (Bias Adjustment Factor = 0.92	2020 (Bias Adjustment Factor = 0.76)	2021 (Bias Adjustment Factor = 0.77)	2022 (Bias Adjustment Factor = 0.77)
LTD08	Industrial	N	10.9	9.2	9.21	8.4	8.2

21.4.3 DEFRA Mapped Concentration Estimates

DEFRA have issued estimates for the years 2021 – 2040. The reference year used for background mapping is 2021, and summarised estimates of Oxides of Nitrogen - NO_X, Nitrogen Dioxide - NO_2, Particulate Matter - PM_{10} and Particulate Matter - $PM_{2.5}$, which incorporate updates to the input data used for modelling. The use of background concentrations within the air quality concentration prediction process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants within the vicinity

of the study site include industrial, domestic and agricultural emissions. DEFRA results are available for eight locations close to the Project, as shown in Figure 21-2.

For the purposes of the scoping report, the DEFRA estimates for the nearest location for the years 2023 – 2030 are presented in Table 21-4.

Table 21-4: DEFRA Location 2 Background Results (NO_x, NO_2, PM_{10}, $PM_{2.5}$) 2023 - 2030

DEFRA Location 2								
X Co-ordinates: 343,500				Y Co-ordinates: 400,500				
	2023	2024	2025	2026	2027	2028	2029	2030
NO_x	4.5	4.3	4.2	4.1	4.0	3.9	3.7	3.6
NO_2	3.6	3.5	3.4	3.3	3.2	3.1	3.0	2.9
PM_{10}	8.5	8.5	8.4	8.3	8.2	8.2	8.1	8.0
$PM_{2.5}$	4.2	4.1	4.0	4.0	3.9	3.9	3.8	3.8



Figure 21-3: Closest DEFRA Monitoring Locations (Islandmagee)


The Maidens SAC
Waterloo
Portmuck
North Channel SAC
The Gobbins
Larne Lough SPA
Kilcoan
Newlands
N
0
0.5
1 km
Legend
Red Line Boundary
Air Quality Study Area (250m Buffer)
ASSI
Ramsar
SAC
SPA

Table 21-5: Impacts Proposed to be Scoped In (✓) / Out (x) for Air Quality

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Traffic Generation	x		The effects on human health and the outcomes of the compliance risk assessment shall be assessed to determine whether a project triggers a potentially significant air quality effect.	N/A	N/A
		x	Vessel movements associated with operations will mainly be associated with personnel carrying out operations and maintenance activities. The number of people involved will be limited and, as such will not give rise to significant movements; no potential significant effects are predicted.	N/A	N/A
Dust and Particulates	x		All infrastructure (caverns, outfall and intake) and activities being considered within this EIA are located within the marine environment. All terrestrial elements (including the pipeline across Islandmagee) of the facility were considered as part of the application process for the extant planning consent (F/2010/0092/F) granted 17th October 2012, and do not need to be considered here. There are no construction activities (including transport via the road network) occurring within the terrestrial environment being considered in this EIA, whilst air quality during operation is also consented under the extant planning consent.	N/A	N/A
		x	It is not expected that operational activities associated with the Islandmagee Gas Storage Facility, or infrastructure, would lead to any significant generation of dust and fine particulate matter, as there would be no ground disturbance or earthworks carried out.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).

21.6 ES Assessment Methodology

21.6.1 Construction Phase – Methodology

If required the assessment of potential air quality effects of dust at potentially sensitive receptors follows the methodology outlined within the IAQM Guidance on the assessment of dust from demolition and construction v1.1, 2024 (IAQM 2024)[9]. A summary of the assessment methodology is provided in Table 21-6.

Table 21-6: Summary of IAQM construction dust assessment methodology

Step	Methodology Summary
Step1	Screen the need for a detailed assessment.
Step 2a	Determine the potential dust emission magnitude - Small, Medium and Large-scale risk, for each site activity – Demolition, Earthworks, Construction and Trackout*.
Step 2b	Define the Sensitivity of the Area – Low, Medium or High which includes Specific sensitivities of receptors based on proximity and numbers of those receptors and the local background PM10 (pertinent to human health effects).
Step 2c	Define the Risk of Impacts, based on the dust risk and area sensitivity conclusions from Step 2a and 2b (without mitigation).
Step 3	Site Specific Mitigation (if required).
Step 4	Determination of Significant Residual Effects.

**Trackout is the transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when Heavy Duty Vehicles (HDVs) leave the construction site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.*

21.6.2 Operation Phase Methodology

21.6.2.1 Land Use Planning and Development Control: Planning for Air Quality (IAQM)

This IAQM document sets out indicative criteria for requiring an air quality assessment. These points are set out in Table 21-7 below and it shows how the operational phase is scoped out of the assessment.

Table 21-7: IAQM Indicative Criteria for Requiring an Air Quality Assessment

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment:	Does this Project satisfy the criteria?
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight)	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere	**No**

[9] Although it is proposed to scope out the assessment, the methodology used in construction phase analysis is still presented for completeness.

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment:	Does this Project satisfy the criteria?
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.	**No**
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.	**No**
4. Introduce a new junction or remove an existing junction near to relevant receptors	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.	**No**
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere	**No**
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).	**No**
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. **NB. this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping**	Typically, any combustion plant where the single or combined emission rate is less than 5 mg/sec* is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.	**No**

**As a guide, the 5 mg/s criterion equates to a 450 kW ultra low NOx gas boiler or a 30kW Combined Heat and Power (CHP) unit operating at <95mg/Nm^3.*

The Project does not satisfy the criteria requiring a proposal to be supported with an air quality assessment. Therefore in accordance with this IAQM guidance an operational air quality assessment may be screened out.

21.6.2.2 Design Manual for Roads and Bridges (DMRB) Sustainability and Environment, LA105 Air Quality

The approach to considering an assessment (local assessment) or screening it out follows the guidance set out by the DMRB Sustainability and Environment, LA105 Air Quality (June 2024). Requirements for a local air quality assessment emanate from the following criteria being met:

- Road alignment change by 5m or more; or
- Daily traffic flows change by 1000 Annual Average Daily Traffic (AADT) or more; or



Figure 22-1: Climate Study Area

22.3 Data Sources

The assessment will be undertaken in line with a suite of all applicable legislation, policy and guidance data sources as listed in **Table 22-1**.

Table 22-1: Data Sources used for the assessment of Climate Change

International Policy and Guidance	European Policy and Legislation	National Policy, Legislation and Guidance
2015 Paris Agreement	EU (2021) Technical guidance on the climate proofing of Infrastructure in the Period 2021-2027 (European Commission 2021)	The Climate Change Act (Northern Ireland) 2022
		The Climate Change (Carbon Budgets 2023-2037) Regulations (Northern Ireland) 2024
UN Sustainable Development Goals	The Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (IEMA 2020)	Existing GHG NI - GHG Statistical Bulletin – June 2025 (DAERA, 2025)

International Policy and Guidance	European Policy and Legislation	National Policy, Legislation and Guidance
Green Construction Board Publicly Available Specification (PAS) 2080: Carbon Management in Infrastructure	IEMA (2022) Guidance on 'Assessing GHG Emissions and Evaluating their Significance', 2nd Edition	NI Climate Change Adaptation Programme 2019-2024[10]
		Met Office UK Climate Averages

22.4 Baseline Environment

Climate Change, caused by human activities, is one of the most significant threats to global biodiversity and is projected to become increasingly severe through the course of this century.

Naturally occurring gases in the Earth's atmosphere allow some of the sun's radiation to be trapped, warming the Earth's surface and maintaining a stable environment. This is the Greenhouse Effect. However, as more GHGs are emitted into the atmosphere, the more heat becomes trapped, increasing the Earth's temperature. There is a strong scientific consensus that the GHG emissions from human activities, especially burning fossil fuels, are the key cause of this global warming.

Climate change is the long-term shift in average weather patterns across the world and the increase in extreme weather events. Increased flood risk, associated with Climate Change, has the potential to result in considerable impacts on riparian and coastal developments. Higher sea levels have already been observed, while wetter winters are anticipated. There could be serious consequences to increased flood risk. Predicted impacts of Climate Change include an increase in the frequency and intensity of rainfall, an increase in peak flows in rivers, a rise in sea levels and increased storminess. These Climate Change effects are likely to increase pluvial, fluvial, and coastal flooding and will require that future development be adaptable or resilient to future climatic change and its associated impacts.

Further information on flood risk can be found in Chapter 20 (Flood Risk).

22.4.1 National Climate Study Area

The NI Greenhouse Gas Inventory contains data which details GHG emissions from NI from 1990 to the latest reporting year. It is a subcategory of the UK GHG Inventory, which is produced to satisfy both European Union Monitoring Mechanism (EUMM) and United Nations Framework Convention on Climate Change (UNFCCC) reporting requirements, and the UK has responsibility for under the Kyoto Protocol. It is compiled in line with international guidance from the Intergovernmental Panel on Climate Change (IPCC).

Published on 10th June 2025, the latest GHG statistical bulletin, the NI greenhouse gas inventory 1990 – 2023, details information about greenhouse gas emissions in 2023. The volume of emissions is reported for seven greenhouse gases:

[10] Northern Ireland's third Climate Change Adaptation Programme (NICCAP3) is currently being developed in response to the third CCRA which was published in January 2022.

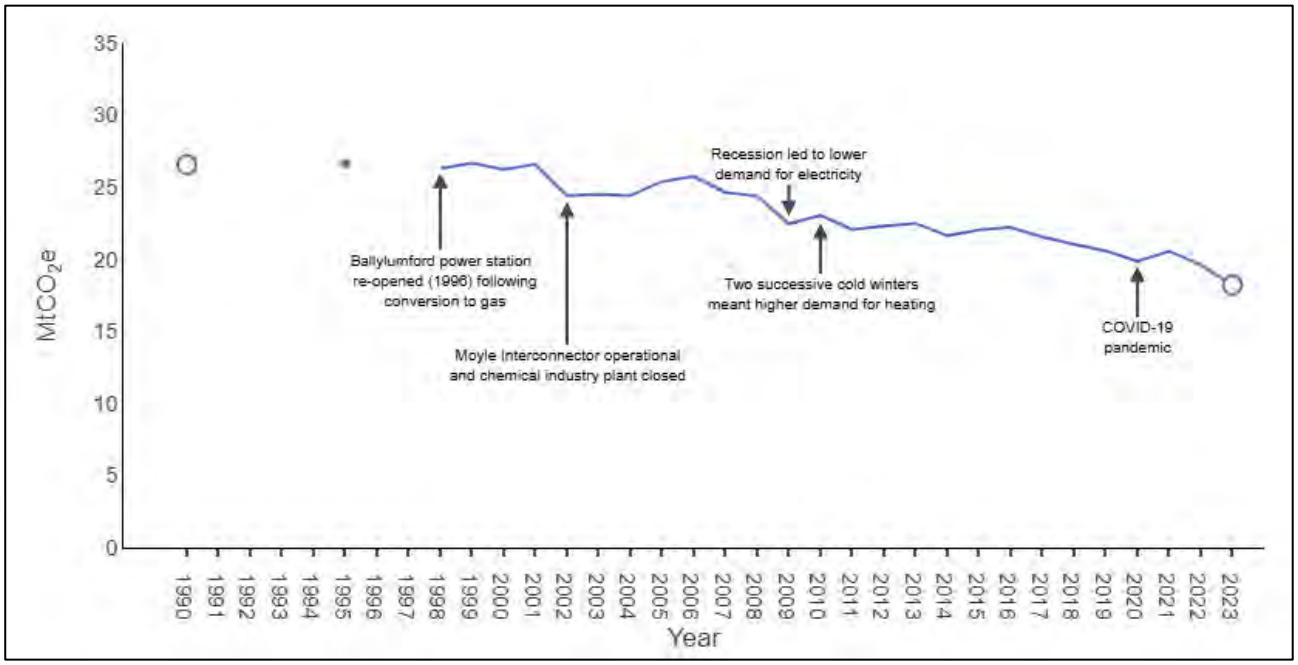

MtCO2e
35
30
25
20
15
10
5
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Year
Ballylumford power station re-opened (1996) following conversion to gas
Moyle Interconnector operational and chemical industry plant closed
Recession led to lower demand for electricity
Two successive cold winters meant higher demand for heating
COVID-19 pandemic

Table 22-2: Impacts Proposed to be Scoped In (✓) / Out (x) for Climate

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Vessel Movements[12]	x	x	Vessel movements associated with construction and operations will mainly be associated with personnel carrying out operations and maintenance activities. Number of people involved will be limited and as such will not give rise to significant vessel movements, no potential significant effects are predicted. Vessel movements associated with occasional surveys during the operation and maintenance phase of the Project are anticipated to be low and can be scoped out.	N/A	N/A
Use of Materials	✓		The first life cycle stage is 'construction', which includes GHG emissions from the construction process and the manufacture/transport of materials. For construction, the Study Area shall comprise GHG emissions associated with Project construction related activities/materials and their associated transport.	Life Cycle Assessment	An EIA construction Life Cycle Assessment (LCA) is a scientific methodology that quantifies the environmental impact of a project. It assesses raw material extraction, material processing, construction, use, and recycling to evaluate impacts like carbon emissions, resource depletion, and waste generation.

[12] Please note that any related traffic associated with the Islandmagee Gas Storage Facility have already been considered and approved as part of the existing terrestrial planning consent/conditions (F/2010/0092/F). As such air quality impacts arising from traffic do not need to be considered here. The EIA is only considering the marine environment.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			The recycling of materials will help to minimise the lifecycle carbon cost of the Project.		LCA provides a holistic, data-driven view to inform design decisions, improve sustainability, and ensures that regulatory requirements are met.
		x	It is not expected that operational activities associated with the maintenance of the Project or infrastructure would lead to any significant use of materials.	N/A	N/A
Non-Vehicle and Vessel Emissions	x		Emissions from generators are not expected to be significant. Any generators proposed to be used on-site during construction will adhere to all appropriate emission requirements.	N/A	N/A
		✓	As noted within the Section 22.6.2.1, scope 3 emissions include downstream emissions in their entirety, as well as some upstream emissions.	Further information gathering and analysis	For the purpose of quantifying the environmental effects of scope 3 emissions, the assessment must consider the highest quantity of hydrocarbons expected to be produced (i.e. extracted from the field) over the lifetime of a project. The facility does not produce any new hydrocarbons. Gas would be burnt irrespective of whether the facility was there or not. On a precautionary basis, this is still scoped into the ES.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Embodied Carbon	✓		Embodied carbon refers to the emissions during the construction of a project rather than when it is operational – or the carbon footprint of a material. With regard to embodied carbon (material resourcing, processing and manufacturing) this is not likely to be significant, but acknowledgement will be made in the EIA in regard to carbon datasets. Typical embodied carbon datasets are 'cradle-to-gate' (i.e. all emissions to the point of delivery from the factory gate) and expressed in kilograms of CO_2e per kilogram of product or material.	Review of Inventory of Carbon and Energy (ICE) Database v4.0 (Dec 2024)	The ICE database, which stands for "Inventory of Carbon and Energy," is a resource that's used in the construction industry to assess and calculate the embodied carbon emissions associated with various building materials. These embodied carbon emissions represent the greenhouse gases emitted during the production, transportation, and assembly of construction materials. Understanding these emissions is crucial for sustainable and environmentally friendly construction practices.
		x	Embodied carbon refers to the emissions during the construction of a project rather than when it is operational. Therefore, there are no effects.	N/A	N/A
Climate Change Resilience	✓	x	In accordance with IEMA 'Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation', health and safety risks to the workforce during severe weather events and unsuitable conditions (due to very hot weather or very wet weather, for example) are included for certain construction activities as a worst-case scenario.	Desktop analysis	The identification and assessment of climate change resilience is an area of emerging practice. There is no single prescribed format for undertaking such assessments; therefore, the approach adopted to undertake and report the assessment has drawn on good practice from other similar developments and studies.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
					The types of receptors considered vulnerable to climate change are: • construction phase receptors (i.e. workforce, plant and machinery)
Flood Risk**	x	x	The Project will be designed to be resilient to flood risk and will account for the increased risk resulting from climate change.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).

**Note - Flood Risk included in the table for completion. Full assessment for flood risk is considered in Chapter 20 (Flood Risk), and therefore not considered further in this Chapter

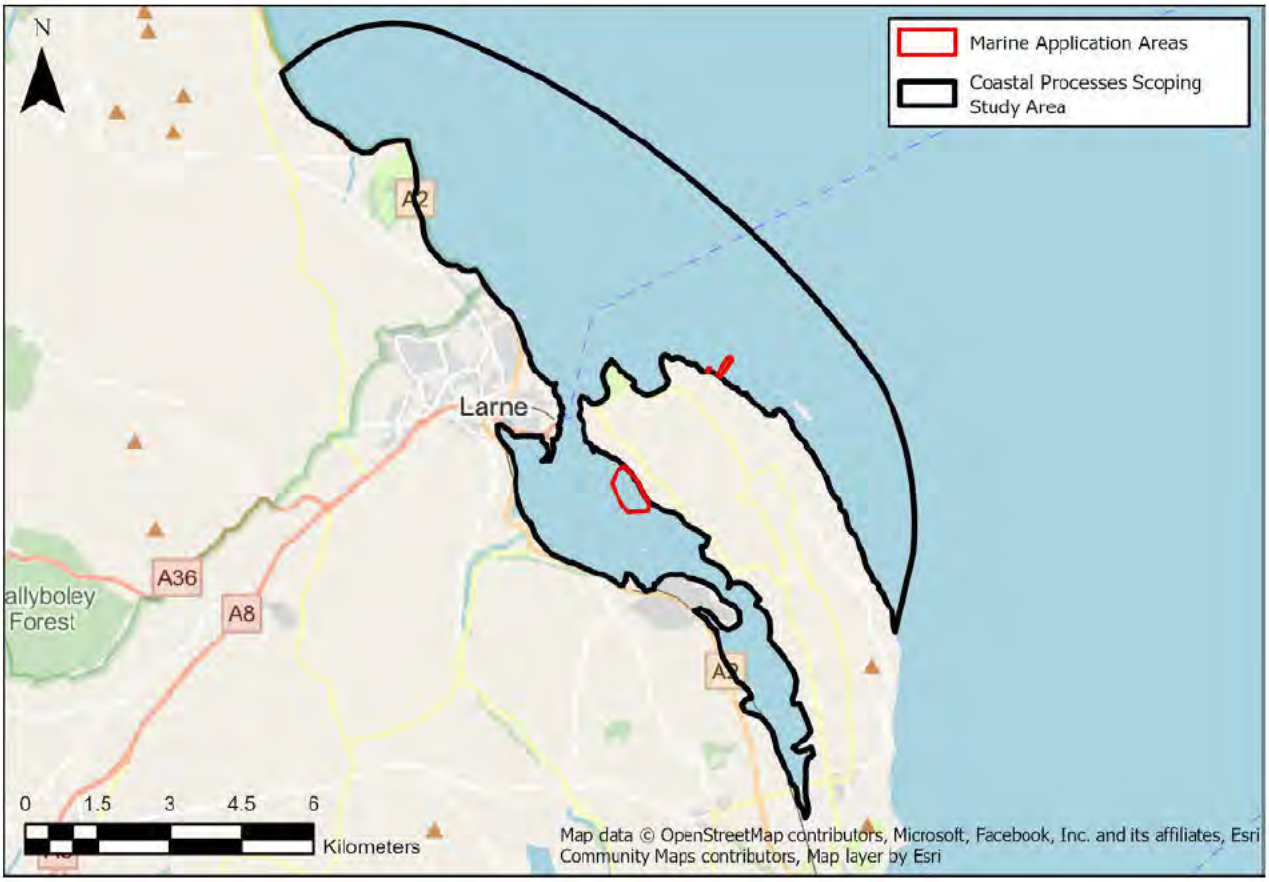


Figure 23-1: Coastal Processes Study Area

Table 23-1: Summary of key reports and datasets

Source	Year	Author
British Geological Survey (BGS) Seabed Sediments 250K	2025	BGS
Joint Nature Conservation Committee (JNCC) Marine Protected Area (MPA) Mapper	2025	JNCC
United Kingdom Hydrographic Office (UKHO) - Published Charts and Tide Tables	2025	UKHO
Department of Agriculture Environment and Rural Affairs (DAERA) OpenData	2022	DAERA
European Marine Observation and Data Network (EMODnet)	2022	EMODnet
Islandmagee Gas Storage Facility Marine Environmental Conditions Update Report	2019	Islandmagee Energy Ltd
IGSF Brine Dispersion Modelling Front End Engineering Design (FEED) Update	2019	Islandmagee Energy Ltd
Centre for Environment, Fisheries, and Aquaculture Science (CEFAS) Climatology Report	2016	CEFAS

Source	Year	Author
Islandmagee Storage Project Environmental Impact Statement	2010	Islandmagee Energy Ltd
United Kingdom (UK) Renewables Atlas	2008	ABPmer

23.4 Baseline Environment

23.4.1 Bathymetry

Water depths within the Coastal Processes Study Area can reach depths of up to c. 70m at the eastern edge of the Study Area, north-east of Portmuck, however, depths are generally limited to less than c. 40m (EMODnet, 2022). Several shallow regions exist within the Coastal Processes Study Area, such as Hunter Rock, a reef situated c. 2km north-east of the coastline of the Islandmagee Peninsula. The maximum depth within Larne Lough itself is c. 10m (AFBI NI, 2015).

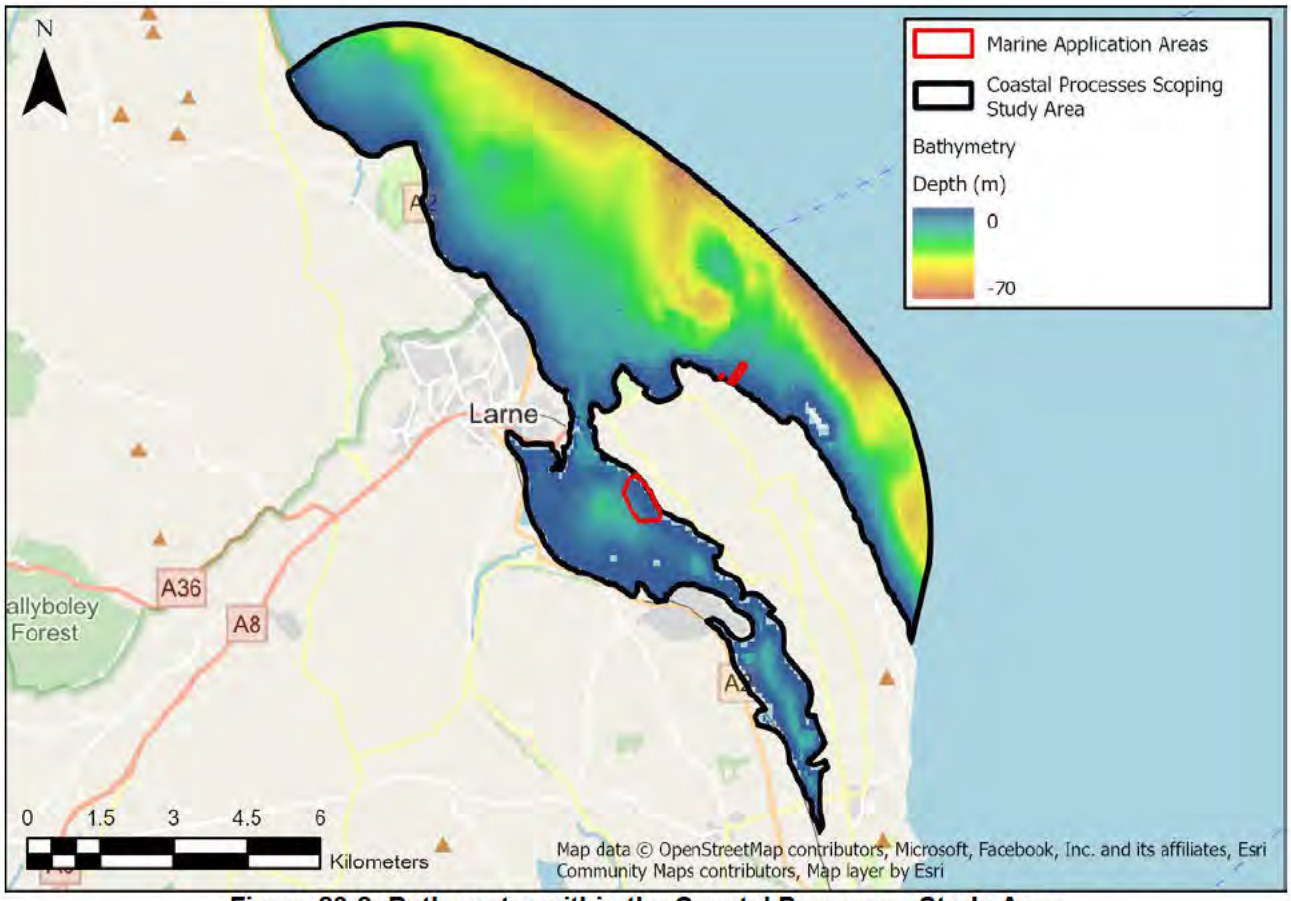
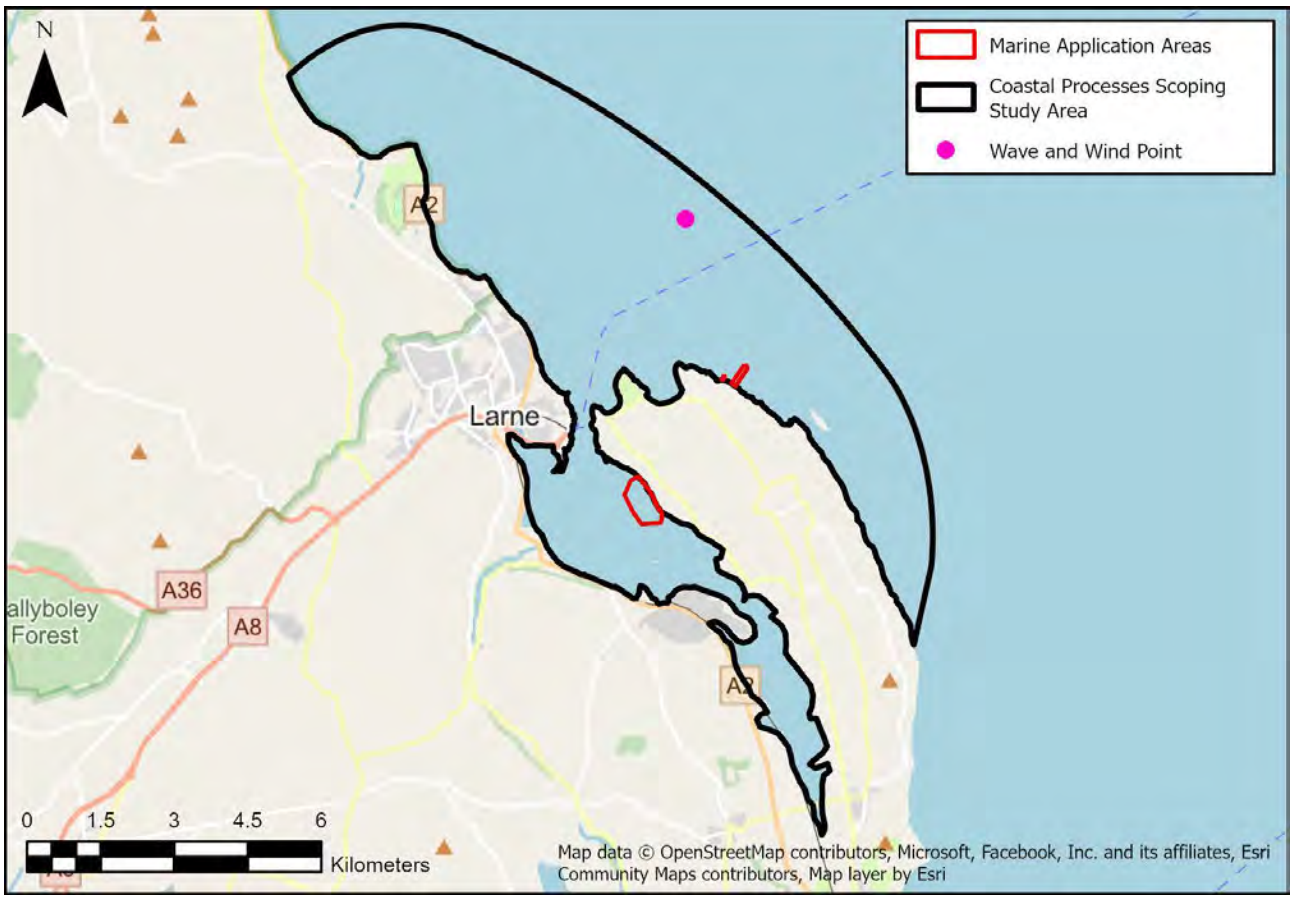


Figure 23-2: Bathymetry within the Coastal Processes Study Area

23.4.2 Wind and Waves

Wind and wave data were extracted from the European Centre for Medium-Range Weather Forecasts, ERA5 dataset (ECMWF, 2025) for the point location 54.887955°N, 5.7597251°W shown in Figure 23-3. This


N
Marine Application Areas
Coastal Processes Scoping Study Area
Wave and Wind Point
A2
Larne
A36
A8
allyboley Forest
0 1.5 3 4.5 6
Kilometers
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

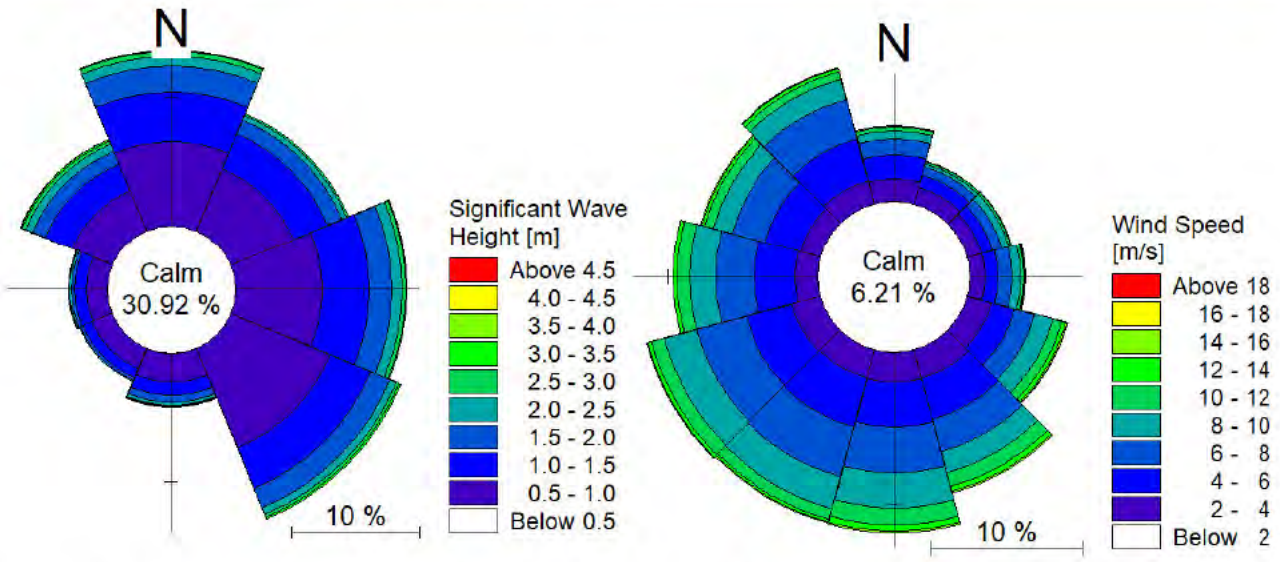


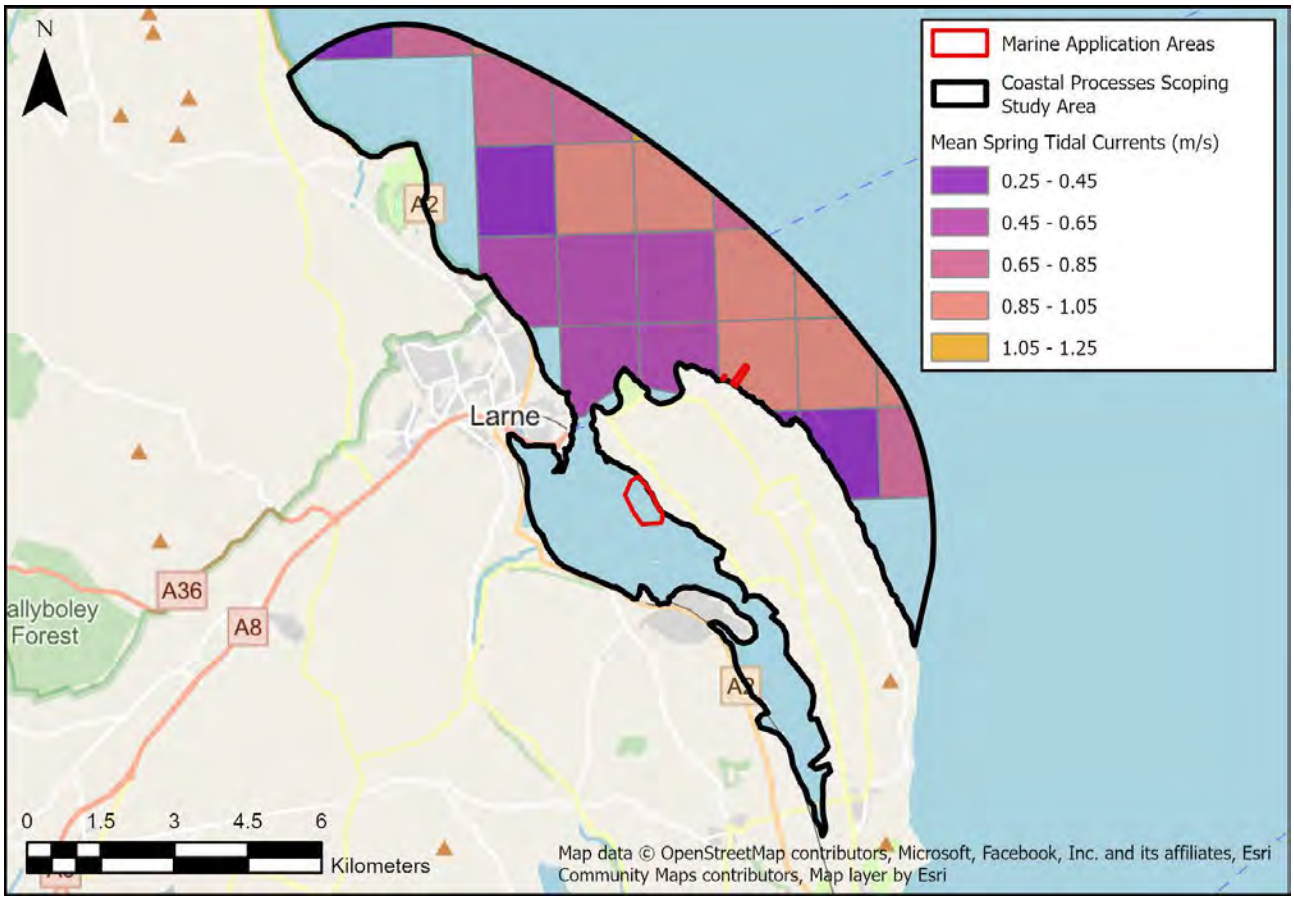
Figure 23-4: Long-term Wave (Left) and Wind (Right) Roses at the Location 54.887955°N, 5.7597251°W

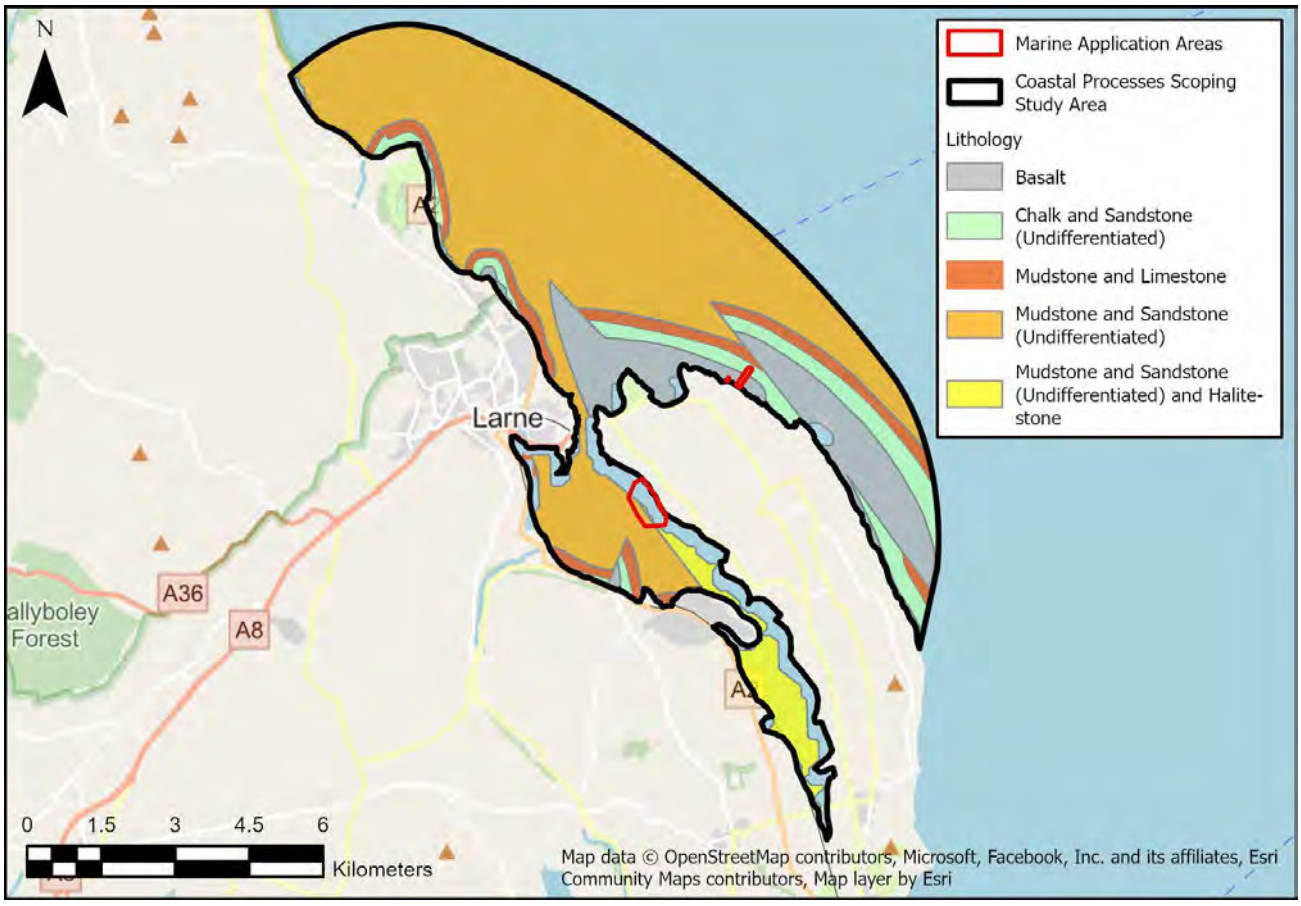
23.4.3 Tidal Currents

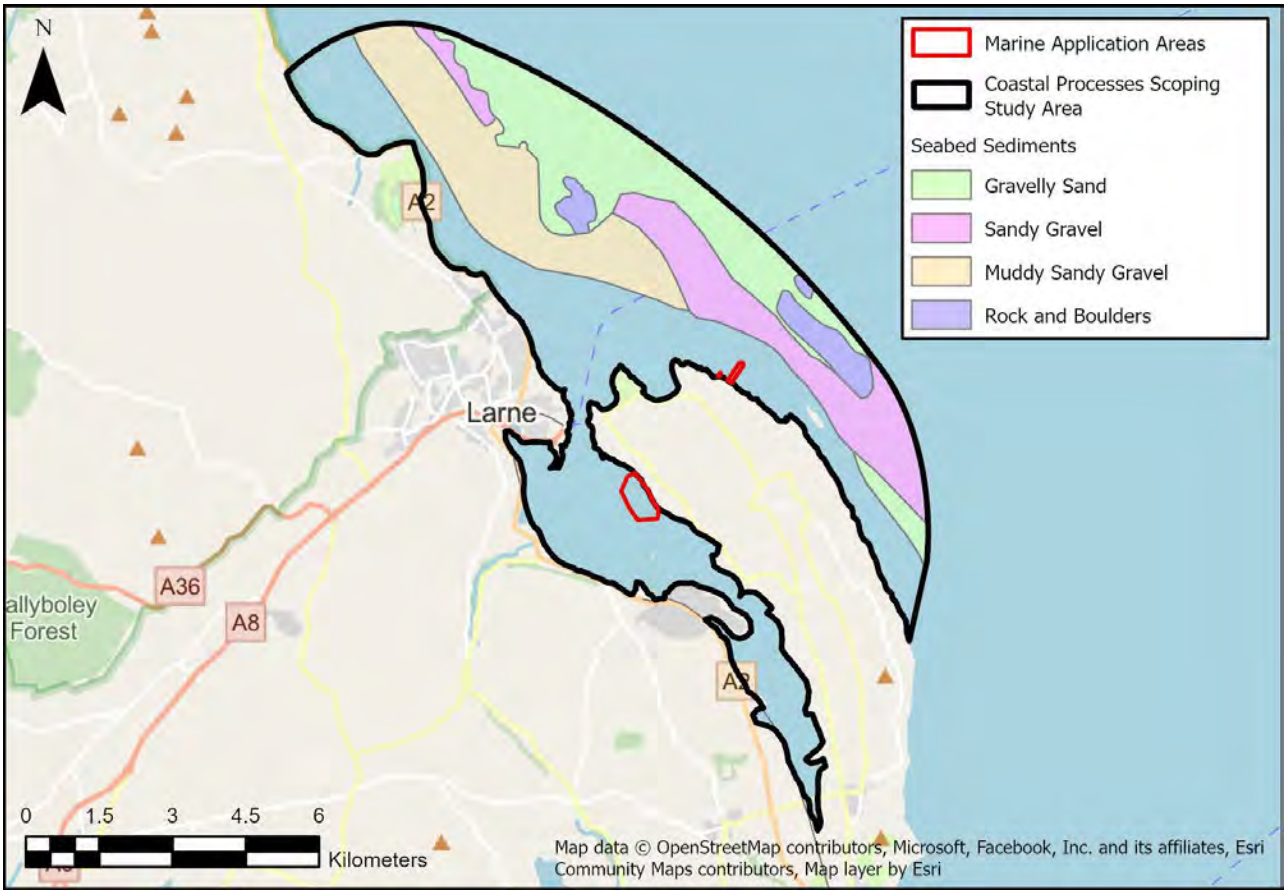
The United Kingdom Hydrographic Office (UKHO) publishes a range of tidal data around the UK and reports a spring tidal range of 2.4m for the Standard Port of Larne, as shown in Table 23-2. Tidal currents within the North Channel, in which the Coastal Processes Study Area is located, move south on the flood tide and north with the ebb. As described in the UK Renewables Atlas (ABPmer, 2008) current speeds at the offshore boundary are limited to less than 1.1m/s, and decrease towards the coastline, where they reach 0.25-0.45m/s, with the exception of in the entrance to Larne Lough, wherein currents can reach c. 0.8m/s as per tidal chart 1237, tidal diamond C.

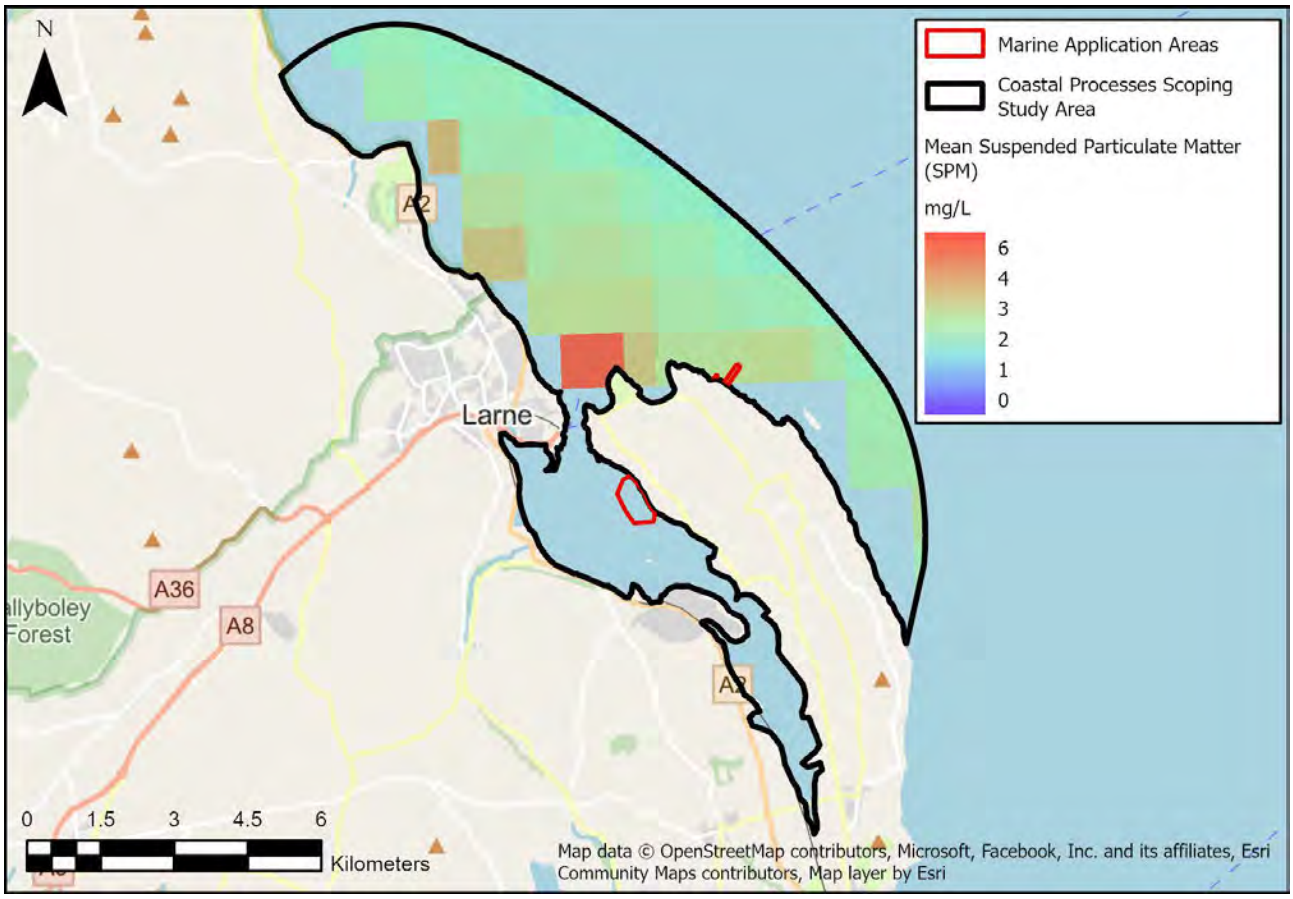
Table 23-2: Typical Tidal Levels at the Standard Port of Larne (UKHO, 2025)

Phase	Tidal Height (m) Chart Datum (CD)	Tidal Height (m) Mean Sea Level (MSL)
Highest Astronomical Tide	+3.30	+5.07
Mean High Water Springs	+2.80	+4.57
Mean High Water Neaps	+2.50	+4.27
Mean Low Water Neaps	+0.80	+2.57
Mean Low Water Springs	+0.40	+2.17
Lowest Astronomical Tide	+0.00	+1.77


N
Marine Application Areas
Coastal Processes Scoping Study Area
Mean Spring Tidal Currents (m/s)
0.25 - 0.45
0.45 - 0.65
0.65 - 0.85
0.85 - 1.05
1.05 - 1.25
A2
Larne
A36
A8
allyboley Forest
A2
0 1.5 3 4.5 6
Kilometers
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N
Marine Application Areas
Coastal Processes Scoping Study Area
Lithology
Basalt
Chalk and Sandstone (Undifferentiated)
Mudstone and Limestone
Mudstone and Sandstone (Undifferentiated)
Mudstone and Sandstone (Undifferentiated) and Halite-stone
Larne
A36
A8
allyboley Forest
0 1.5 3 4.5 6
Kilometers
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N
Marine Application Areas
Coastal Processes Scoping Study Area
Seabed Sediments
Gravelly Sand
Sandy Gravel
Muddy Sandy Gravel
Rock and Boulders
A2
Larne
A36
A8
allyboley Forest
0 1.5 3 4.5 6
Kilometers
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N
Marine Application Areas
Coastal Processes Scoping Study Area
Mean Suspended Particulate Matter (SPM)
mg/L
6
4
3
2
1
0
A2
Larne
A36
A8
0
1.5
3
4.5
6
Kilometers
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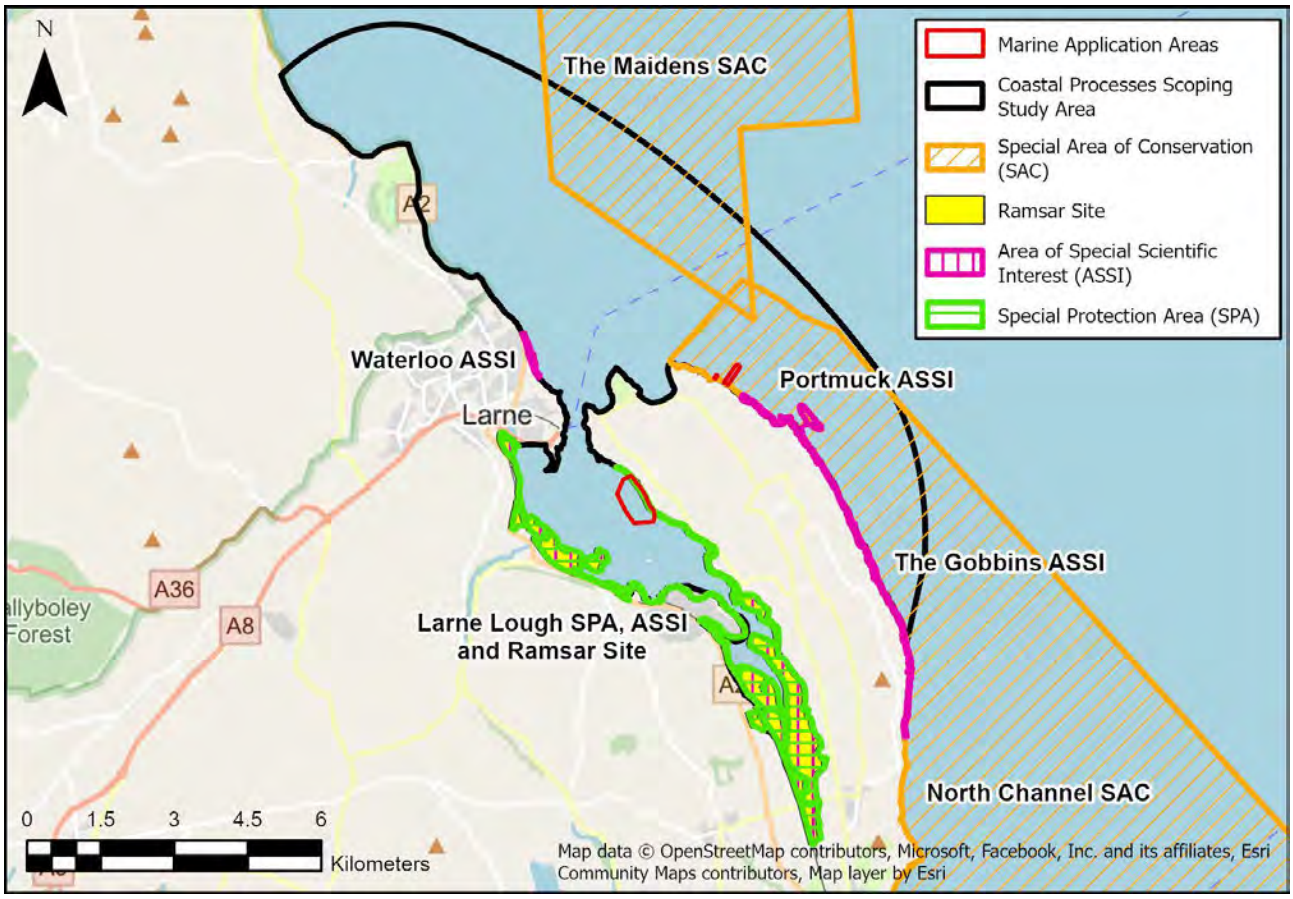

N
The Maidens SAC
Marine Application Areas
Coastal Processes Scoping Study Area
Special Area of Conservation (SAC)
Ramsar Site
Area of Special Scientific Interest (ASSI)
Special Protection Area (SPA)
A2
Waterloo ASSI
Larne
Portmuck ASSI
The Gobbins ASSI
A36
A8
Larne Lough SPA, ASSI and Ramsar Site
North Channel SAC
0 1.5 3 4.5 6
Kilometers
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Table 23-3: Impacts Proposed to be Scoped In (✓) / Out (x) for coastal processes

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Increased suspended sediment concentrations and associated depositions	x	x	The utilisation of trenchless techniques for the construction of the brine outfall, eliminates the potential for large scale sediment release, similarly the small scale of excavation required for the tunnel reception pit associated with the seawater intake construction means any induced sediment plumes will be of limited concentration, and rapidly reduce to below background concentrations (5.5 mg/l) within a short distance from the works. Therefore, this impact can be scoped out of further detailed assessment. Furthermore, all activities associated with the construction and operation of the caverns will occur beneath the seabed.	N/A	N/A
Impacts to waves, tides and sediment transport due to the presence of Project infrastructure	x	x	Given both the limited volume and footprint of structures to be introduced within the water column and the fact that most infrastructure is limited to 0.5m above the seabed, it can be expected that the impact upon waves, tides and sediment transport would be negligible. Therefore, this impact can be scoped out of further detailed assessment for both the construction and operation phases.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).

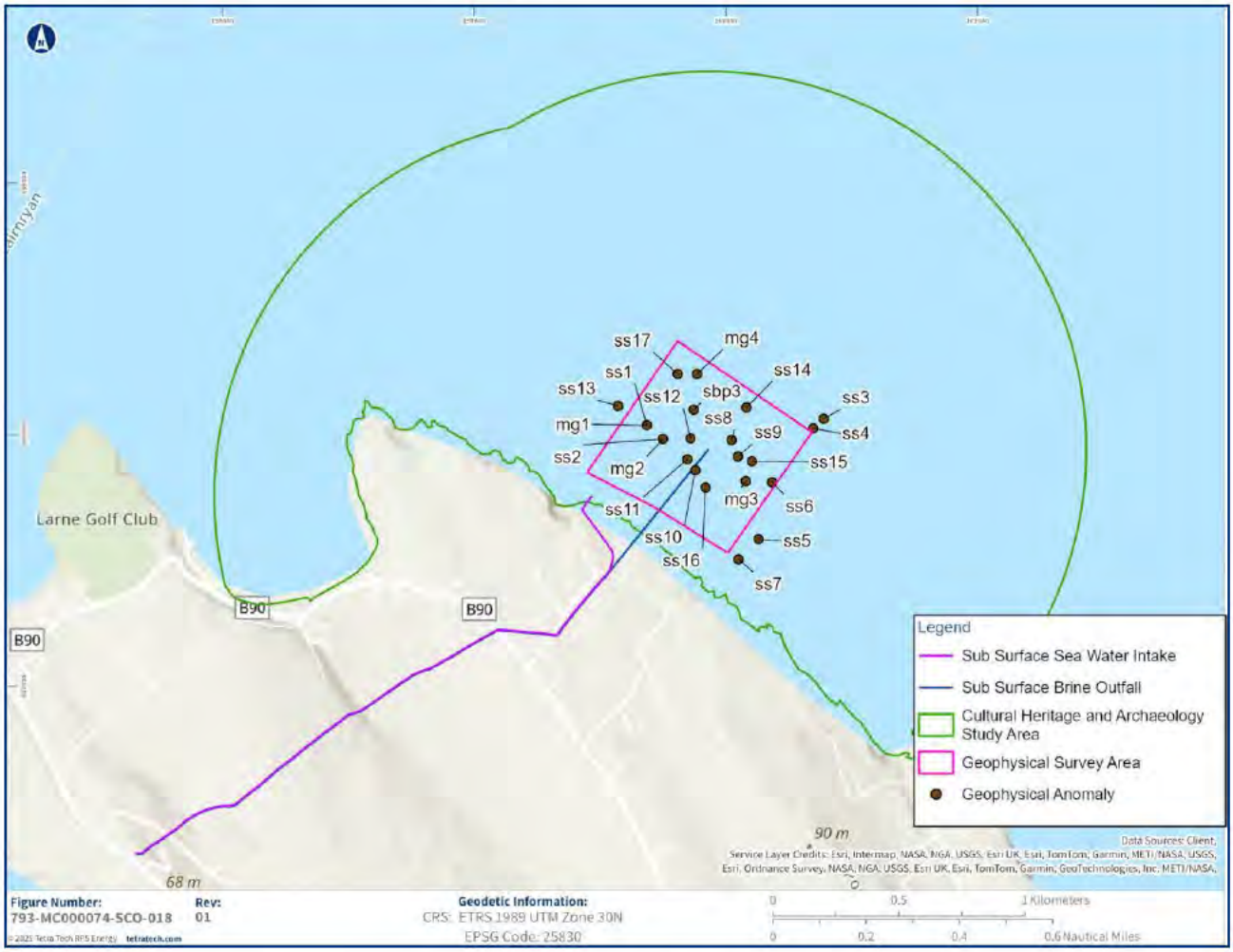


Figure 24-1: Geophysical Anomalies

This Chapter of the Scoping Report restates the results of the assessments contained in the previous assessments and so uses many of the same data sources. However, new data searches were undertaken of the United Kingdom Hydrographic Office (UKHO) Wrecks and Obstructions database and the NI Sites and Monuments Record (NISMR), in case these sources had relevant updates since 2010. The NISMR did not contain any relevant records. Relevant publications and grey literature are cited in the text.

Table 24-1: Data sources used to characterise the cultural heritage and archaeology baseline

Data title	Data Time Period	Source
Archaeological assessment of site-specific geophysical survey data	2010	Survey by IMAR Survey Ltd. Archaeological assessment by ADCO (ADCO, 2011).
The Historic Shipwreck Inventory	2010	Centre for Maritime Archaeology, Ulster University, Coleraine (restated from ADCO, 2010).
NISMR (no relevant records)	2025	Department for Communities
UKHO Wrecks and Obstructions	2025	UKHO

24.4 Baseline Environment

Marine archaeology is considered within the following categories:

- submerged prehistoric archaeology: this includes palaeochannels and other inundated terrestrial landforms that may preserve sequences of sediment of palaeoenvironmental interest as well as Palaeolithic and Mesolithic sites and artefacts;
- maritime archaeology: this relates generally to craft or vessels and any of their associated structures and/or cargo;
- aviation archaeology: this comprises all military and civilian aircraft crash sites and related wreckage; and
- intertidal archaeology: any archaeological or heritage receptor located within the intertidal zone.

24.4.1 Maritime and Aviation Archaeology

24.4.1.1 Known Maritime and Aviation Assets

Britain and Ireland have a long maritime history, with evidence of seafaring since at least the Mesolithic period. Wreck sites are a common feature around the entirety of the Irish and UK coast.

Three UKHO records are located within the Cultural Heritage and Archaeology Study Area, all of which are wrecks (Table 24-2; Figure 24-2). The SS *Alisa* was an iron-hulled steam ship built in 1867 in Glasgow, which ran aground in 1892 while on route from Ayr to Belfast. The SS *Peridot* was a steam coaster built in 1890, which ran aground in 1905 with the loss of all crew. Finally, the *Berbice* was a four-masted square rigger which ran aground in Brown's Bay in 1827.

Table 24-2: UKHO records in the Cultural Heritage and Archaeology Study Area

UKHO ID	Name	Description	Easting (WGS84 UTM 30N)	Northing (WGS84 UTM 30N)
5273	*Ailsa* (ex-*Rose*)	1158-ton steamship built in 1867. Stranded and lost in 1892 whilst carrying general goods and a passenger from Ayr to Belfast. Owned at the time of loss by Ayr Shipping Co. The wreck was first discovered by divers in 1965, lying in shallow waters and is badly broken up.	324220.51	6081813.56
5275	*Peridot*	82-ton steamship built in 1890 in Paisley. Driven onto Skernaghan Point in 1905 whilst enroute from Irvine to Larne. The entire crew of 9 were lost. Owned at the time of loss by William Robertson. The wreck was located in 1965 and is badly broken up, with the bow section lying to the west of	322692.32	6082678.18

UKHO ID	Name	Description	Easting (WGS84 UTM 30N)	Northing (WGS84 UTM 30N)
		Skernaghan Point and the stern and boilers lying to the east.		
100813	*Berbice*	A four-masted square rigger which was bound from Greenock to Havana with a cargo of coal. The ship was swept into Brown's Bay during a gale in 1827 and broken up. An anchor is reportedly located on the southwest side of Brown's Bay, but the wreck is not visible in geophysical surveys.	322200.21	6082024.82



Figure 24-2: Known wrecks and obstructions located within the Study Area

The marine archaeology baseline environment was further characterised by the analysis of geophysical survey data in 2011 (ADCO, 2011). This identified 17 anomalies on the seabed surface using the SSS data, only two of which were considered to be of medium archaeological potential, the rest probably representing natural

features (Table 24-3). Four magnetic anomalies were identified, two of which correspond with SSS anomalies (ss1/mg1, ss2/mg 2). Finally, the SBP data shows one small variation in the surface deposit that may be related to buried material (Table 24-3).

Only one anomaly lies in proximity to the brine outfall, anomaly ss10, which is approximately 10m from the pipeline and appears to be a cluster of boulder features.

The archaeological analysis of geophysical survey data concluded that there was no clear indication of archaeologically significant features in the anomalies observed, and there are no geophysical anomalies that will be directly impacted by the Project (ADCO, 2011).

Table 24-3: Gazetteer of Geophysical Anomalies

Reference Name	Archaeological Potential	Description	Type	Easting (WGS84 UTM 30N)	Northing (WGS84 UTM 30N)
ss1/mg1	Medium	Sonar target measuring 1m x 0.3m in size, associated with a magnetic anomaly of 6nT. One of several small boulder-like anomalies, 0.58m in size.	SSS, Mag	323797	6082539
ss2/mg2	Medium	Sonar target measuring 1.6m x 0.5m in size, associated with a magnetic anomaly of 2nT. Irregularly shaped anomaly with acoustic shadow.	SSS, Mag	323861	6082484
ss3	Low	Anomaly, 0.88m in size, boulder.	SSS	324500	6082566
ss4	Low	Anomaly, 1.31m in size, rock.	SSS	324457	6082527
ss5	Low	Isolated boulder feature, 0.6m in size.	SSS	324241	6082086
ss6	Low	Anomaly, 0.5m in size, boulder.	SSS	324294	6082314
ss7	Low	Target in area of dynamic sand, perhaps an object causing obstruction; 6.65m long, 1m wide, in area of scour measuring c. 10m by 10m.	SSS	324162	6082007
ss8	Low	A more prominent looking boulder feature, measuring 2.41m in size, in wider area of rock.	SSS	324134	6082480
ss9	Low	Cluster of boulder features, measuring 2.41 in size.	SSS	324159	6082415
ss10	Low	Boulder feature, 2.41m in size, with acoustic shadow.	SSS	323990	6082359
ss11	Low	Ovoid-shaped area of soft sediment, perhaps a cluster of	SSS	323959	6082404

Reference Name	Archaeological Potential	Description	Type	Easting (WGS84 UTM 30N)	Northing (WGS84 UTM 30N)
		shell material, measuring 12.9m long, 4m wide.			
ss12	Low	Well-defined small target, square in shape, 0.35m in size.	SSS	323971	6082487
ss13	Low	Well-defined target, 1.13m long, close to rock outcropping.	SSS	323683	6082616
ss14	Low	An anomaly, perhaps a boulder, 1.14m in size, square shape.	SSS	324193	6082609
ss15	Low	Acoustic shadow in the area of outcropping.	SSS	324215	6082396
ss16	Low	Boulder-like anomaly, 4.79m long, with acoustic shadow.	SSS	324030	6082291
ss17	Low	Very slight indicator comprising two short linear features in a sandy/silty area. 1.46m and less than 1m in size. Close to mg2. However, the correlation between fixes is not clear.	SSS	323921	6082742
mg3	Medium	2nT, ma anomaly 11m and 17 m east of sonar contacts	Mag	324192	6082318
mg4	Medium	2nT, isolated mag anomaly	Mag	323997	6082743
sbp3	Medium	Inverted reflector at surface strata level, inclining into the seabed. Clearly defined for 21m in length, with c. 2.3m right-angled section at surface level, extending 5.3m into the seabed.	SBP	323983	6082600

24.4.1.2 Maritime and Aviation Potential

Recorded losses relate to maritime losses that are known to have occurred in an area, but to which a specific location cannot be attributed, as the positional data of these records is unreliable. However, they do provide information on the archaeological potential of the area. The Historic Shipwreck Inventory provides a list of 25 recorded losses in the waters surrounding the Project, identified using the geographical key words: Larne Lough, Larne, Barr's Point, Mill Bay, Island Magee, Skernaghan Point, Browns Bay, Ferris Point, Yellowstone, Castle Robin Bay, Port Muck Bay, White Cliff, Mullroy's Point, North Head, and the Isle of Muck (RPS, 2010; Table 24-4). Most of these recorded losses date from the 19th century. However, records are usually biased towards the 18th century and later, when more systematic reporting began. Therefore, there is still potential for

vessels from earlier periods to have been lost in the vicinity of the Project, despite there being few records of wrecks from these periods.

There is potential for unknown maritime archaeological sites and material from all periods to exist in the Cultural Heritage and Archaeology Study Area, with material dating from the post-medieval period or later most likely to be present. Due to the rocky environment, however, the potential for the preservation of shipwrecks is low (Quinn, Cooper and Williams, 2000; ADCO, 2011). Due to this, and following the analysis of geophysical data (ADCO, 2011), the potential for unknown maritime archaeological sites to be present is low.

Table 24-4: Recorded losses

Name	Year sunk	Location	Type
Jane	1798	Off Larne (in the roadstead)	Sloop (later raised)
Isabella	1821	Island Magee	Sloop
Industry	1847	Larne	Sailing vessel
Lord Nelson	1847	Larne	Sailing vessel
Elizabeth	1848	Larne	Unknown
Ruby	1848	Larne	Smack
Erin	1850	Larne	Unknown
Fair Ellen (Helen)	1851	Lighthouse Point, Larne Lough	Sloop
Flora	1854	Inside Lighthouse Point, Larne Lough	Galliot
Harriet Preston	1854	On rocks near entrance to Larne Lough	Schooner
John Alexander	1855	Larne Harbour	Cargo vessel
Blenkinsop	1866	Larne Lough	Schooner
Peri	1869	Near Browns Bay	Vessel
Henrietta	1871	Larne Harbour	Schooner
Jane and Ellen	1876	Yellowstone, Island Magee	Schooner
Foam	1877	Near Larne	Cutter
Alfred	1882	Entrance to Larne Lough	Schooner
Ariadne	1882	Skernaghan Point, Island Magee	Brig
Tobago	1886	Skernaghan Point	Barque
Agnes Wyllie	1887	Island Magee	Schooner
Louisa	1889	Browns Bay	Schooner
Tuskar	1891	Near Skernaghan Point	Steamship
Arathusa	1894	Near Larne, Larne Lough	Barque
Defiance	1903	Larne Harbour	Fishing yawl
Empress	1903	1 mile North of Portmuck, Island Magee	Steamship

Marine aviation archaeology receptors comprise the remains or associated remains of military and civilian aircraft that have been lost at sea. Evidence can be divided into three primary time periods based on major technological advances in aircraft design: pre-1939; 1939 to 1945; and post-1945. There are no known aircraft crash sites located within the Cultural Heritage and Archaeology Study Area. There is the potential for previously unknown aircraft-related debris to exist on the seafloor within the Cultural Heritage and Archaeology Study Area, with a higher potential for material dating to the Second World War. Any remains of military aircraft

Table 24-5: Impacts Proposed to be Scoped In (✓) / Out (x) for Cultural Heritage and Archaeology

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Physical impacts to terrestrial and intertidal heritage receptors.	x	x	The Project only has marine elements and so has no pathway to impact terrestrial or intertidal heritage receptors. The terrestrial elements of the facility are also excluded on the grounds that they have previously been subject to environmental impact assessment and are consented under the 2012 Planning consent.	N/A	N/A
Visual impacts to terrestrial heritage receptors	x	x	The Project only has marine elements that will be entirely submerged, and so there is no pathway to impact the setting of terrestrial heritage receptors.	N/A	N/A
Indirect physical impacts on marine archaeology receptors associated with the seawater intake and brine outfall	x	x	The impacts on coastal processes, including increased suspended sediment concentrations and associated depositions, and impacts to sediment transport processes due to the presence of Project infrastructure, have been scoped out of the Coastal Processes Chapter of the Scoping Report (Chapter 23). Any potential indirect impacts from these processes on marine archaeology receptors are therefore also scoped out.	N/A	N/A
Direct physical impacts on marine archaeology receptors associated with the seawater intake and brine outfall	x	x	Activities such as excavation of the reception pit for the seawater intake head and the breakout from HDD for the brine outfall may directly impact marine archaeology receptors. However, following the review of known records and site-specific geophysical survey data, there are no known marine archaeology receptors in the areas of impact. There is potential for unknown receptors to exist in the areas of impact, particularly seabed prehistory receptors, but any impacts in the construction phase of the Project will be mitigated through the embedded mitigation measures (Section 24.7). As the seawater intake and	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
			brine outfall are not operational during the operation phase of the facility, there is no pathway for impact, in that phase of the Project.		
Physical and visual impacts on cultural heritage and archaeology receptors associated with cavern construction and operation	**x**	**x**	Construction and operation of the caverns will take place entirely underground and so there is no pathway for any impacts on any cultural heritage nor archaeology receptors.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).

Table 25-1: Onshore Project Elements Generating Wastes for Construction and Operation Phases (assessed in RPS (2010)).

Location	Project Element	Construction Phase	Operation Phase
Onshore	Wellpad construction	Waste generated from enabling works and concrete pad works prior to drill rig mobilisation.	N/A
	Drilling of wells to the cavern locations	Drill cuttings produced from HDD of all wells into the salt dome. Drill cutting wastes will be water-based and oil-based, so non-hazardous and hazardous wastes respectively.	Small quantities of waste may be generated from pigging of pipes.
	Storage cavern creation by leaching	Concentrated brine wastes are generated from leaching of salt formation to form the caverns. This is pumped back to the surface (see pumping facilities and brine outfall below).	N/A
	Seawater intake pumping station	Waste from the construction and commissioning of the pumping station located onshore. General construction wastes expected as part of the build.	N/A
	Seawater pipeline	Waste from the excavation and installation of the onshore pipeline. Bulk of excavation wastes will be reinstated as part of the works.	N/A
	Gas pipeline	Works will be undertaken at the same time as the seawater pipeline, no large waste stream expected.	Small quantities of waste may be generated from pigging of pipelines, may be hazardous waste.
	Seawater and brine pumping facilities (Leaching plant)	Wastes from construction and commissioning of the infrastructure.	N/A
	Temporary construction set-down area	Various wastes from logistics storage and packaging of equipment.	N/A

Location	Project Element	Construction Phase	Operation Phase
	Worker welfare facilities	Wastes from worker changing, welfare areas and toilets. Will vary throughout the construction programme depending on workforce at site.	Small quantities of wastes from workers during operations as mainly routine maintenance.
	Main gas plant facility	Non-hazardous and hazardous wastes from construction and commissioning works.	May be some hazardous wastes generated from gas clean-up or process activities.

Table 25-2: Offshore Project Elements Generating Wastes for Construction and Operation Phases (to be considered in this Scoping Report)

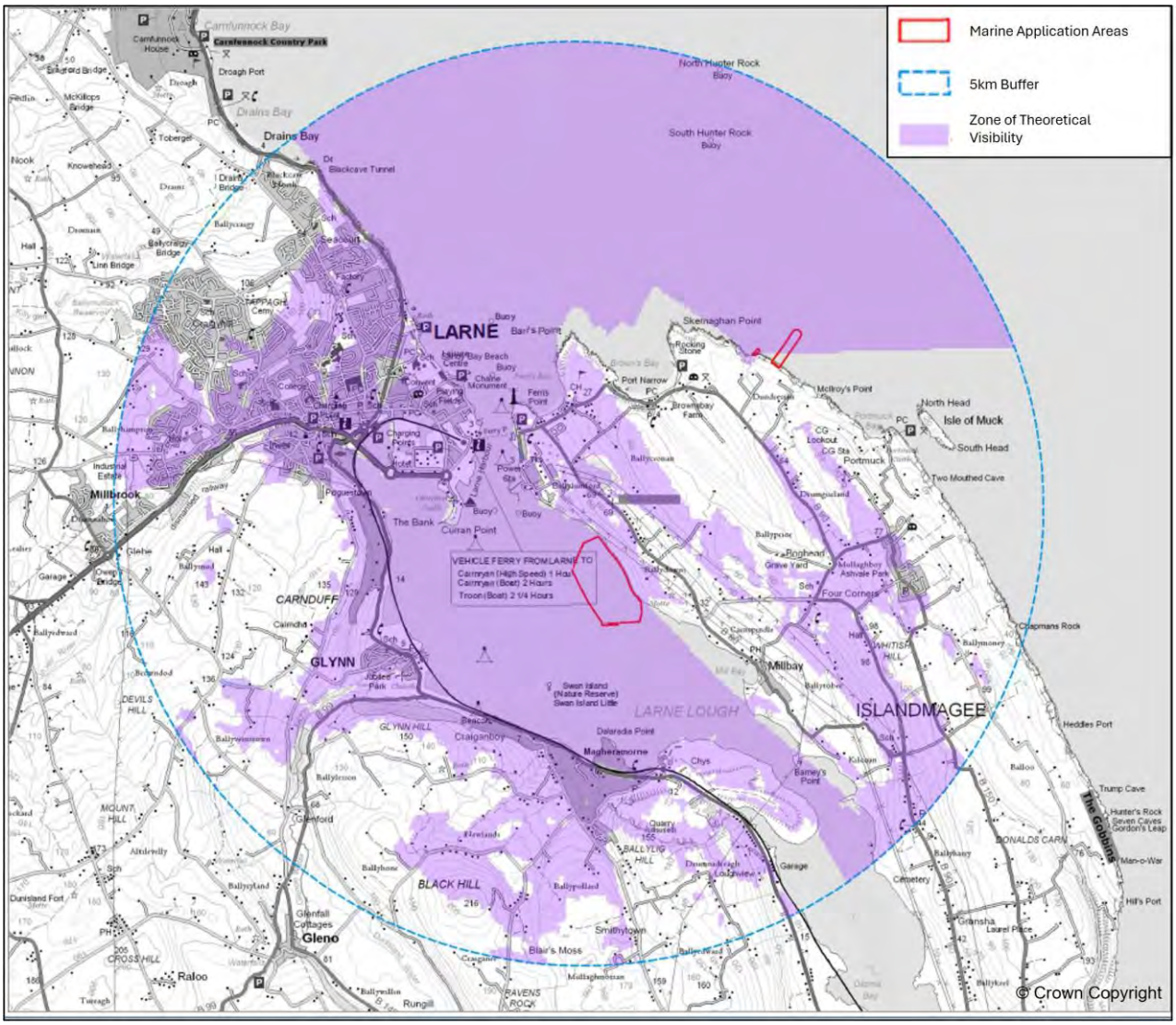
Location	Project Element	Construction Phase	Operation Phase
Offshore	Seawater intake (including marine pipeline)	Small quantities of non-hazardous and hazardous wastes from construction and commissioning works. Natural and non-natural wastes will be produced from the clearing of debris from the intake screen.	The outfall will not be used during the operational phase of the facility. Following the construction of the caverns, the intake is likely to be capped (active head removed and replaced with blank plates) so no wastes will be generated.
	Brine outfall (including offshore pipeline)	Quantities of non-hazardous wastes from construction and commissioning works. Concentrated brine, as a waste product from cavern leaching, will be discharged at the outfall.	The outfall will not be used during the operational phase of the facility. Following the construction of the caverns, the outfall will be capped (active head removed and replaced with blank plates) so no wastes from leaching will be discharged.
	Vessels	Small quantities of non-hazardous and hazardous wastes from routine vessel operation and maintenance for those used to support offshore construction works.	N/A

Table 25-3: Impacts Proposed to be Scoped In (✓) / Out (x) for Waste Management

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Impact of drilling wastes on marine water quality	x	x	Drill cuttings and fluids will be managed from the drill rig as part of onshore works. Where works punch out into the marine environment, method statements will be agreed with appropriate authorities to minimise and reduce any effects of these temporary works. No drilling is planned to take place during the operational phase.	N/A	N/A
Impact of disposal of debris removed from seawater intake screens	x	x	Periodic maintenance during the construction phase will remove natural and man-made debris from the seawater intake screens. A previous commitment was made to agree on a disposal plan for the management of all removed materials with NIEA. The seawater intake will not be used during the operational phase of the facility. There is also potential that following the construction of the caverns, the intake will be capped (active head removed and replaced with blank plates) to prevent silt ingress and internal biofouling. There is no pathway for this effect during the construction phase.	N/A	N/A
Impact of discharge of concentrated brine on water quality	x	x	Brine will be discharged throughout the leaching of the caverns during the construction phase. Brine discharges have been previously modelled in the ES submission Appendix B (RPS, 2019b) with dispersion confirmed as suitable and conservative by peer review (HR Wallingford,	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
			2019). The project EMP will include gathering chemical data on discharges. The brine outfall will not be used during the operational phase of the facility, so no wastes will be discharged. There is also potential that following the construction of the caverns, the outfall will be capped (active head removed and replaced with blank plates) to prevent silt ingress and internal biofouling. There is no pathway for this effect during the construction phase.		

* The project phase refers to construction/decommissioning (C) and operation (O).


Marine Application Areas
5km Buffer
Zone of Theoretical Visibility
LARNE
Curran Point
The Bank
Millbrook
CARNDUFF
GLYNN
Glenoe
Glenfall Cottages
Gleno
Raloo
Rungill
Drains Bay
Carnfunnock Bay
Carnfunnock Country Park
Droagh Port
Blackcave Tunnel
Seacourt
Ferris Point
Port Narrow
Skeinaghan Point
Rocking Stone
Brownbay Farm
McIlroy's Point
North Head
Isle of Muck
South Head
Portmuck
Two Mouthed Cave
Ballycronan
Drumpsiland
Ballypoint
Boghead
Grave Yard
Mullaghboy
Ashvale Park
Four Corners
Millbay
ISLANDMAGEE
LARNE LOUGH
Swan Island (Nature Reserve)
Swan Island Little
Magheramorne
Craigantlet
Craigenboy
Delarada Point
Barney's Point
Chapmans Rock
Heddles Port
Trump Cave
Hunter's Rock
Seven Caves
Gordon's Leap
The Gobbins
Man-o-War
Hill's Port
DONALDS CARN
BALLYLIG HILL
BLACK HILL
GLYNN HILL
MOUNT HILL
DEVILS HILL
CROSS HILL
WHITISH HILL
Smithstown
Blair's Moss
RAVENS ROCK
Gransha
Laurel Place
Cemetery
Garage
Chys
Quarry
Ballyrolland
Ballyhone
Glenford
Altdrivelly
Dunsland Fort
Ballyclug
Ballyeglish
Ballyeaston
Ballyweelin
Ballyhenry
Ballykinlet
Mullaghmorgan
Ballyhead
Ballyrobert
Ballyboley
Ballyhanny
Ballyharry
Ballyconagan
Ballyhampton
Ballyhenry
Ballyeaston
Ballyclug
Ballyrolland
Ballyhone
Ballyland

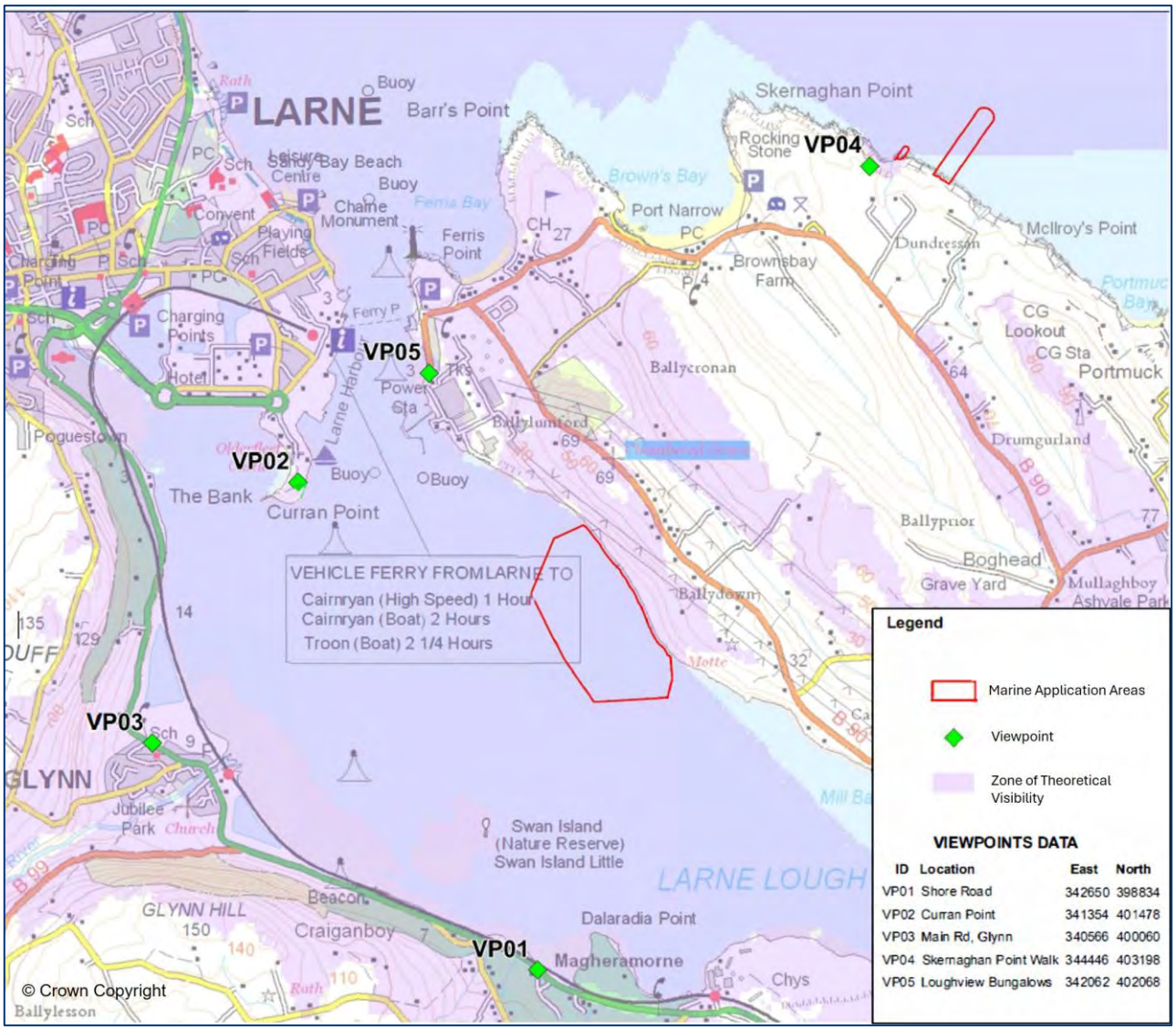

LARNE
Barr's Point
Buoy
Skernaghan Point
Rocking Stone
VP04
Brown's Bay
Port Narrow
Mcllroy's Point
Dundresson
Brownsbay Farm
Ferris Point
Ferris Bay
Sandy Bay Beach
Leisure Centre
Chaine Monument
Playing Fields
Convent
Charging Point
Charging Points
Hotel
Ferry P
Larne Harbour
VP05
Power Sta
Ballycronan
CG Lookout
CG Sta
Portmuck
Drumgurland
Poguestown
VP02
The Bank
Curran Point
Buoy
Ballylumford
Ballyprior
Boghead
Grave Yard
Mullaghboy
Ashvale Park
Ballydown
Motte
VEHICLE FERRY FROM LARNE TO
Cairnryan (High Speed) 1 Hour
Cairnryan (Boat) 2 Hours
Troon (Boat) 2 1/4 Hours
VP03
GLYNN
Jubilee Park
Swan Island
(Nature Reserve)
Swan Island Little
LARNE LOUGH
GLYNN HILL
Beacon
Craiganboy
Dalaradia Point
VP01
Magheramorne
Chys
Ballylesson
© Crown Copyright
Legend
Marine Application Areas
Viewpoint
Zone of Theoretical Visibility
VIEWPOINTS DATA
ID Location East North
VP01 Shore Road 342650 398834
VP02 Curran Point 341354 401478
VP03 Main Rd, Glynn 340566 400060
VP04 Skernaghan Point Walk 344446 403198
VP05 Loughview Bungalows 342062 402068

Table 26-1: Proposed Viewpoint Locations

Proposed Viewpoint	Name	Co-ordinates	Representative of
VP01	Shore Road	54°49'1.23"N, 5°46'54.01"W	Commuters Recreational users
VP02	Curran Point	54°50'27.98"N, 5°48'1.88"W	Recreational users
VP03	Main Road	54°49'42.97"N, 5°48'48.50"W	Recreational users Commuters Residents
VP04	Skernaghan Point walk	54°51'20.41"N, 5°45'5.69"W	Recreational users
VP05	Loughview Bungalows	54°50'46.34"N, 5°47'21.18"W	Residents Commuters Recreational users

26.5 Potentially Significant Effects

A range of potential impacts on seascape, landscape and visual receptors, which may occur during the construction and operation of the Project, have been identified. At this stage, it is considered that decommissioning activities will be a subset of the construction phase. Further environmental assessment and relevant consents for decommissioning will be required in the future.

The impacts that have been scoped in to or out of the assessment are outlined in Table 5-1 together with justification, a description of any additional data collection (e.g. ground truthing) and supporting analyses (e.g. photomontages) that will be required to enable a full assessment of the impacts.

Table 26-2: Impacts Proposed to be Scoped In (✓) / Out (x) for Seascape, Landscape and Visual

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Seascape character Potential effect from **caverns,** seawater intake and brine outfall.	✓	x	The coast is appreciated at a national level for its scenic value. The sensitivity is high for this receptor. The magnitude of change in coastal character is considered localised at the areas of the Project, which are likely to give rise to locally significant effects through the construction of various elements of the Project. The Operational Phase is considered as the lifetime of the caverns (approximately 50 years). The operation of the intake and outfall is only required for the construction of the caverns, so they are in effect construction assets operating for a maximum of approximately 5-10 years, not for operational phase discharges. As such, the operation of the intake and outfall are effectively construction phase activities. These elements of the project are under the water and will not have any effects on the seascape character during the Operational Phase of the Project.	Ground truthing and creation of photomontages for the construction phase.	The significance of the Project on the seascape character in accordance with Section 26.6 ES Assessment Methodology.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Designations Potential effect from **caverns,** seawater intake and brine outfall.	X	x	Designations identified are land-based with regional importance and therefore have a high sensitivity. Construction will be within the marine environment and will not affect the direct or indirect physical environment of the designations or their surrounding environment. (Construction impact within the terrestrial environment has already been assessed and consented through the planning process) During the operational phase, caverns and any associated activities take place beneath the seabed or in terrestrial sites therefore, there will be no change to the existing baseline for these receptors.	N/A	N/A
Visual receptors Potential effect from **caverns,** seawater intake and brine outfall.	✓	x	These receptors generally have a high sensitivity depending on their focus and reason to be within the study area. Activities associated with the construction of the brine outfall/ seawater intake may be visible due to the presence of vessels (including support or dredging vessels and excavation/dredging). The magnitude for visual receptors is considered localised at the areas of the Project, which are likely to give rise to locally significant effects through the	Ground truthing and creation of photomontage for construction phase.	The significance of the Project on the visual land receptors in accordance with Section 26.6 ES Assessment Methodology.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			construction phase with additional vessels and their movements on Larne Lough. During the operational phase, caverns and any associated activities take place beneath the seabed therefore there will be no change to the existing baseline for visual receptors		

* The project phase refers to construction/decommissioning (C) and operation (O).

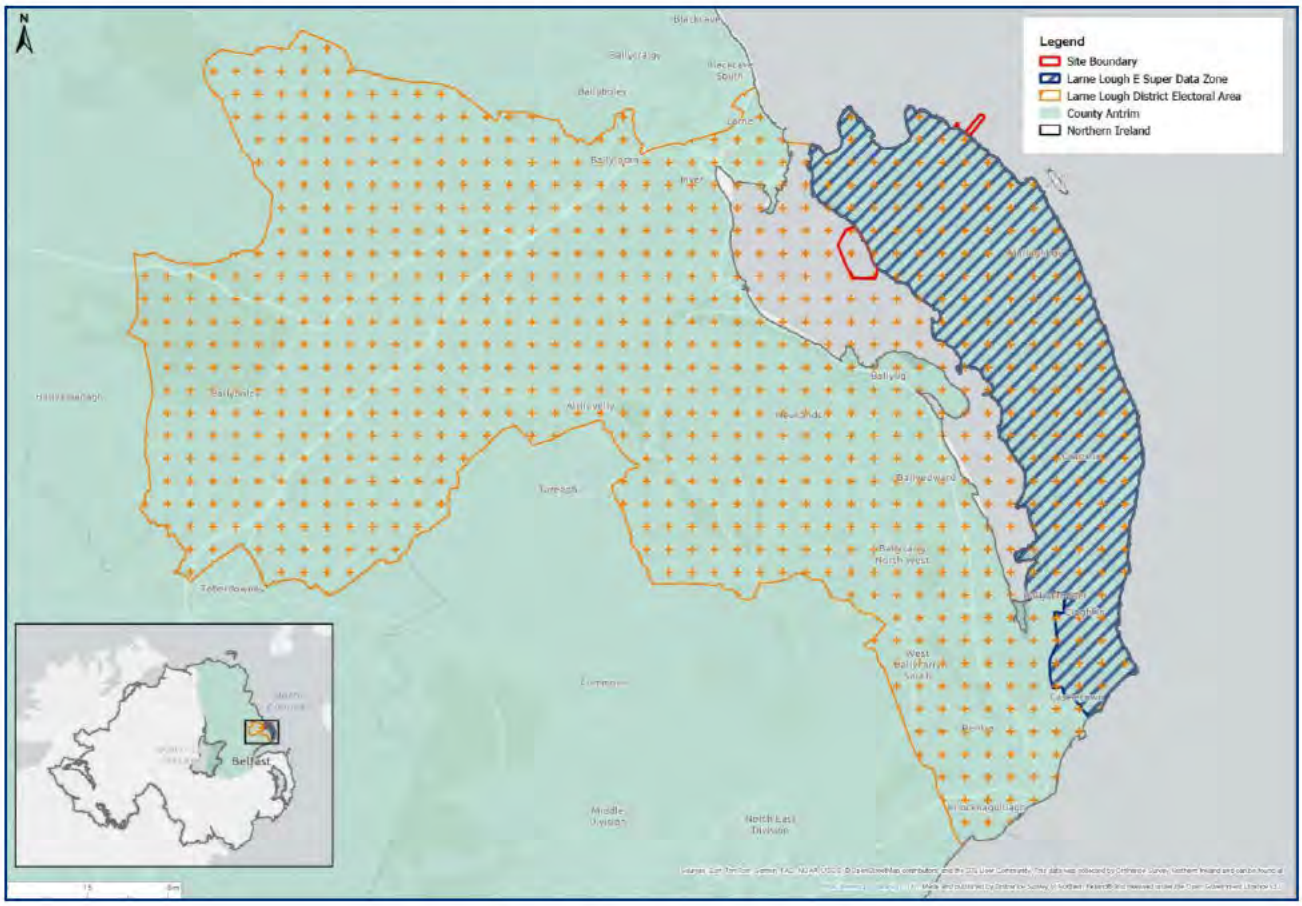


Figure 27-1: Human Health Study Area

27.3 Data Sources

Data from other Chapters will be used to inform the health assessment, with data from other technical disciplines used to identify potential receptors and community assets relevant to the health assessment, such as residential properties and walking and cycling routes. No bespoke baseline Human Health surveys will be undertaken as part of the assessment, although the health analysis will be informed by project-wide consultation. Additionally, scientific literature and regulatory standards will also be used as technical evidence for the health assessment. The data sources listed in Table 27-1 will inform the health baseline assessment.

Table 27-1: Human health baseline data sources

Data Source	Evidence
Google Earth Pro	Aerial and street-level site location review.
Department of Health Statistics and Research (2022)	Social determinants of health indicators including life expectancy.
Northern Ireland Statistics and Research Agency, (2022)	NI mapping including population estimates.

27.4 Baseline Environment

Table 27-2: Human health summary baseline indicators

Indicator	Larne Lough E	Larne Lough	Mid and East Antrim*	NI
General health				
Very good	46%	47.6%	47.8%	50.0%
Good	32%	31.2%	30.5%	28.7%
Fair	15%	14.2%	14.4%	13.7%
Bad	5%	5.3%	5.5%	5.7%
Very bad	1%	1.8%	1.7%	1.9%
Life Expectancy				
Life expectancy at birth (females)	n/a	83.5 years	82.5 years	82.3 years
Life expectancy at birth (males)	n/a	78.4 years	78.3 years	78.4 years
Employment and income				
In employment	n/a	n/a	80%	74%
Unemployed	n/a	n/a	1%	2%
Economically inactive	n/a	n/a	19%	25%

Source: (NISRA 2022)

*Baseline data is not available at the regional level for County Antrim; therefore, data for Mid and East Antrim (local government district) will be used instead.

As shown in Table 27-2, the proportions of people reporting very good health in Larne Lough E (46%) and Larne Lough (47.6%) study areas are lower compared to the national average of 50%. However, both Larne Lough E and Larne Lough have higher percentages of people reporting "good" health (32% and 31.2% respectively) than the national average (28.7%). When combining "very good" and "good," these local areas are broadly in line with the national level of general good health.

For those reporting poor health, Larne Lough E and Larne Lough report similar levels to NI. Five percent in Larne Lough E and 5.3% in Larne Lough report "bad" health compared to 5.7% nationally, and both report similar proportions of people in "very bad" health (1% and 1.8%) compared to 1.9% across NI.

Regarding life expectancy, data is not available for the Larne Lough E study area. In Larne Lough, life expectancy at birth is slightly above the national average for females (83.5 vs 82.3 years) and similar for males (78.4 vs 78.4 years), indicating a better performance in female life expectancy.

Employment and income data are not available for Larne Lough E or Larne Lough study areas. However, in Mid and East Antrim, the proportion of those who are in employment (80%) is higher than the national employment rate of 74%. The rate of unemployment in Mid and East Antrim (1%) is similarly better (lower) than the national unemployment rate (2%).

Overall, Larne Lough E and Larne Lough study areas show comparable or slightly better outcomes in general health and life expectancy (where data is available) relative to the NI average, indicating relatively strong performance in health-related indicators.

Table 27-3: Deprivation

Deprivation	Island Magee	Larne Lough	Mid and East Antrim	NI
Proportion of the population living in households whose equivalised income is below 60 per cent of the NI median	11%	11.4%	11.6%	13.1%

Source: (NISRA, 2017)

Deprivation in the site-specific study area is similar to the wider area trends for Mid and East Antrim but slightly lower (better) than the average for NI (Table 27-3).

27.5 Potentially Significant Effects

A range of potential impacts on human health, which may occur during the construction and operation of the Project, have been identified. At this stage, it is considered that decommissioning activities will be a subset of the construction phase. Further environmental assessment and relevant consents for decommissioning will be required in the future.

The impacts that have been scoped into the assessment are outlined in Table 27-4 together with justification, and a description of any additional data collection and supporting analyses that will be required to enable a full assessment of the impacts. There are no new surveys that will be conducted for the Human Health assessment. Existing public health data and literature from the wider scientific evidence will be used to inform the Human Health assessment in the ES.

Health and well-being are influenced by a range of factors, termed the 'wider determinants of health'. Determinants of health span environmental, social, behavioural, economic and institutional factors. Determinants therefore reflect a mix of influences from society and environment on population and individual health.

Table 27-4: Impacts Proposed to be Scoped In (✓) / Out (x) for Population and Human Health

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
Health-related behaviours	Physical activity	x	x	Community physical activity is an important determinant of health. However, to avoid duplication, this issue is addressed under "transport modes, access and connections" and "open space, leisure and play".	N/A	N/A
	Risk-taking behaviour	x	x	Construction/decommissioning and Operation: Issues of community health behaviours being detrimentally affected by the presence of the construction and operational workforces are scoped out. All activities will take place within the marine environment; therefore, interactions with the public will be minimal. The workforce is unlikely to be sufficiently large in number to affect local markets, e.g. for alcohol, cigarettes or gambling, to an extent which could significantly affect community health. Healthy workforce behaviour would be encouraged through health and safety management systems with reference to the Health and Safety at Work Act, 1974 (HM Government, 1974). There is not considered to be the potential for a likely significant population health effect associated with risk-taking behaviour by the workforce; therefore, this issue is scoped out. The issue of communicable illness is noted but scoped out. The Project will operate appropriate measures to safeguard the Project workforce and the public in line with Government guidance of the day, including in relation to vessel crews. Risks are similar to other routine construction and shipping activities.	N/A	N/A

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
	Diet and nutrition	x	x	Construction and operation activities are neither expected to require significant permanent agricultural land take, nor disrupt food-related production or transport (due to taking place entirely within the marine environment). Effects on diet due to effects on commercial fisheries have been considered. This includes information in relation to bioaccumulation and catch volumes. The changes will be temporary and are not considered likely to affect the availability or price of food to a degree that could affect population health.	N/A	N/A
Social environment	Housing	x	x	Construction and Operation: Housing-related issues are scoped out. No new housing is proposed. The construction and operational workforces will have housing requirements, but it is expected that a high proportion will be resident in the regional area or will be based aboard their vessels unless travelling to their usual place of residence. Any temporary accommodation requirements by non-home-based workers would be met through the usual capacity within the region for B&B, Hotel and short-term rentals. There is not considered to be the potential for a likely significant population health effect associated with changes in the availability of housing. Health effects associated with housing are therefore scoped out on the basis of the anticipated capacity in the local housing market. Workforce assumptions and associated housing capacity analysis will be reported in the Project's socio-economic assessment.	N/A	N/A

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
	Relocation	x	x	Construction and operational works would not involve compulsory land purchases of homes or community facilities. This issue is scoped out.	N/A	N/A
	Transport modes, access and connections	x	x	Construction: Onshore effects of construction compound activities, as well as vehicle traffic associated with construction activities, have been considered. While construction works may disrupt local vehicle traffic (private and public transport) as well as active travel (pedestrians and cyclists), these impacts are not part of the Project and have been addressed through other planning processes. These issues are therefore scoped out here. Operation: Onshore effects of the Project on road transport have been noted. These have been considered through other planning processes and are not part of the current marine license application. These issues are therefore scoped out. Construction and Operation: Offshore effects on shipping access to Larne and Ballylumford have been considered and are scoped out. These are not anticipated to be at a scale that could significantly affect population health. This includes effects on the shipping of medical supplies. A watching brief will be kept on Chapter 13 (Shipping, Navigation and Safety) to ensure that these issues can remain scoped out.	N/A	N/A
	Open space, play and leisure	✓	x	Construction: Works may disrupt access to recreational spaces for physical activity, leisure and recreation. This includes nearshore coastal activities during cavern construction and installation of	No new surveys. Use of existing	Qualitative assessment informed by

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
				seawater intake and brine outfall pipelines. Consideration will be given to the influences on nearshore recreation, e.g. bathing, sailing and other water sports. Operation: Once construction is completed, no further disruption to recreational spaces would be required. Therefore, the Project change is unlikely to significantly affect physical, mental or social health aspects of community recreation. This issue is scoped out.	public health data sources. Literature and policy review.	quantitative analysis in the equivalent ES Chapters for Chapter 15 (Material Assets - Infrastructure and Other Users) and Chapter 16 (Material Assets - Agriculture and Land Use).
	Community safety	x	x	Construction and Operation: The Project workforce requires skilled technical roles. There are not anticipated to be community safety or security issues associated with worker behaviour in the communities. The Project would operate appropriate security, safeguarding and modern slavery policies. It is assumed that workforce behaviour and policies would be outlined in a workforce management plan. The potential for widespread actual or perceived crime that could affect population health is unlikely. This issue is scoped out. Construction and Operation: Risk of major accidents and disasters during both construction and operation is considered separately within the Chapter 29 (Risk of Major Accidents and Disasters) and will not be repeated here. Best practice measures to prevent such	N/A	N/A

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
				issues (as well as occupational health) would be secured through suitable management plans. These issues are scoped out.		
	Community identity, culture, resilience and influence	✓	x	Construction: The visual impact of the Project is scoped in to consider the potential for the introduction of visual changes to influence community identity to an extent that could significantly affect population mental health and wellbeing. This includes negative associations with changes to visual impact (i.e. disruption of views) and positive associations (i.e. the new job opportunities). Operation: Most of the Project infrastructure would be underground, including the caverns. There are no visual impacts that are therefore anticipated from the Project. This issue is scoped out.	No new surveys. Use of existing public health data sources. Literature and policy review.	Qualitative assessment informed by quantitative analysis in the equivalent ES Chapter for Chapter 26 (Seascape, Landscape and Visual Impact).
	Social participation, interaction and support	x	x	Construction and Operation: The Project will not directly affect land used for community interaction (e.g. meeting places, village greens, community centres, etc, that promote community voluntary, social, cultural or spiritual participation). This issue is scoped out.	N/A	N/A
Economic environment	Education and training	x	x	Construction and Operation: Whilst the Applicant could support upskilling and career development in relation to its workforces, this is not anticipated to be of a scale with the potential for significant population level health effects. Additionally, a large influx of workers, including those bringing families, is not expected, so changes to educational capacity or quality are unlikely and are	N/A	N/A

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
				scoped out. It is noted that education has been scoped into the Socio-economic assessment, therefore, a watching brief will be kept on their conclusions, and this topic may be scoped into the health assessment if deemed necessary.		
	Employment and income	✓	x	Construction: Effects arising from employment and training opportunities during construction are scoped in. Consideration will also be given to the impacts of the Project on commercial fisheries. The Project would operate appropriate employment equality policies but is not expected to influence how employment affects family structures and relationships in local populations. Occupational working conditions include particular risks, which are appropriately managed through health and safety policies and practices. Project activities are not expected to differ from industry norms. These issues are scoped out. Any international supply chain would be expected to operate appropriate policies that safeguard against significant population challenges to equality, health and safety, for both workers and, as appropriate, the public. These issues are scoped out. Operation: The workforce required to facilitate operation and maintenance of the Project would be minimal. On this basis, it is proposed that employment and income will be scoped out of the health assessment during operation of the Project.	No new surveys. Use of existing public health data sources. Literature and policy review.	Qualitative assessment informed by quantitative analysis in the equivalent ES Chapters for Chapter 28 (Socio-economics) and Chapter 14 (Material Assets - Commercial Fisheries).

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
Biophysical environment	Climate change mitigation and adaptation	x	x	Construction and Operation: Embodied carbon and climate-altering pollutant emissions of the Project during construction are not of a scale to have the potential for population-level health effects associated with climate change. It is not anticipated that the Project would produce climate-altering pollutant emissions or other climate impacts during operation. This issue is therefore scoped out.	N/A	N/A
	Air quality	x	x	Construction: Although there can be air quality impacts, such as dust and exhaust emissions from construction traffic during construction, these issues are scoped out on the basis that these impacts are not part of the Project and have been addressed through other planning processes. Operation: The Project is not expected to change air quality emissions, even accounting for non-threshold effects, that could affect onshore populations to a degree that there could be potentially significant effects. On this basis, it is proposed that the effects of air quality are scoped out of the health assessment during the operation and maintenance of the Project.	No new surveys. Use of existing public health data sources. Literature and policy review.	Qualitative assessment informed by the equivalent ES Chapters for Chapter 21 (Air Quality) and Chapter 22 (Climate).
	Water quality or availability	✓	x	Construction: Bathing water quality may be temporarily affected by construction works, including dredging that mobilises pollutants, resulting in the leaching of pollutants into water bodies. Consideration will be given to waterborne mobilised historic contaminants. Potential impacts from the discharge of brine on water quality will also be considered.	No new surveys. Use of existing public health data sources.	Qualitative assessment informed by the equivalent ES Chapter for

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
				Operation: Checks and maintenance activities are unlikely to result in any water-related risks to public health. Any risks would be managed through standard best practice spill avoidance and response measures that would be secured through the appropriate management plans. It is also noted that the seawater intake and outfall structures will not be operational during the operation phase. This issue is scoped out.	Literature and policy review.	Chapter 19 (Water Quality).
	Land quality	x	x	Construction and Operation: The effects of construction activities on land and soil are scoped out, on the basis that no activities impacting land and soil are part of the Project and have been addressed through other planning processes. Direct exposure to construction workforces will be addressed by routine health and safety measures, including PPE. There are no effects on land quality anticipated from the Project during operations; therefore, this issue is scoped out.	N/A	N/A
	Noise and Vibration	✓	x	Construction: Construction sites would generate noise. Consideration will be given to population health effects, for example, related to annoyance and sleep disturbance. Operation: Operational activities are not anticipated to generate noise at a level to impact nearby onshore populations. This issue is therefore scoped out of the health assessment.	No new surveys. Use of existing public health data sources. Literature and policy review.	Qualitative assessment informed by the equivalent ES Chapter for Chapter 12 (Terrestrial Noise and Vibration).

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
	Understanding of Risk (Risk Perception)	x	✓	Construction: During construction, the Project is not anticipated to generate issues of community concern that could affect mental health. This issue is scoped out at this stage. Operation: In line with good practice, public understanding of risk in relation to gas storage is scoped in. The assessment will provide reassurance on the safety of the Project and avoid/reduce any widespread community concern that could affect mental health. This includes considering the potential for mental health effects and how these can be avoided or reduced through provisions of timely and non-technical information on how actual health risks are mitigated.	No new surveys. Use of existing public health data sources. Literature and policy review.	Qualitative assessment informed by relevant evidence from literature, professional expertise and equivalent ES Chapter for Chapter 29 (Risk of Major Accidents and Disasters).
	Health and social care services	x	x	Construction and Operation: Effects on health and social care are scoped out. The Project workforce is assumed to include specialist international suppliers and fabricators to the offshore works, as well as subcontractors who are resident in the regional area. The former is assumed to have appropriate insurance or would pay for their healthcare directly where required. The latter would access healthcare under their existing entitlements or payment schemes. The expectation is that the great majority of healthcare needs of the onshore workforce will be met by their usual healthcare provider when they return to their usual place of residence during rotation.	N/A	N/A

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
				It is not expected that a high proportion of workers would move to the area with dependants requiring social care. Health protection measures such as screening and immunisations are expected to continue from the workers' usual place of residence. Similarly, routine dental appointments are assumed to be with the worker's dental practice close to their usual place of residence. Other health services are not expected to be affected as no large-scale in-migration is expected, and the workforce of skilled technical roles would return to their usual places of residence when ashore. Based on available information, healthcare pressures are not anticipated to have the potential for likely significant effects on population health, so they are scoped out.		
	Built environment	x	x	Construction and Operation: Utilities disruption is unlikely, and any crossing of existing power or communications cables would be managed to avoid interruption. Appropriate waste management practices would be used in regard to the MARPOL regulations on waste at sea. The Project design will be resilient to accidents and disasters. Significant population health implications are not anticipated and are scoped out.	N/A	N/A
	Wider societal infrastructure and resources	x	x	Construction and Operation: The Project is beneficial to public health through contributing to energy security. However, public health benefits from improvements to wider societal infrastructure	N/A	N/A

Wider determinants of health		Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		C	O			
				is scoped out, on the basis that this would not be at a scale with a significant effect.		

* The project phase refers to construction/decommissioning (C) and operation (O).



Figure 28-1: Socio-Economic Study Area

28.3 Data Sources

The baseline was informed by a desktop study; the sources of information used are listed in Table 28-1, whilst relevant policies are included in Table 28-2.

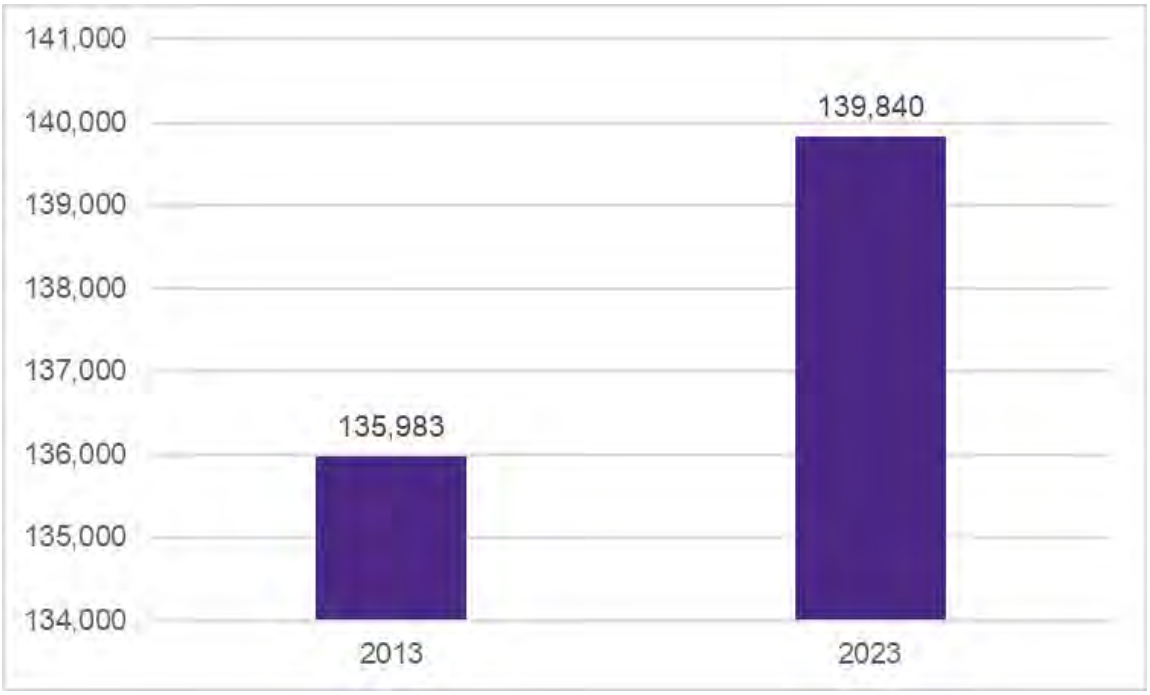
Table 28-1: Data Sources used to inform the Socio-Economic Chapter

Indicator	Source
Study Area Median Age, Economic Inactivity Rate, Employment Rate and Regional GVA by Industry	Census 2021, Northern Ireland Statistics and Research Agency, ONS
Spatial Context Map	Mid and East Antrim, Council Briefing (2025), Local Development Plan, 2030
Occupation Structure, Employment by Industry and Education	Northern Ireland Statistics and Research Agency, Annual Labour Force Survey (2023)

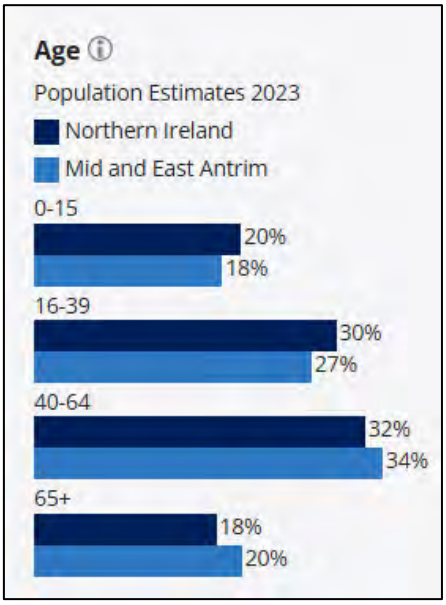
Indicator	Source
Public and Private Sector Employment, Employment by broad sector, Median Income, Businesses by Size, Tourism Businesses and Employment, Tourism Accommodation Occupancy Rates, Registered Northern Ireland Accommodation Stock, and Recreation and Tourism Receptors	Business Register and Employment Survey (BRES, 2022), Northern Ireland Statistics and Research Agency, Inter Departmental Business Register data (2025), NISRA Occupancy Survey, Tourism Northern Ireland, Google Maps
Recorded Crime	Police Service of Northern Ireland

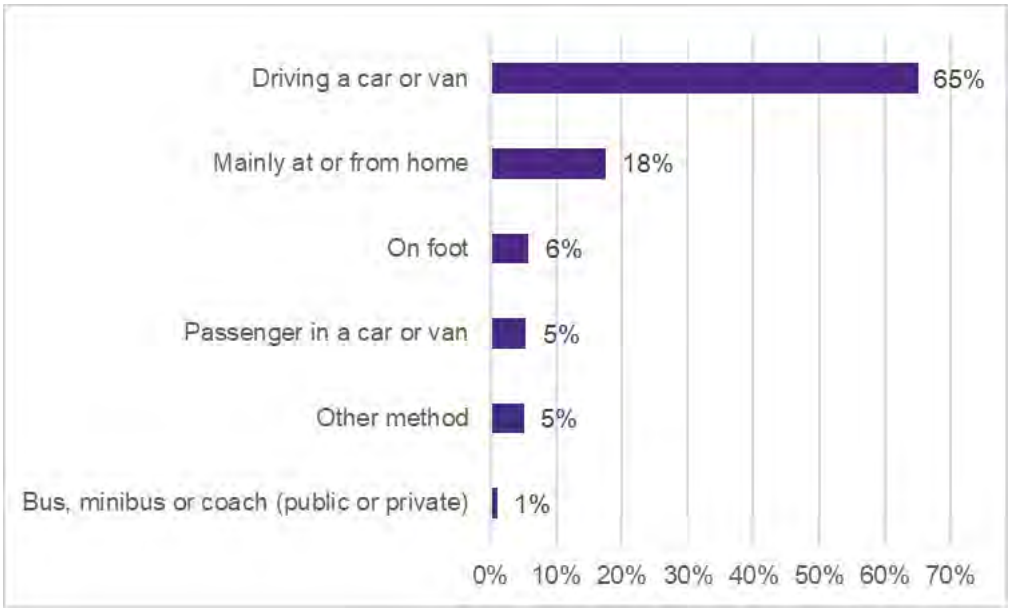
Table 28-2: Policies relevant to the Socio-economic Chapter

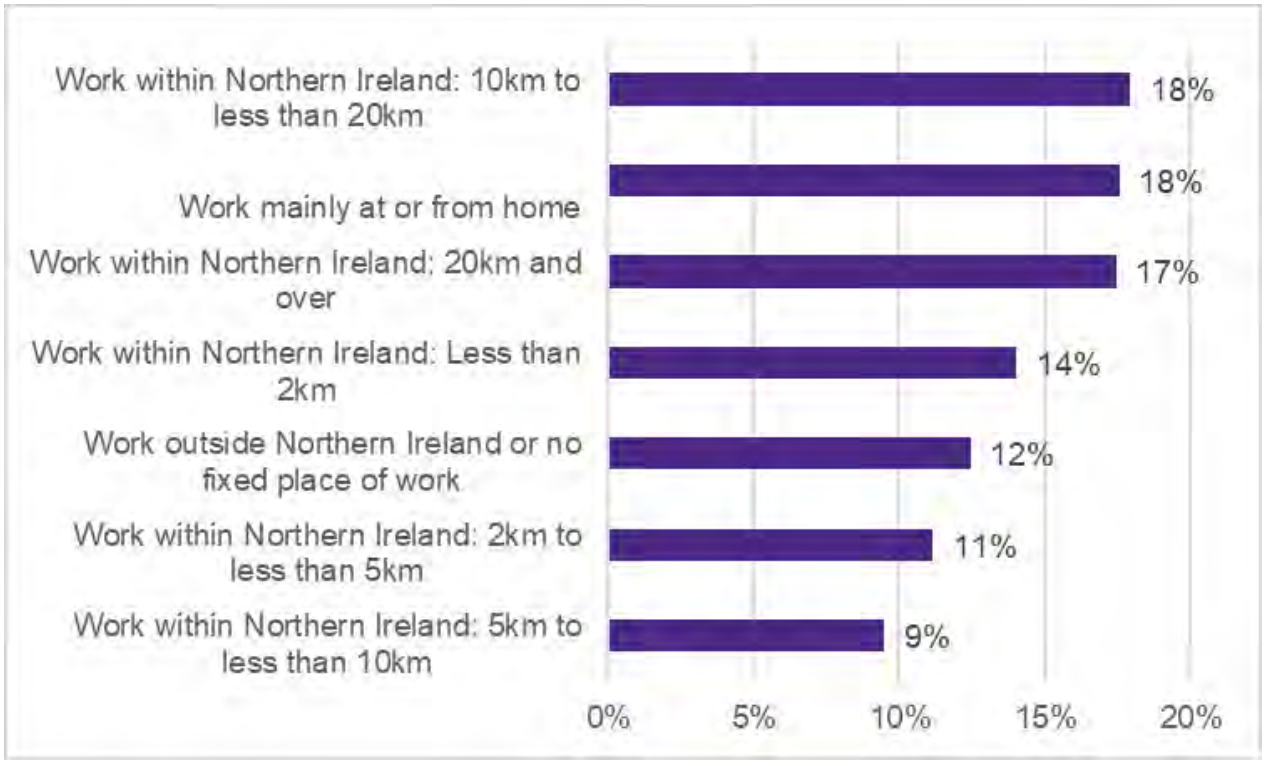
Policy	Region	Areas of Relevance
SPPS (2010)	NI	Pertaining to 'Economic Development, Industry and Commerce' the regional strategic objectives are to: • "promote sustainable economic development in an environmentally sensitive manner; • "tackle disadvantage and facilitate job creation by ensuring the provision of a generous supply of land suitable for economic development and a choice and range in terms of quality"; • "sustain a vibrant rural community by supporting rural economic development of an appropriate nature and scale"; In the context of villages and small settlements, "favourable consideration should be given to an economic development proposal where it is of a scale, nature and design appropriate to the character of the particular settlement and subject to meeting normal planning criteria such as compatibility with nearby residential use"
Local Development Plan 2030 Plan Strategy	Mid and East Antrim	Policy ECD1 (Economic Development in Settlements) Development proposals will be permitted where "a) the proposal is commensurate with the LDP Spatial Growth Strategy; b) the nature, scale and form/design of the proposal is appropriate to the character of the settlement; and c) the proposal is compatible with adjacent and nearby land uses". **Policy MIN1 (Mineral Development)** states that planning permission will be granted when the "Council is satisfied that the proposal will not have an unacceptable adverse impact upon any of the following interests: a) The natural environment, including the conservation of flora and fauna, natural habitats, biodiversity and earth science features. b) The water environment, including water quality and natural flow regimes. c) Landscape quality and visual amenity. d) The historic environment. e) Traffic movement and road safety. f) The safety and amenity of people living in proximity to operational sites" **Policy MIN2 (Valuabe Minerals)** re-emphasises the need to mitigate the areas stated in Policy MIN1. **Policy MIN3 (Hydrocarbons)** states that "Proposals for exploitation of hydrocarbons through conventional or unconventional methods of extraction must comply with Policies MIN1 and MIN2."


141,000
140,000
139,000
138,000
137,000
136,000
135,000
134,000
135,983
139,840
2013
2023


N
Marine Application Areas
Larne Lough E1
Blackcave
Ballycraigy
Blackcave South
Larne
Ballyloran
Inver
B90
Mullaghboy
A2
147 m
B90
Ballylig
B150
A2
Newlands
Altilevelly
Gransha
0 1 2 3 4
Kilometers
Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, TomTom, Garmin, GeoTechnologies, Inc, METI/NASA, USGS


Age
Population Estimates 2023
Northern Ireland
Mid and East Antrim
0-15
20%
18%
16-39
30%
27%
40-64
32%
34%
65+
18%
20%


Driving a car or van
65%
Mainly at or from home
18%
On foot
6%
Passenger in a car or van
5%
Other method
5%
Bus, minibus or coach (public or private)
1%
0%
10%
20%
30%
40%
50%
60%
70%


Work within Northern Ireland: 10km to less than 20km
18%
Work mainly at or from home
18%
Work within Northern Ireland: 20km and over
17%
Work within Northern Ireland: Less than 2km
14%
Work outside Northern Ireland or no fixed place of work
12%
Work within Northern Ireland: 2km to less than 5km
11%
Work within Northern Ireland: 5km to less than 10km
9%
0%
5%
10%
15%
20%

28.4.4 Employment

The Study Area has a relatively low economic inactivity rate of 19.3%. This is the lowest proportion across all of NI's local authorities and is lower than the NI average (23.3%).

As expected, the Study Area also has a high employment rate, with 79.5% of the working-age population being in employment as of 2023. This is the highest rate across NI.

Table 28-3 shows the most recent data published by the NI Statistics and Research Agency from the Business Register and Employment Survey (BRES) in 2022. There were a total of 42,758 employees working in the Study Area. This would equate to around 5.3% of the working population of NI.

The vast majority of workers (74%) in the Study Area worked within the private sector, 2% more than observed nationally. The neighbouring local authority Antrim and Newtownabbey has a marginally larger proportion of the working population employed in the private sector (76%) than observed in the Study Area (74%).

Table 28-3: Public and Private Sector Employment

Sector	Mid and East Antrim (Study Area)		Antrim and Newtownabbey		NI	
	Number	%	Number	%	Number	%
Public Sector	11,141	26%	14,355	24%	218,638	28%
Private Sector	31,617	74%	45,114	76%	575,841	72%
TOTAL	42,758	100%	59,469	100%	794,479	100%

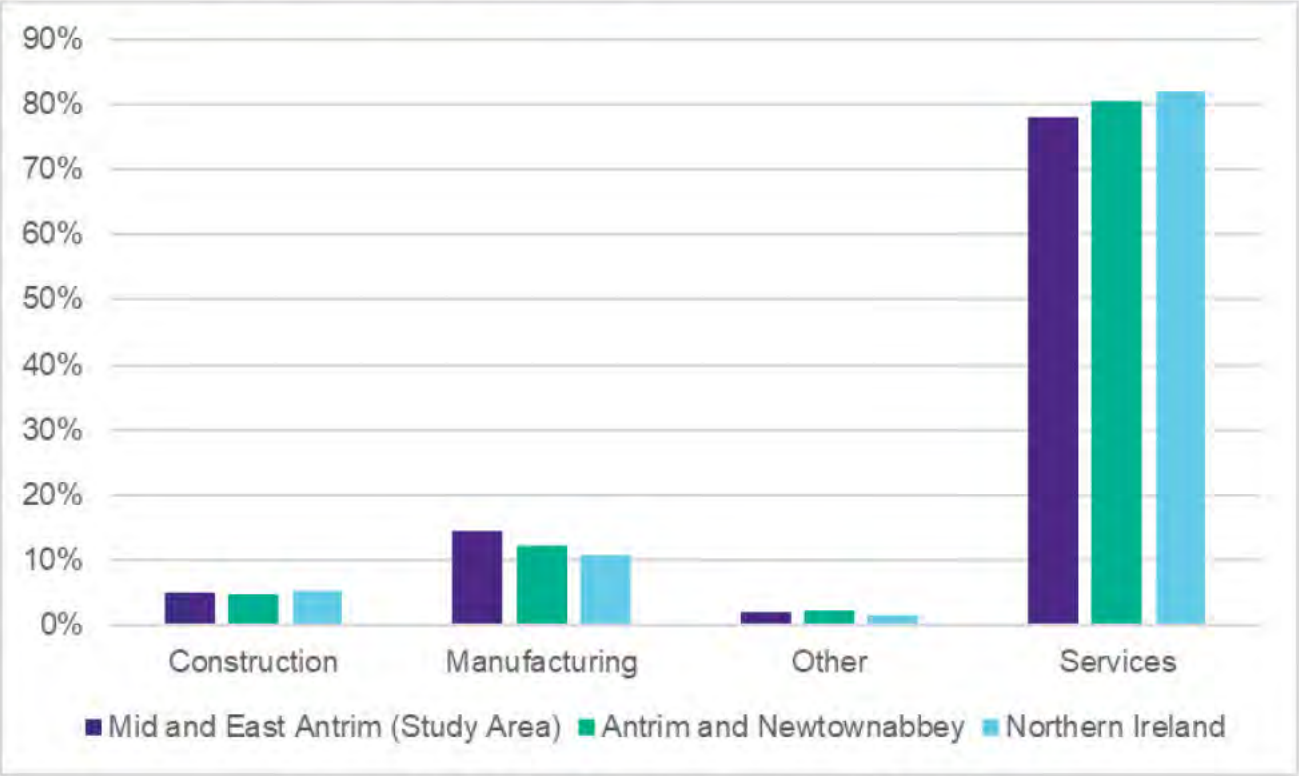


Figure 28-7: Employment by Broad Sector (BRES, 2022)

Table 28-4: Employment by Broad Sector (BRES 2022)

Sector	Mid and East Antrim (Study Area)		Antrim and Newtownabbey		NI	
	Number	%	Number	%	Number	%
Construction	2,228	5%	2,860	5%	44,146	5%
Manufacturing	6,273	15%	7,330	12%	90,287	11%
Other	879	2%	1,407	2%	13,735	2%
Services	33,378	78%	47,873	80%	677,336	82%
TOTAL	42,758	100%	59,470	100%	825,504	100%

According to the most recent data regarding employment by industry (Table 28-5), 4,000 people, which represents 8% of employment in the Study Area, are employed in the construction sector.

Table 28-5: Employment by Industry (Annual Labour Force Survey (2023))

Sector	Mid and East Antrim (Study Area)		Antrim and Newtownabbey		NI	
	Number	%	Number	%	Number	%
Agriculture, Forestry and Fishing Estimate	1,000	1	1,000	1	22,000	2.6
Energy and Water Estimate	2,000	2	1,000	3	14,000	1.6
Manufacturing Estimate	4,000	9	6,000	6	78,000	9.1
Construction Estimate	4,000	8	5,000	6	68,000	7.9
Distribution, Hotels and Restaurants Estimate	16,000	16	11,000	24	145,000	17.0
Transport and Communication Estimate	6,000	11	8,000	8	57,000	6.6
Banking and Finance Estimate	9,000	15	11,000	13	121,000	14.2
Public Admin, Education and Health Estimate	23,000	34	23,000	34	298,000	34.8
Other Services Estimate	4,000	4	3,000	6	53,000	6.2
Total Estimate	67,000	100	70,000	100	855,000	100

Table 28-6 shows the occupational structure within the Study Area, Antrim and Newtownabbey and NI based on the most recent data regarding employment by industry.

In the Study Area, the proportion of people in "Professional Occupations" was 19.2%, which was considerably lower than in Antrim and Newtownabbey (24.9%) and NI as a whole (24.4%).

The Study Area has a higher proportion of employees, employed within "Administrative and Secretarial Occupations" (15.4%) compared to Antrim and Newtownabbey (12.2%) and the NI average (12%).

Table 28-6: Occupation Structure by Local Authority (Annual Labour Force Survey (2023))

Sector	Mid and East Antrim (Study Area)		Antrim and Newtownabbey		NI	
	Number	%	Number	%	Number	%
Managers, Directors and Senior Officials Estimate	5,000	7.8	4,000	5.2	60,000	7.0
Professional Occupations Estimate	13,000	19.2	18,000	24.9	209,000	24.4
Associate Professional and Technical Occupations Estimate	7,000	11.0	7,000	10.4	95,000	11.1
Administrative and Secretarial Occupations Estimate	10,000	15.4	9,000	12.2	103,000	12.0
Skilled Trades Occupations Estimate	7,000	9.7	7,000	9.8	98,000	11.5
Caring, Leisure and Other Service Occupations Estimate	8,000	11.4	9,000	13.2	90,000	10.5
Sales and Customer Service Occupations Estimate	6,000	9.5	6,000	9.2	68,000	7.9
Process, Plant and Machine Operatives Estimate	4,000	6.0	5,000	6.8	53,000	6.1
Elementary Occupations Estimate	7,000	10.0	6,000	8.3	81,000	9.5
Total Estimate	**67,000**	**100**	**70,000**	**100**	**857,000**	**100**

28.4.5 GVA and Wages

Gross Value Added (GVA) is an economic productivity metric that measures the contribution of an industry, economy or region. It is calculated by taking the total value of goods and services produced and subtracting the cost of intermediate goods and services used in the production process. GVA per employee calculations are made by dividing the GVA by the total number of employees in said region.

Table 28-7 shows that the Study Area has an overall GVA per employee of £47,045, whilst the construction GVA per employee is £55,750 and the manufacturing GVA per employee is £141,250. NI's overall GVA per

employee is higher than for the Study Area (£65,662), whilst the national construction GVA per employee is also higher than for the Study Area (£68,176). The national manufacturing GVA per employee is lower than for the Study Area (£83,821).

According to the Annual Survey of Hours and Earnings (ASHE), the 2024 median gross annual earnings for all employees (full-time and part-time) in the Study Area were £26,402, which is lower than the neighbouring Antrim and Newtownabbey area (£29,359) and slightly lower than the NI average (£28,825).

Table 28-7: Regional GVA by Industry (ONS)

Region	Industry	Employees	GVA (£m)	GVA per Employee (£m)
Mid and East Antrim	Construction	4,000	223	55,750
	Manufacturing[17]	4,000	565	141,250
	Agriculture, forestry and fishing; mining and quarrying	1,000	69	69,000
	All industries	67,000	3,152	47,045
NI	Construction	68,000	4,704	69,176
	Manufacturing	78,000	6,538	83,821
	Agriculture, forestry and fishing	22,000	781	35,500
	All industries	855,000	56,141	65,662

28.4.6 Education

Figure 28-8 shows data from the Annual Labour Force Survey (2023). The Study Area contains a relatively low proportion of people who have Level 4[18] and above qualifications (40.1%) when compared to the neighbouring Antrim and Newtownabbey council area. The Study Area has a higher proportion of individuals who only have a qualification below Level 4 (51.1%) in comparison to neighbouring Antrim and Newtownabbey (46.2%) and NI as a whole (48%).

[17] This incudes the Manufacture of coke, refined petroleum and chemicals
[18] According to .gov.uk Level 4 Qualifications are certificate of higher education (CertHE); higher apprenticeship; higher national certificate (HNC); level 4 award; level 4 certificate; level 4 diploma; level 4 NVQ

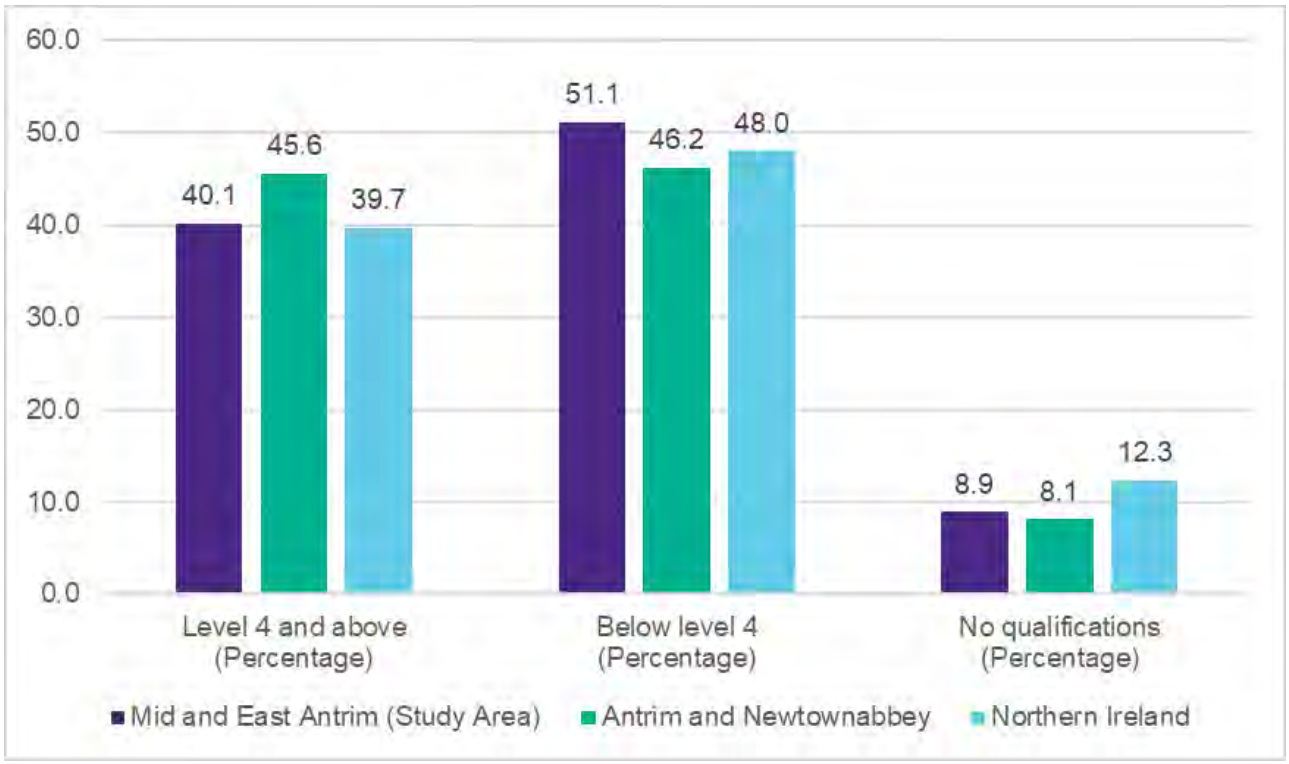

60.0
50.0
40.0
30.0
20.0
10.0
0.0
40.1
45.6
39.7
51.1
46.2
48.0
8.9
8.1
12.3
Level 4 and above (Percentage)
Below level 4 (Percentage)
No qualifications (Percentage)
Mid and East Antrim (Study Area)
Antrim and Newtownabbey
Northern Ireland

Table 28-8: Business Broad Industry Groups (2023)

Broad Industry Groups	Mid and East Antrim (Study Area)		Antrim and Newtownabbey		NI	
	Number	%	Number	%	Number	%
Agriculture, forestry and fishing	1,455	28%	730	17%	19,050	23%
Production	385	7%	330	8%	5,580	7%
Construction	650	13%	580	13%	11,470	14%
Accommodation and food services	295	6%	245	6%	4,445	5%
Professional, scientific and technical	340	7%	370	9%	6,755	8%
Arts, entertainment, recreation and other services	375	7%	305	7%	4,965	6%
TOTAL (includes other Broad Industry Groups)	5,145	N/A	4,340	N/A	81,135	N/A

28.4.8 Crime

Using the latest data (12 months to May 2025) from the Police Service of NI, all districts experienced less crime over the 12-month period preceding May 2025, as shown in Figure 28-9 and Table 28-9. The Study Area's police recorded crime reduced by 7.2% which was virtually in line with NI's reduction (7.1%), and overall the 8th largest or the 3rd smallest reduction out of NI's 11 Police District areas.

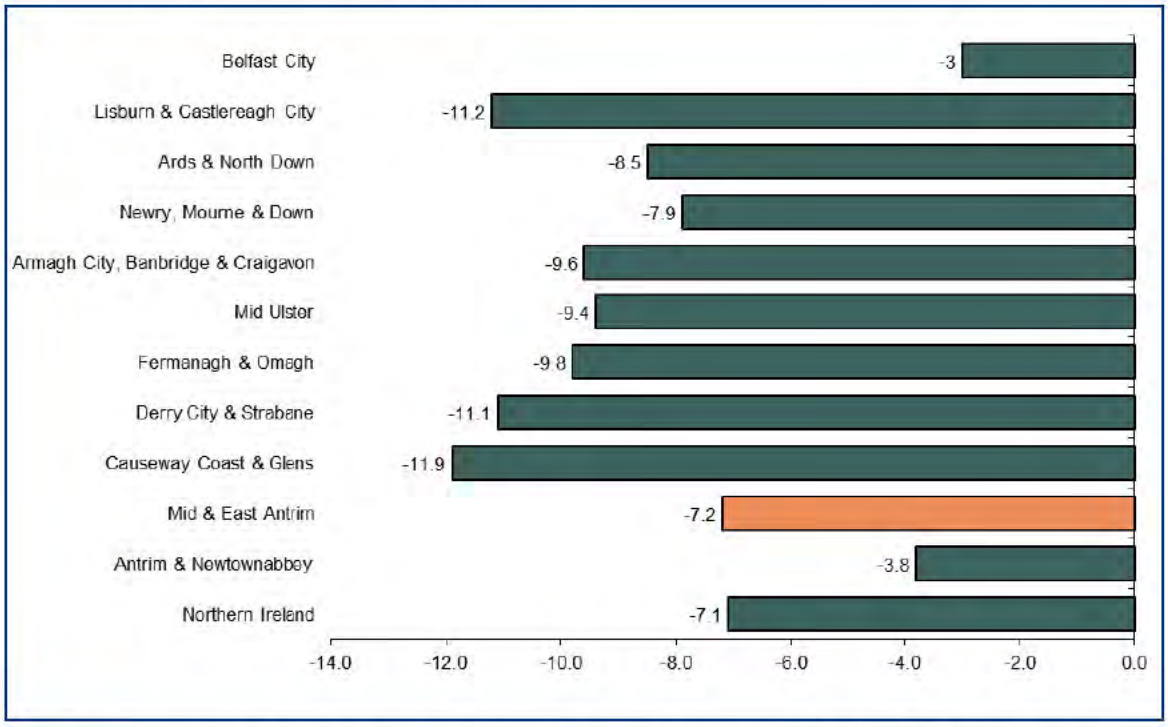


Figure 28-9: Percentage change in police recorded crime by policing district, 12 months to May 2025 compared with the previous 12 months

Table 28-9: Police Recorded Crime by District (2025)

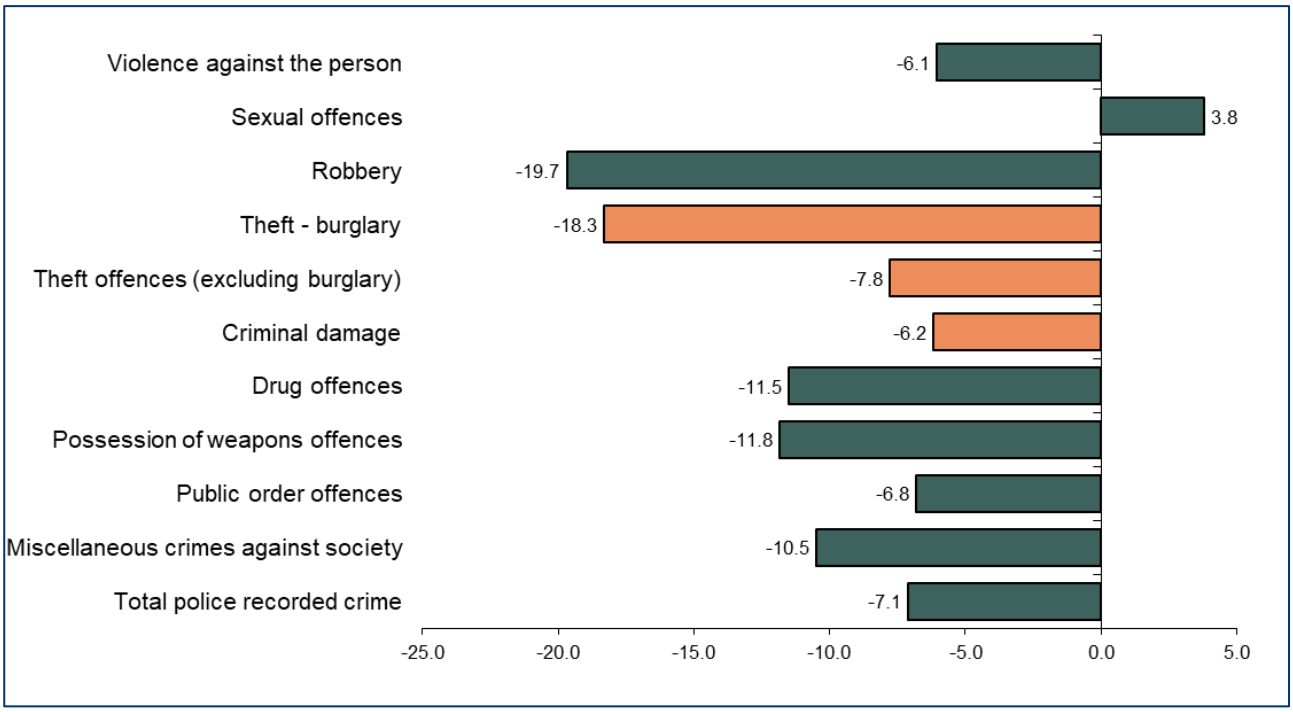
Policing district	Police recorded crime			
	Jun'23-May'24	Jun'24-May'25[1,2]	change	% change
Belfast City	32,836	31,855	-981	-3.0
Lisburn and Castlereagh City	5,871	5,212	-659	-11.2
Ards and North Down	6,062	5,545	-517	-8.5
Newry, Mourne and Down	8,430	7,764	-666	-7.9
Armagh City, Banbridge and Craigavon	9,819	8,875	-944	-9.6
Mid Ulster	4,900	4,437	-463	-9.4
Fermanagh and Omagh	4,177	3,768	-409	-9.8
Derry City and Strabane	10,917	9,703	-1,214	-11.1
Causeway Coast and Glens	6,044	5,322	-722	-11.9
Mid and East Antrim (Study Area)	6,252	5,804	-448	-7.2
Antrim and Newtownabbey	6,717	6,462	-255	-3.8
NI	**102,025**	**94,750**	**-7,275**	**-7.1**

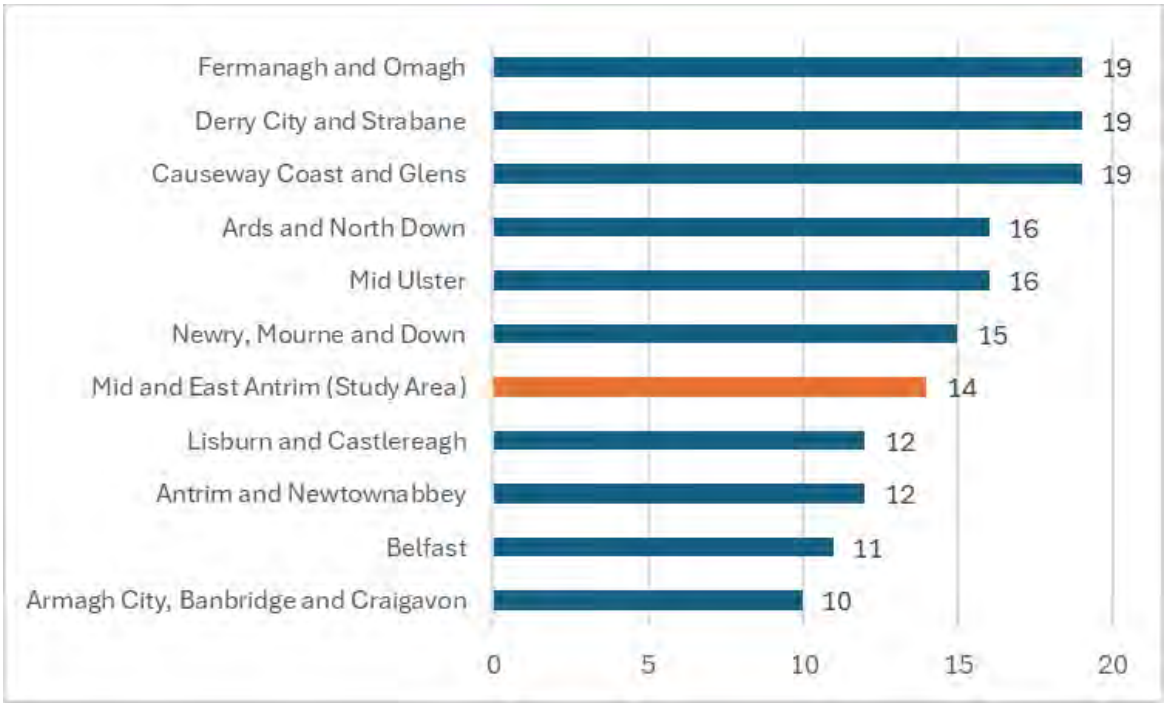
Table 28-10 shows the NI districts, with their mid-year 2023 population rounded numbers taken from NISRA. The recorded crime numbers are taken from the Police Service of NI and are used to calculate recorded crimes per 1,000 population. The district with the lowest recorded crimes per 1,000 population is Mid Ulster, whilst the highest is Belfast. The Study Area ranks 7th highest out of 11 districts, with a crime per 1,000 of 41.5, which is below the NI level (49 per 1,000).

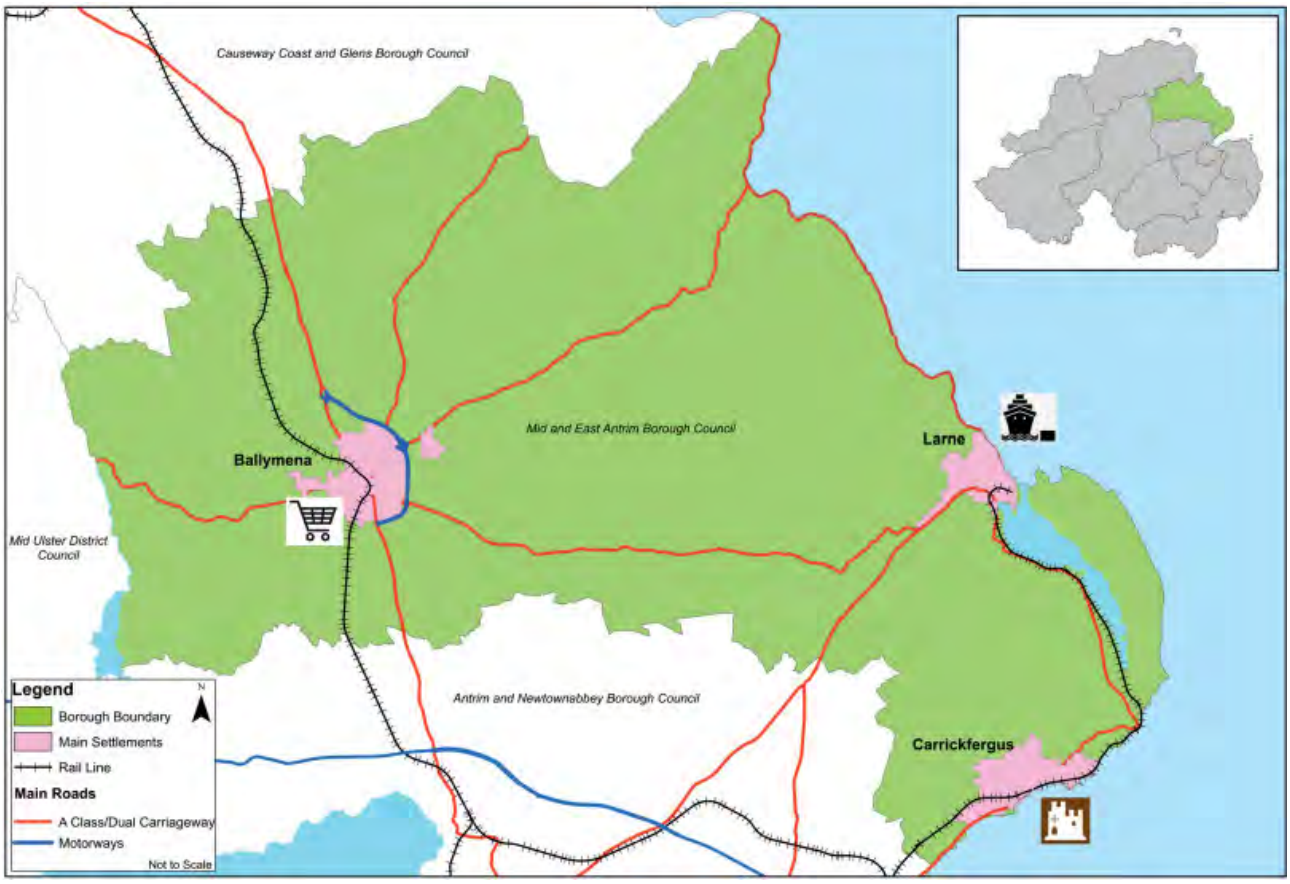
Table 28-10: Crime Rate per 1,000 Population District

Crime Rate per 1,000	Recorded Crimes	Population	Crimes per 1,000
Mid Ulster	4,437	152,000	29.2
Fermanagh and Omagh	3,768	117,200	32.2
Ards and North Down	5,545	164,900	33.6
Lisburn and Castlereagh City	5,212	150,800	34.6
Causeway Coast and Glens	5,322	141,700	37.6
Armagh City, Banbridge and Craigavon	8,875	221,800	40.0
Mid and East Antrim (Study Area)	5,804	139,800	41.5
Newry, Mourne and Down	7,764	183,400	42.3
Antrim and Newtownabbey	6,462	147,300	43.9
Derry City and Strabane	9,703	150,900	64.3
Belfast City	31,855	350,500	90.9

Figure 28-10 shows that theft and criminal damage-related crimes fell by an average of circa 11%. These are crimes that construction projects may be most susceptible to.


Violence against the person
Sexual offences
Robbery
Theft - burglary
Theft offences (excluding burglary)
Criminal damage
Drug offences
Possession of weapons offences
Public order offences
Miscellaneous crimes against society
Total police recorded crime
-6.1
3.8
-19.7
-18.3
-7.8
-6.2
-11.5
-11.8
-6.8
-10.5
-7.1
-25.0
-20.0
-15.0
-10.0
-5.0
0.0
5.0


Fermanagh and Omagh
Derry City and Strabane
Causeway Coast and Glens
Ards and North Down
Mid Ulster
Newry, Mourne and Down
Mid and East Antrim (Study Area)
Lisburn and Castlereagh
Antrim and Newtownabbey
Belfast
Armagh City, Banbridge and Craigavon
19
19
19
16
16
15
14
12
12
11
10
0
5
10
15
20


Causeway Coast and Glens Borough Council
Mid and East Antrim Borough Council
Ballymena
Larne
Mid Ulster District Council
Antrim and Newtownabbey Borough Council
Carrickfergus
Legend
Borough Boundary
Main Settlements
Rail Line
Main Roads
A Class/Dual Carriageway
Motorways
Not to Scale
N

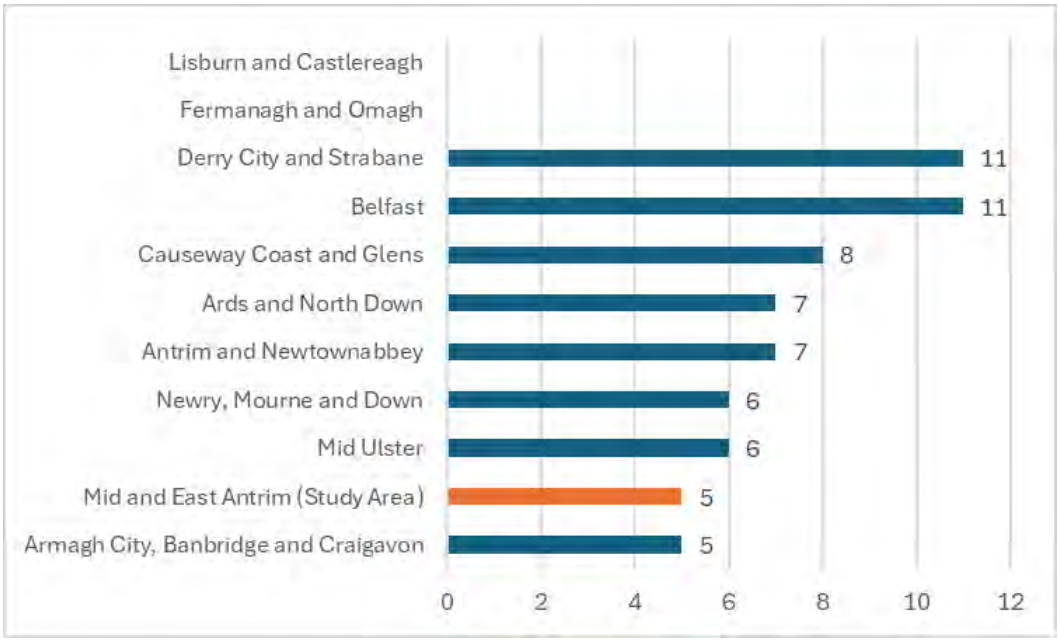

Lisburn and Castlereagh
Fermanagh and Omagh
Derry City and Strabane
Belfast
Causeway Coast and Glens
Ards and North Down
Antrim and Newtownabbey
Newry, Mourne and Down
Mid Ulster
Mid and East Antrim (Study Area)
Armagh City, Banbridge and Craigavon
11
11
8
7
7
6
6
5
5
0
2
4
6
8
10
12

Table 28-11: Accommodation Type and Supply

Accommodation Type	Number of Establishments		Number of Rooms		Number of Bed Spaces	
	Mid and East Antrim	Antrim and Newtownabbey	Mid and East Antrim	Antrim and Newtownabbey	Mid and East Antrim	Antrim and Newtownabbey
Hotels	11	8	472	576	1,033	1,216
Guesthouses	2	4	30	30	61	81
Guest Accommodation	43	23	194	46	416	113
Bed and Breakfasts	29	17	91	56	199	118
Self-Catering	252	85	718	248	1,424	479
Bunk Houses	3	0	12	0	60	0
Hostel	0	1	0	40	0	44
TOTAL	**340**	**138**	**1,517**	**996**	**3,193**	**2,051**

28.4.11.3 Tourism Accommodation Occupancy Rates

The 2024 NISRA Occupancy Survey shows occupancy rates across NI's districts. The Study Area had a bed occupancy rate of 53% across its hotels and 40% across its service accommodations (Figure 28-14).

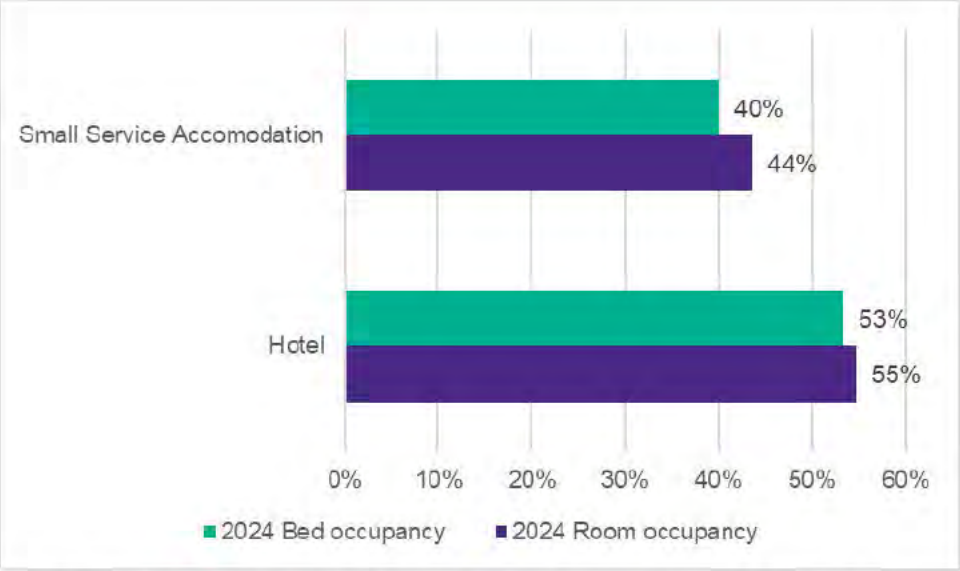


Figure 28-14: 2024 Study Area Bed and Room Occupancy (NISRA)

28.4.11.4 Tourism Demand Numbers

In regard to overnight trips, there were 220,000 within the Study Area, which was almost double the amount of overnight trips to neighbouring Antrim and Newtownabbey (115,000). Between 2023 and 2024, the number

Table 28-12: Impacts Proposed to be Scoped In (✓) / Out (x) for Socio-Economics

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Employment	✓	✓	Positive effect(s): The Project will create direct jobs and indirect jobs in the wider economy during both the construction and operation phases. In a relatively small local authority context, even a small amount of employment may be influential to socio-economics. Operational employment are indirect impacts from the completion of the marine elements. As the caverns will be approximately 1 mile under the seabed, so any positive employment effects during operation will be associated with the already consented terrestrial infrastructure to facilitate the Projects operation. However, the caverns are the key component of the Project so employment benefits arising from the Gas Storage Facility as a whole (marine and terrestrial) will only be possible due to the caverns.	Desk-based review to develop a detailed baseline assessment of relevant socioeconomic conditions, including an assessment of employment and the businesses by sector.	An economic impact model will be developed to estimate direct, indirect, and induced employment impacts of the Project.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Education, Skills and Qualifications	✓	✓	Positive effect(s): Opportunities to skill up the workforce by providing training and skills as part of an outline, skills, supply chain and plan (if commissioned). Whilst they may be limited in number, their impact within a small community may be disproportionately beneficial if they can be appropriately targeted to vulnerable groups.	Desktop review of occupational structure and qualifications of the study area population. Stakeholder engagement to identify local impacts baseline data cannot capture.	Consultation with key members of the local community to identify appetite for upskilling in the community will be undertaken to inform an Employment and Skills Plan (if commissioned).
Economic Output	✓	✓	Positive effect(s): During construction, GVA is associated with construction labour and worker spend, greater construction worker spending in the local economy and the direct investment in the local supply chain. During operation, increased employment will lead to increased GVA	Desktop-based review of employment demographics, potential sources of an increase in spend.	Estimates of the GVA as a result of additional/lost expenditure at each stage of the project will be calculated
Commuting	✓	x	There is potential for the construction of the Project to interfere with commuting roads within Islandmagee, causing disruption to workers' commutes. A non-resident workforce, as well as construction materials and equipment, have the potential to increase vehicles using the	Desktop-based review of commuting patterns.	Estimating the impacts on commuting traffic.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			road network on Islandmagee, causing delays.		
Temporary Workers Accommodation	✓	x	This has been scoped in as it is expected that construction workers will need to come from outside of the Study Area due to the specialist nature of the construction needed for the Project. As such temporary construction workers accommodation may be needed which may impact the local housing market or short term let market.	Desktop-based review of short-term housing data and housing data.	Estimating the demand of construction workers who will need temporary accommodation and comparing this to the supply of short term let accommodation in the Study Area.
Shops and Services	x	x	Shops and services have been scoped out across construction and operation, as due to the sparse population of the immediate vicinity of the Project site, there are not many shops and services to be impacted.	N/A	N/A
Tourism	x	x	Tourism has been scoped out across construction and operation, as there are not many tourism receptors in a close vicinity to the Project and most of the tourism and recreational receptors are at the south of the island.	N/A	N/A
Recreational Amenity	x	x	Recreational Amenity has been scoped out across construction and operation, as there are not many recreational receptors in a close vicinity to the Project and most of the	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			tourism and recreational receptors are at the south of the island.		
Housing	x	x	Housing related receptors has been scoped out as the Project's closest and smallest measurable area, has a population density circa 193 times smaller than Mid and East Antrim – emphasizing its extremely rural and sparsely populated nature. Overall, the scheme is not expected to impact the availability of the housing or house prices.	N/A	N/A
Crime and Safety	x	x	There is the potential for increased crime in relation to theft or criminal damage related to the construction sites. The Study Area ranks 7th highest out 12 districts, with a crime per 1,000 of 41.5 which is below the NI level (49 per 1,000) and the districts average (45 per 1,000). Theft and criminal damage related crimes fell by an average of circa 11%. These are crimes that construction projects may be most susceptible to. Furthermore, the immediate vicinity being extremely sparsely populated relative to other areas within Mid and East Antrim makes it less likely criminals will not target the construction site. Nonetheless, it is assumed that security arrangements for	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
			the Project will be in line with the requirements set out in the Construction (Design and Management) Regulations and appropriate levels of security (personnel / CCTV) will be appointed. Therefore, there is unlikely to be a significant effect in relation to crime and safety, and this is unlikely to be significant		

* The project phase refers to construction/decommissioning (C) and operation (O).

28.6 ES Assessment Methodology

The Socio-Economic Chapter of the EIA will follow the methodology set out in Chapter 3.

There is no specific guidance available which establishes a methodology for undertaking an EIA of the socio-economic effects of a Development. Accordingly, the approach adopted for this assessment will be based on professional experience and best practice, and in consideration of the policy requirements/tests set out within the National Planning Policy Framework (NPPF), NPSs, and local planning policy.

In the absence of more directly applicable guidance, the definitions of magnitude and sensitivity will be adapted from those used in the Design Manual for Roads and Bridges (DMRB) methodology (Highways England et al., 2020)[20].

The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor.

28.6.1 Receptor Sensitivity/Value

The criteria for defining sensitivity in this chapter are outlined in Table 28-13.

Table 28-13: Definitions of Sensitivity

Sensitivity	Definition
High	Receptor is identified as a policy priority; and Evidence of major socio-economic challenge or underperformance.
Medium	Receptor is important in policy; and Evidence of under-performance or vulnerability.
Low	Receptor is not a policy priority; and Evidence that the receptor is resilient and no particular challenges.
Negligible	Receptor is not a policy priority; and Good overall performance in impact area.

28.6.2 Magnitude of impact

The criteria for defining magnitude in this chapter are outlined in Table 28-14.

[20] Highways England. 2020a. Design Manual for Roads and Bridges, LA 104 Environmental Assessment and Monitoring (Revision 1). [online] Available at: https://standardsforhighways.co.uk/dmrb/search/0f6e0b6a-d08e-4673-8691- cab564d4a60a [Accessed 23/05/2025]

Table 28-14: Impact Magnitude Criteria

Magnitude of impact		Definition
High	Adverse	Severe detrimental impact to key social and/or economic characteristic(s). Where the impact is able to be quantified this would equate to a percentage change of above 20% and where it is not appropriate to quantify this, professional judgement is used to qualitatively determine if there would be an impact of this scale.
	Beneficial	Major enhancement to key social and/or economic characteristic(s). Where the impact is able to be quantified this would equate to a percentage change of above 20% and where it is not appropriate to quantify this, professional judgement is used to qualitatively determine if there would be an impact of this scale.
Medium	Adverse	Discernible detrimental impact upon key social and/or economic characteristic(s). Where the impact is able to be quantified this would equate to a percentage change of 11-20% and where it is not appropriate to quantify this, professional judgement is used to qualitatively determine if there would be an impact of this scale.
	Beneficial	Discernible improvement to key social and/or economic characteristic(s). Where the impact is able to be quantified this would equate to a percentage change of 11-20% and where it is not appropriate to quantify this, professional judgement is used to qualitatively determine if there would be an impact of this scale.
Low	Adverse	Minor detrimental alteration to, one or more key social and/or economic baseline characteristic(s). Where the impact is able to be quantified this would equate to a percentage change of 6-10% and where it is not appropriate to quantify this, professional judgement is used to qualitatively determine if there would be an impact of this scale.
	Beneficial	Minor benefit to one or more key social and/or economic baseline characteristic(s), or a reduced risk of negative impact occurring. Where the impact is able to be quantified this would equate to a percentage change of 6-10% and where it is not appropriate to quantify this, professional judgement is used to qualitatively determine if there would be an impact of this scale.
Negligible	Adverse	Very minor detrimental alteration to one or more social and/or economic baseline characteristic(s). Where the impact is able to be quantified this would equate to a percentage change of under 5% and where it is not appropriate to quantify this, professional judgement is used to qualitatively determine if there would be an impact of this scale.
	Beneficial	Very minor benefit to one or more social and/or economic baseline characteristic(s). Where the impact is able to be quantified this would equate to a percentage change of under 5% and where it is not appropriate to quantify this, professional judgement is used to qualitatively determine if there would be an impact of this scale.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction and where it is not appropriate to quantify this, professional judgement is used to qualitatively determine if there would be an impact of this scale.

28.6.3 Duration of impacts

Time periods within the socioeconomic assessment are defined as follows and will inform the professional judgement in determining magnitude:

Table 28-15: Magnitude of Impact Duration Definitions

Duration of impact	Definition
Short term	Period of months, up to one year.
Medium term	Period of more than one year, up to five years.
Long term	Period of greater than five years. This includes operational lifetime effects, which are considered long-term reversible

Effects that have a longer duration will typically have a greater magnitude of impact.

28.6.4 Significance of Effects

The significance of effects upon socioeconomic receptors will be determined by taking into account the sensitivity of the receptor, the magnitude of the impact (which includes the duration) and also guided by professional judgement. The method employed for this assessment is presented in Table 28-16. Where a range of significance levels is presented, the final assessment for the effect will be based upon professional judgement.

In all cases, the evaluation of receptor sensitivity, impact magnitude (including duration) and significance of effect will be informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

For the purpose of this assessment, any effects with a significance level of minor or less will not be considered to be significant, whilst any effects with a significance level of moderate or major will be considered to be significant in terms of the EIA Regulations.

Table 28-16: Assessment Matrix

Sensitivity of Receptor	Magnitude of Impact			
	High	Medium	Low	Negligible
High	Major	Moderate / Major	Moderate	Negligible
Medium	Moderate / Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible

Where the magnitude of impact is 'Negligible', no discernible effect would arise.

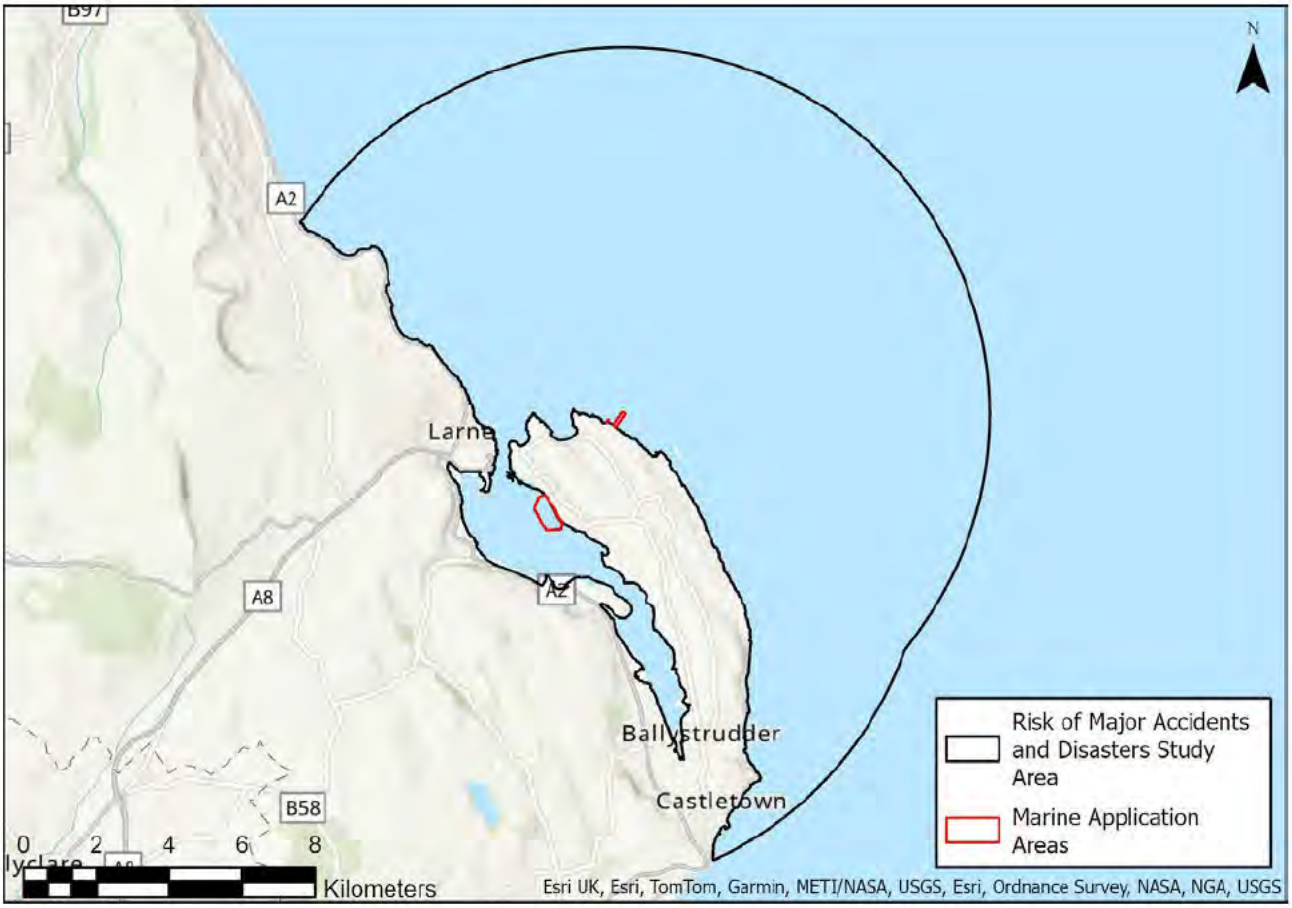


Figure 29-1: Risk of Major Accidents and Disaster Study Area

29.3 Data Sources

This Chapter of the Scoping Report has been informed by the other Chapters of this Scoping Report. Additional data sources used to inform the desk-based study are listed in Table 29-1.

Table 29-1: Data sources used to inform the Risk of Major Accidents and Disasters Chapter

Source	Data Provision
Department of Agriculture, Environment and Rural Affairs (DAERA) – Natural Environment Map Viewer	Environmental data and mapping
DEFRA – COMAH Public Information NI: Information about COMAH sites in NI	COMAH site information
Kingfisher Information Service – Offshore Renewable and Cable Awareness	Subsea cables and pipelines data and mapping
HM Government - National Risk Register 2025	Likelihood and Consequences of National Risks in the UK

Table 30.1: Summary of the EIA Scoping

Report Chapter	Environmental Topic	Construction/ Decommissioning	Operation and Maintenance
5	Terrestrial Biodiversity, Flora and Fauna	Scoped In	Scoped Out
6	Terrestrial Ornithology	Scoped Out	Scoped Out
7	Offshore and Intertidal Ornithology	Scoped In	Scoped Out
8	Benthic, Subtidal and Intertidal Ecology	Scoped In	Scoped In
9	Fish, Shellfish and Plankton Ecology	Scoped In	Scoped In
10	Marine Mammals	Scoped In	Scoped In
11	Underwater Noise	Scoped In	Scoped Out
12	Terrestrial Noise and Vibration	Scoped In	Scoped Out
13	Shipping, Navigation and Safety	Scoped In	Scoped In
14	Material Assets - Commercial Fisheries	Scoped In	Scoped In
15	Material Assets - Infrastructure and Other Users	Scoped In	Scoped Out
16	Material Assets - Agriculture and Land Use	Scoped Out	Scoped Out
17	Material Assets -Traffic and Transportation	Scoped Out	Scoped Out
18	Land, Soils, Geology and Hydrogeology	Scoped Out	Scoped Out
19	Water Quality	Scoped In	Scoped Out
20	Flood Risk	Scoped Out	Scoped Out
21	Air Quality	Scoped Out	Scoped Out
22	Climate	Scoped In	Scoped In
23	Coastal Processes	Scoped Out	Scoped Out
24	Cultural Heritage and Archaeology	Scoped Out	Scoped Out
25	Waste	Scoped Out	Scoped Out
26	Seascape, Landscape and Visual Impact	Scoped In	Scoped Out
27	Population and Human Health	Scoped In	Scoped In
28	Socio-economics	Scoped In	Scoped In
29	Risk of Major Accidents and Disasters	Scoped In	Scoped In

-

-

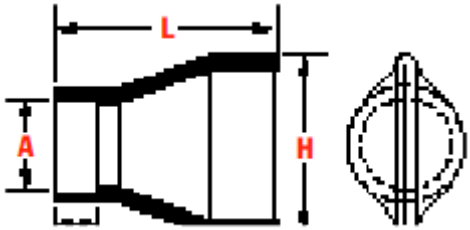

Tideflex

$$Ca = \frac{p - p_v}{\frac{1}{2} \times \rho \times v^2}$$

$$p_{ambient} = p_{atm} + G_E \times D \times \rho = 101325Pa + 9.81m/s^2 \times 26m \times 1027kg/m^3 = 363198Pa$$

$$p_v = 610.64Pa \times e^{\left(\frac{17.625 \times T}{T+243.04}\right)}$$

$$p_v = 610.64 \times e^{\left(\frac{17.625 \times 15}{15+243.04}\right)} = 1702Pa$$



$$Ca = \frac{363198Pa - 1702Pa}{\frac{1}{2} \times 1026kg/m^3 \times 7.62m/s^2} = 12.13$$

$$Ca = \frac{363198Pa - 1702Pa}{\frac{1}{2} \times 1026kg/m^3 \times 7.62m/s^2} = 12.09$$

Appendix C – List of Abbreviations

Abbreviation	Definition
AADT	Annual Average Daily Traffic
ADCO	Archaeological Diving Company Ltd
AEP	Annual Exceedance Probability
AFBI	Agri Food and Biosciences Institute
AIS	Automatic Identification System
ALARP	As low as reasonably practicable
ALC	Agricultural Land Classification
ANSI	American National Standards Institute
AON	Apparently Occupied Nest
AQMA	Air Quality Management Areas
AQSA	Air Quality Study Areas
ASA	Acoustical Society of America
ASHE	Annual Survey of Hours and Earnings
ASSI	Areas of Special Scientific Interest
BGS	British Geological Survey
BHE	Belfast Harbour Evaporite Formation
BMAPA	British Marine Aggregate Producers Association
BNL	Baseline Noise Level
BP	Before Present
BPM	Best Practicable Means
BRES	Business Register & Employment Survey
BS	British Standards
BT	British Telecommunications
BTIP	British Tertiary Igneous Province
BTO	British Trust for Ornithology
CAFÉ	Cleaner Air for Europe
CAQSA	Construction Air Quality Study Area
CCS	Carbon Capture and Storage
CCTV	Closed-circuit television
CD	Chart Datum
CDM	Construction Design and Management
CEFAS	Centre for Environment, Fisheries, and Aquaculture Science
CEH	UK Centre for Ecology & Hydrology
CEMP	Construction Environmental Management Plan
CGNS	Celtic and Greater North Sea
CHA	Competent Harbour Authority
CHIA	Cultural Heritage Impact Assessment
CHP	Combined Heat and Power
CI	Confidence Interval
CIEEM	Chartered Institute of Ecology and Environmental Management
CIFA	Chartered Institute for Archaeologists
CIL	Commissioners of Irish Lights
CIRIA	Construction Industry Research and Information Association
CIS	Celtic and Irish Seas

Abbreviation	Definition
CMF	Connswater Marl Formation
COMAH	Control of Major Accident Hazards
COSHH	Control of Substances Hazardous to Health
CSA	Cavern sealing and abandonment
CTD	Conductivity, Temperature, Dissolved Oxygen
CWSH	Coastal West Scotland and Hebrides
DAERA	Department of Agriculture, Environment and Rural Affairs (NI)
DARD	Department of Agriculture and Rural Development
DDV	Drop Down Video
DECC	Department of Energy & Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DEHLG	Department of Environment, Heritage and Local Government
DESNZ	Department for Energy Security and Net Zero
DETI	Department of Enterprise, Trade and Investment (NI)
DfE	Department for Economy (NI)
DHI	Danish Hydraulic Institute
DMRB	Design Manual for Roads and Bridges
DOE	Department of the Environment
DP	Dynamic Positioning
DTM	Digital Terrain Model
DUKES	Digest of UK Energy Statistics
DWPA	Drinking Water Protected Areas
EABC	East Antrim Boat Club
EC	European Commission
ECMWF	European Centre for Medium-Range Weather Forecasts
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ELC	European Landscape Convention
EMEC	European Marine Energy Centre
EMP	Environmental Monitoring Programme
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ES	Environmental Statement
EU	European Union
EUMM	European Union Monitoring Mechanism
EUNIS	European Nature Information System
FEED	Front-End Engineering Design
FSA	Formal Safety Assessment
GB	Great Britain
GBP	Great British Pound
GEP	Good Ecological Potential
GHG	Greenhouse Gases
GISZ	Gas Importation and Storage Zone
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GPP	Guidance for Pollution Prevention

Abbreviation	Definition
GPS	Global Positioning System
GSNI	Geological Survey of Northern Ireland
GVA	Gross Value Added
HAZID	Hazard Identification
HDD	Horizontal Directional Drilling
HDPE	high-density polyethylene
HDV	Heavy Duty Vehicle
HM	His Majesty's
HMWB	Heavily Modified Water Bodies
HRA	Habitat Regulations Appraisal
HVDC	High Voltage Direct Current
IAIA	International Association for Impact Assessment
IALA	The International Organization for Marine Aids to Navigation
IAMMWG	Inter-Agency Marine Mammal Working Group
IAPS	Invasive Alien Plant Species
IAQM	Institute of Air Quality Management
IAS	Invasive Alien Species
IBA	Important Bird Area
ICE	Inventory of Carbon and Energy
ICES	International Council for the Exploration of the Seas
IEF	Important Ecological Features
IEMA	Institute of Environmental Management and Assessment
IGSF	Islandmagee Gas Storage Facility
IHBC	Institute of Historic Building Conservation
IMEL	Islandmagee Energy Limited
IMO	International Maritime Organization
IMSL	Islandmagee Storage Limited
INNS	Invasive Non-Native Species
IPCC	Intergovernmental Panel on Climate Change
IPH	Institute of Public Health
IS	Irish Sea
ISCOPE	Irish Scheme for Cetacean Observation and Public Education
IUCN	International Union for Conservation of Nature
IWDG	Irish Whale and Dolphin Group
JCDP	Joint Cetacean Data Portal
JCP	Joint Cetacean Protocol
JNAPC	Joint Nautical Archaeology Policy Committee
JNCC	Joint Nature Conservation Committee
LBF	Lower Basalt Formation
LCA	Life Cycle Assessment
LDP	Local Development Plan
LDV	Light Duty Vehicle
LFA	Less Favoured Areas
LLA	Local Lighthouse Authority
LNG	Liquefied natural gas
LSE	Likely Significant Effect
LULUCF	Land use, land use changes, and forestry

Abbreviation	Definition
MAIB	Marine Accident Investigation Branch
MARPOL	International Convention for the Prevention of Pollution from Ships
MCA	Maritime and Coastguard Agency
MCAA	Marine and Coastal Access Act 2009
MCLA	Marine Construction Licence Application
MEA	Mid & East Antrim
MGN	Marine Guidance Notice
MHWS	mean high water springs
ML	Marine Licence
MLWS	Mean low water spring tide mark
MMG	Mercia Mudstone Group
MMO	Marine Mammal Observer
MNR	Marine Nature Reserves
MPA	Marine Protected Area
MPS	Marine Policy Statement
MPS	UK Marine Policy Statement 2011
MSFA	Multi-Species Foraging Association
MSL	Mean Sea Level
MU	Management Units
NBN	National Biodiversity Network
NEC	National Emission Ceilings
NEWS	Non-Estuarine Wetland Surveys
NH	Natural Heritage
NI	Northern Ireland
NIE	Northern Ireland Electricity
NIEA	Northern Ireland Environment Agency
NIHE	NI Housing Executive
NIMF	Nationally Important Marine Features
NIOPA	Northern Ireland Official Publications Archive
NIPS	Northern Ireland Priority Species
NISMR	Northern Ireland Sites and Monuments Record
NISRA	Northern Ireland Statistics and Research Agency
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOX	Nitrogen Oxides
NPPF	National Planning Policy Framework
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
NRA	Navigational Risk Assessment
NRW	Natural Resources Wales
NSNG	North Sea Net Gain
NSTA	North Sea Transition Authority
OAQSA	Operational Air Quality Study Area
OFGEM	Office of Gas and Electricity Markets
ONS	Office for National Statistics
OS	Ordnance Survey
OSNI	Ordnance Survey of Northern Ireland

Abbreviation	Definition
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
OWEC	Offshore Wind Evidence and Change Programme
OWF	Offshore Wind Farms
PAD	Protocol for Archaeological Discoveries
PAS	Publicly Available Specification
PAYE	Pay As You Earn
PDF	Portable Document Format
PINS	UK Planning Inspectorate
PMF	Priority Marine Feature
POL	Port of Larne
POW	Programme of Works
PPE	Personal Protective Equipment
PPG	Pollution Prevention Guidelines
PSNI	Police Service Northern Ireland
PSU	Practical Salinity Units
RAMS	Risk Assessment and Method Statement
RBD	River Basin District
RBMP	River Basin Management Plan
RDS	Regional Development Strategy 2035
REZ	Renewable Energy Zone
RIAA	Report to Inform an Appropriate Assessment
RNLI	Royal National Lifeboat Institution
RPS	RPS
RSIS	Ramsar Sites Information Service
RSPB	Royal Society for the Protection of Birds
RYA	Royal Yachting Association
SAC	Special Area of Conservation
SAM	Static Acoustic Monitoring
SBP	Sub-Bottom Profiling
SCA	Seascape Character Area
SCOS	Special Committee on Seals
SEA	Strategic Environmental Assessment)
SEPA	Scottish Environment Protection Agency
SHA	Statutory Harbour Authority
SHEEC	SHARE European Earthquake Catalogue
SHMP	Species and Habitat Management Plan
SLNCI	Sites of Local Nature Conservation Importance
SLVIA	Seascape, Landscape and Visual Impact Assessment
SMRU	Seal Mammal Research Unit
SMU	Seal Management Units
SNIP	Scotland-Northern Ireland Pipeline
SOCC	Species of Conservation Concern
SPA	Special Protection Area
SPL	Sound Pressure Levels
SPM	Suspended Particulate Matter
SPPS	The Strategic Planning Policy Statement 2015

Abbreviation	Definition
SSC	Suspended Sediment Concentrations
SSG	Sherwood Sandstone Group
SSS	Side-Scan Sonar
SWF	Sea Watch Foundation
SWPA	Shellfish Water Protected Areas
TF	Tideflex
TRA	Traffic Reliability Area
TTRPS	Tetra Tech RPS
UK	United Kingdom
UKBAP	United Kingdom Biodiversity Action Plan
UKCP	UK Climate Projections
UKFEN	United Kingdom Fisheries Economics Network
UKHO	United Kingdom Hydrographic Office
UKOOA	UK Offshore Operators Association
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
USBL	Ultra Short BaseLine
UTM	Universal Transverse Mercator
VAT	Value Added Tax
VMS	Vessel Monitoring System
VP	Vantage Point
WANE	Wildlife and Natural Environment Act (Northern-Ireland) 2011
WFD	Water Framework Directive
WHO	World Health Organization
WMS	Web Map Service
WO	Protected at all times by The Wildlife (NI) Order 1985 (as amended)
WOC	Water Order Consent
WS	West Scotland
ZTV	Zone of Theoretical Visibility