Appendix 8-1:
Intertidal Phase 1 Report

ORIEL WINDFARM
OFFSHORE RENEWABLE ENERGY

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ORIEL WIND FARM PROJECT

Environmental Impact Assessment Report
Appendix 8-1: Intertidal Phase 1 Report

MDR1520B
EIAR – Appendix 8-1
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1 INTRODUCTION

1.1 Background

RPS was appointed by Oriel Windfarm Limited (OWL) to carry out a Phase 1 intertidal survey at the landfall location for the Oriel Wind Farm Project (the Project). The purpose of the survey was to provide the baseline characterisation of the intertidal habitat to inform the Environmental Impact Assessment Report (EIAR) for the Project. The landfall location is on the shore east of Togher and south of Dunany Point.

1.2 Survey objectives

The aim of the survey was to characterise the intertidal benthic baseline environment, from the Low Water Mark (LWM) to the High Water Mark (HWM), and to identify any sensitive ecological receptors at the landfall location proposed for the Project for the purposes of informing the EIAR.

1.3 Designated and protected sites

The National Parks and Wildlife Service (NPWS) is responsible for designating, monitoring and reporting on designated sites in Ireland. They draw up conservation management plans for designated sites that outline conservation objectives and strategies for protecting the habitats and species for which the sites are selected. The NPWS regularly carry out monitoring of protected habitats and species to ensure an accurate and up to date record of biodiversity found in marine areas of Ireland.

The Environmental Protection Agency's (EPA) Biodiversity Action Plan 2014-2018 sets out the EPA's action plan for the implementation of its role in the protection of biodiversity. Their responsibilities in relation to intertidal environments are to undertake Water Framework Directive (WFD) monitoring programmes in estuarine and coastal waters, specifically macro-algae, macrophytes and phytoplankton (EPA, 2014).

Ireland has established Special Areas of Conservation (SACs) for 59 habitat types listed under Annex I of the EU Habitats Directive. 16 of these 59 habitat types are priority habitats (NPWS, 2019), which include: active raised bog, active blanket bog, fixed dunes and coastal lagoons. Annex I habitats include six marine habitats, saltmarshes, several lake types, heaths and scree/rock habitats (NPWS, 2014a). 25 species in Ireland are afforded protection under the EU Habitats Directive, including salmon, otter, freshwater pearl mussel and bottlenose dolphin (NPWS, 2014a). Ireland's Prioritised Action Framework[1] under the EU Habitats Directive identifies a range of actions needed to help improve the status of Ireland's habitats and wildlife (NPWS, 2014a).

Ireland has also committed to establishing Marine Protected Areas (MPAs) to protect biodiversity (EC, 2020). No legislation[2] is currently used in Ireland to legally underpin protected areas established to fulfil commitments under international conventions. Therefore, since the creation of OSPAR (the Convention for the Protection of the Marine Environment of the North-East Atlantic) MPAs would not afford any legal protection to the relevant areas on their own. Therefore, Ireland has established a number of its Special Areas of Conservation (SACs) as OSPAR MPAs for marine habitats (NPWS, 2021).

The landfall location is 4.4 km from Dundalk Bay SAC (Site Code 000455), and 14.9 km from the Carlingford Shore SAC (Site Code 002306). The Dundalk Bay SAC Qualifying Interests (QI) include estuaries, mudflats and sandflats not covered by seawater at low tide, *Salicornia spp.,* perennial vegetation of stony banks, and other annuals colonising mud and sand, Atlantic salt meadows and Mediterranean salt meadows (NPWS, 2014b). The Carlingford Shore SAC QIs includes annual vegetation of drift lines and perennial vegetation of stony banks (NPWS, 2014c). The landfall location also intersects with Dunany Point, a proposed National Heritage Area (pNHA).

The landfall location is 24.9 km from the Carlingford Lough Marine Conservation Zone (MCZ), which is designated under UK legislation and submitted to the OSPAR convention. The Carlingford Lough MCZ

[1] https://www.npws.ie/sites/default/files/general/PAF-IE-2014.pdf

[2] In December 2022, the General Scheme of the Marine Protected Areas Bill was announced by the Government. This will provide for the designation and effective management of Marine Protected Areas.

designated features include the habitat *Philine aperta* (White lobe shell) and *Virgularia mirabilis* (Seapen) in soft stable infralittoral mud, this habitat is only present in Carlingford Lough (DAERA, 2017).

Ireland has also established Special Protection Areas (SPAs) under the EU Birds Directive for the protection of endangered bird species. A programme to identify and designate SPA sites has been in place since 1985.

The landfall location is outside the Dundalk Bay SPA (Site Code 4026]) which is designated for a number of wetland bird species and non-breeding wintering migratory species (NPWS 2011). The Carlingford Lough SPA (Site code 4078) is designated for its internationally important breeding populations of Sandwich Terns, Common Terns and important numbers of overwintering Light-bellied Brent Geese (DAERA, 2015). The landfall is located 18.5 km from the Carlingford Lough SPA.

Dunany Point pNHA is a proposed NHA which coincides with the landfall location and is located approximately 10 km from the offshore wind farm area. The site is dominated by a prominent low sea cliff composed of large and medium sized rock fragments in a clay matrix. The foreshore contains rocky habitats including small pebbles to boulder sized fragments of siltstone, limestone and sandstone. At the southern end the beach is characterised of sandy sediment and mudflats with tall banks of shingle between the HWM and LWM at the northern end (NPWS, 2009).

2 METHODOLOGY

2.1 Intertidal survey

A standard Phase 1 intertidal walkover survey was undertaken between 15 and 18 October 2019 at the landfall location (Figure 2-1).

The survey was undertaken following the Department of Communications, Climate Action and Environment's (DCCAE) Guidance on Marine Baseline Ecological Assessments and Monitoring Activities (Part 1 and Part 2) (DCCAE, 2018) and with reference to standard intertidal survey methodologies as outlined in the Joint Nature Conservation Committee (JNCC) Marine Monitoring Handbook (Davies *et al*., 2001) within Procedural Guidance No 3-1 In situ intertidal biotope recording (Wyn and Brazier, 2001 and Wyn *et al*., 2000) and The Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey (Wyn *et al*., 2006). The survey was led by a suitably qualified ecologist experienced in habitat mapping in intertidal, coastal and terrestrial environments.

The intertidal survey was carried out between the LWM and HWM along a 200 m corridor at the intertidal landfall location and consisted of a general walkover noting changes in ecological and physical characteristics and macrofauna observations. During the walkover survey, notes were made on the shore type, wave exposure, sediments/substrates present and descriptions of species/biotopes present. The spatial relationships between these features were observed and waypoints were recorded using a hand-held global positioning system (GPS) device, in conjunction with hand-written descriptions and photographs. All biotopes present were identified, and their extents mapped with the aid of aerial photography and using a hand-held GPS recorder. Any other features within the intertidal zone were also noted including rock pools, man-made structures and any habitats/species of conservation importance. Where present, these features were target noted in the intertidal biotope maps for the landfall location.

Dig-over stations were placed in different biotopes, where possible, the locations of which were determined in the field. On-site sediment dig-overs were undertaken in soft sediments to help characterise the habitats. This involved lifting four spade loads (approximately 0.02 m^2) of sediment dug to a depth of 20 to 25 cm, which were sieved in situ through a 0.5 mm mesh, with all material returned to the same site. All macrofauna species present were identified and enumerated on site, where possible. Field notes were also taken on the physical characteristics, including sediment type and presence of anoxic layers in the sediment.

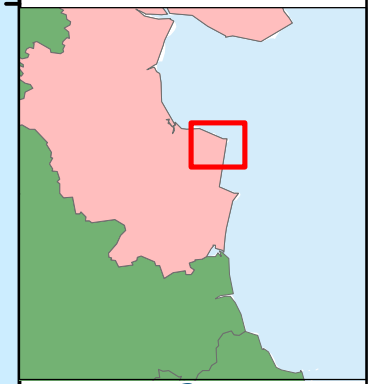
2.2 Aerial extrapolation

The intertidal survey undertaken in 2019 focussed on a survey area of approximately 200 m along Dunany Beach. Since the survey was undertaken, the extent of the offshore cable corridor on the approach to the landfall has been adjusted to minimise the extent of the offshore cable corridor in the North west Irish Sea cSPA. To inform the baseline a further assessment of the intertidal area and biotope classification was undertaken using aerial imagery, and where possible, photographs have been used to extrapolate out the biotopes from the 2019 survey. As specific species of the biotope are undeterminable from aerial imagery, higher biotope classifications have been used and denoted in Figure 3-1 as 'Extrapolated Habitat'. This allows for a more conservative approach to the assessment in the extrapolated area.

Legend

- Landfall Location
- Intertidal Survey Area
- Survey Area Centreline
- Low Water Mark
- High Water Mark

Data Sources: Client, Ordnance Survey Ireland.



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Project

Oriel Wind Farm Project

Title **Figure 2-1**
Landfall Intertidal Survey Area

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2.3 Timing

The fieldwork was undertaken during the optimal survey period for intertidal biotope mapping surveys of April to October (Wyn *et al.,* 2006). Due to the occurrence of low tides close to sunrise and sunset, surveys ran for three to four and a half hours after low water in the morning and for three to four and a half hours before low water in the evening to ensure as much of the intertidal zone was sampled as possible. Low tide times and heights over the survey period are presented in Table 2-1.

Table 2-1: **Tide times during the survey.**

Date	Daylight Hours	HW / LW	Time Local	Height (m)
15 October 2019	07:53 - 18:29	12:46	12:46	4.66
		19:00	19:00	0.93
16 October 2019	07:55 - 18:27	13:18	13:18	4.67
		19:28	19:28	0.95
17 October 2019	07:57 – 18:25	13:55	13:55	4.66
		07:42	07:42	1.01
18 October 2019	07:59 – 18:23	08:11	08:11	1.06
		14:27	14:27	4.65

2.4 Health and safety

The survey staff adhered to the Risk Assessment and Method Statement. A site-specific risk assessment was performed on arrival at the survey location, prior to any work being carried out. Both survey staff were experienced field scientists and were aware of tidal constraints at the site. The staff wore or carried the required personal protective equipment, as necessary, including sturdy footwear (Wellington boots or walking boots); a hi-vis jacket; sun lotion; weatherproof clothing; navigation instruments (GPS); two fully charged mobile phones; a first aid kit; food; and plenty of drinking water. Appropriate emergency phone numbers were pre-saved in the mobile phones. A text message or phone call was placed by the lead surveyor with the onshore-based contact before and after the survey. No accidents, incidents or near-misses occurred during the intertidal surveys.

3 SURVEY RESULTS

3.1 Summary

The intertidal zone at the survey area is sheltered from high energy wave action. The landfall location contained a mix of mobile rocky habitats and sandflats. Exposed bedrock was not recorded. The landfall location contained approximately 30% rock respectively. A steep and narrow band of shingle was present at the landward end of the beach after which a very shallow slope occurred. This shallow slope, in combination with the sheltered locations of the beach, have allowed extensive sandflats to accrete. The sandflats were generally fine grained and clean with a relatively low mud content and without a prominent anoxic layer.

The majority of biotopes identified across the site full salinity and low to moderate energy conditions. Zonation was clearly evident down the shore, particularly in the spatial distributions of fucoid seaweeds (JNCC, 2015).

44 separate taxa were recorded during the survey including a variety of brown, green and red seaweeds, gastropods, crustaceans, polychaete worms, ascidians, hydroids and a starfish. Dig-overs were undertaken in soft sediments, in order to ascertain any infaunal species present.

The following sections describe the intertidal survey area, including a description of the biotopes in terms of sediment and species composition. The extents of biotopes identified have been mapped together with a summary of the biotopes identified at the landfall location.

3.2 Landfall description

The extents of biotopes identified at the landfall location have been mapped in Figure 3-1 together with a summary of the biotopes identified in Table 3-1. Photographs of biotopes and species observed within the landfall location are shown in Appendix A: Plates

A steep and narrow band of shingle (mobile cobbles and pebbles) was present at the head of the beach. Occasionally, small patches of coarse sand were present particularly where the slope declined towards the seaward edge of this feature. The talitrid amphipod *Orchestia gammarellus* was recorded albeit very sparsely under stones and patches of decaying seaweed, originally washed onto the strandline during high tides. The classification for this biotope is LS.LSa.St.Tal (Talitrids on the upper shore and strand-line), although the larger, rounder stones at the landfall location may reduce the amount of interstitial habitat for amphipods.

A band of LS.LSa.MuSa.MacAre; *Macoma balthica* and *Arenicola marina* in littoral muddy sand, was present immediately below the shingle zone. A second band of this biotope (Plate 3) occurred on the lower shore. Both bands of this biotope differed slightly from the JNCC description in that *Macoma balthica* was not recorded and instead the closely related thin tellin *Macomangulus tenuis* was observed via a dig-over of the sediments. The fine sand was relatively clean (low mud content) and generally lacked a prominent anoxic layer; conditions which favour *Macomangulus tenuis* over *Macoma balthica*. Oligochaete worms, a spionid worm and the polychaete worms *Hediste diversicolour*, *Scoloplos armiger* and *Lanice conchilega* were also recorded via a dig-over of the sediments. *Arenicola marina* was more abundant in this biotope than *Lanice conchilega* in areas where the latter was present.

An area of LR.LLR.F.Fves; *Fucus vesiculosus* on moderately exposed to sheltered mid eulittoral rock was present at the northern end of the site. *Fucus vesiculosus* was the most abundant seaweed with *Porphyra umbilicalis* and *Ulva intestinalis* occurring frequently and occasionally, respectively. The barnacle *Semibalanus balanoides* was abundant while the molluscs *Nucella lapillus*, *Mytilus edulis* and *Patella vulgata* occurred occasionally. A patch of damaged *Fucus vesiculosus* approximately 10 m x 15 m was present (TN1). Only remnants of stipes remained; perhaps due to recent sand scouring.

A patch of the biotope LR.FLR.Eph.EntPor (Plate 2) containing an abundance of *Ulva intestinalis* and *Porphyra umbilicalis* was present in the centre of the mid-shore. Frequent components of this biotope were the barnacle *Semibalanus balanoides* and the brown seaweed *Fucus spiralis*. The gastropod mollusc *Littorina littorea* was also present.

Where dense populations of *Lanice conchilega* occurred and *Arenicola marina* was less abundant (if present) the biotope LS.LSa.MuSa.Lan; *Lanice conchilega* in littoral sand was ascribed. This biotope

occurred in clean sand mainly along the mid and lower shores with polychaetes *Euclymene lumbricoides*, *Nephtys hombergii, Scoloplos armiger* and *Arenicola marina* often present.

A mosaic of LR.LLR.F.Fves; *Fucus vesiculosus* and LR.FLR.Eph.EntPor occurred in the mid-shore. An area of barren sand scoured rock LR containing patches of LR.FLR.Eph.EntPor occurred at the southern end of the mid-shore (Plate 1).

3.3 Aerial Extrapolation

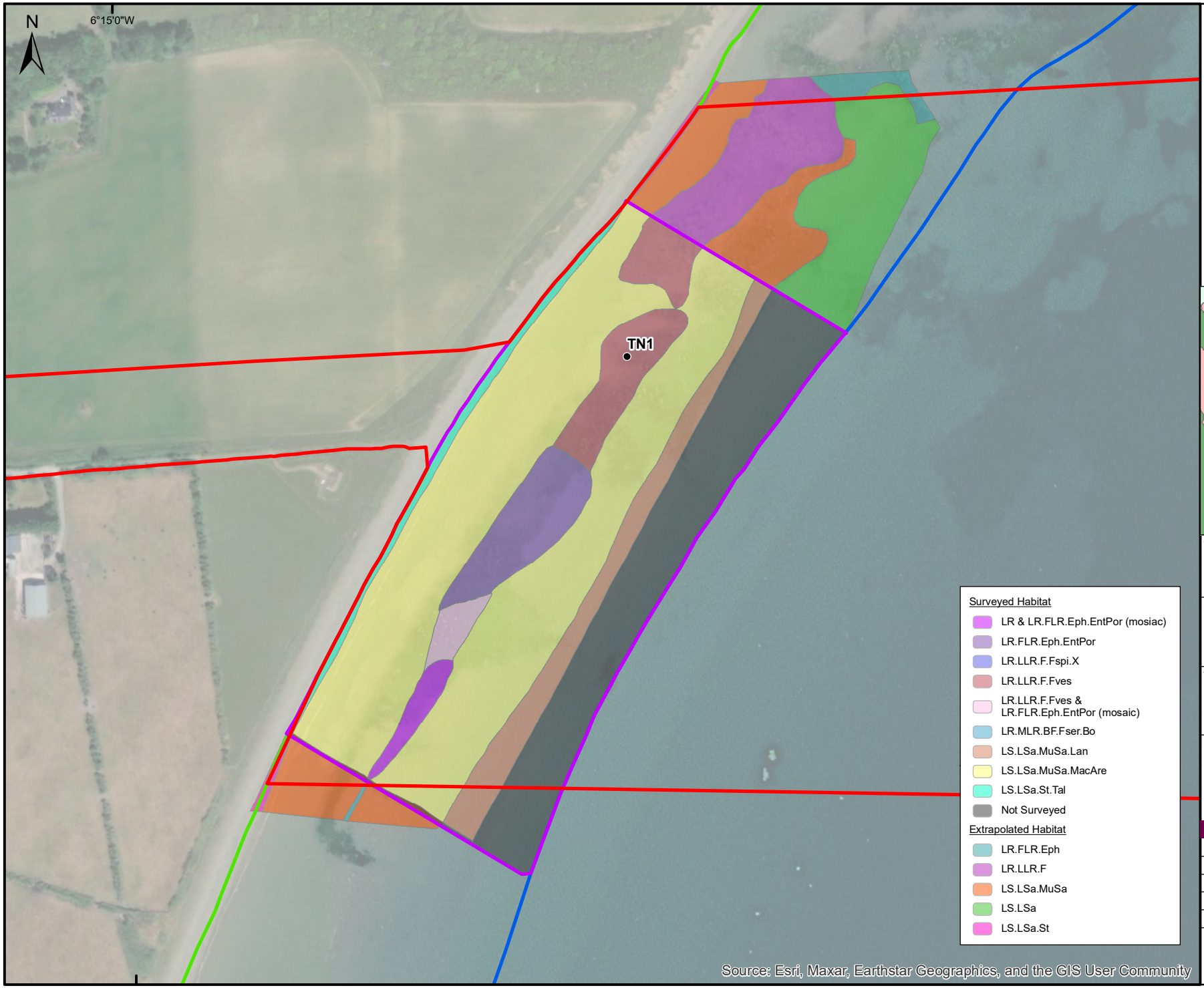
The extrapolated landfall survey area contained a mix of littoral sand, bedrock and cobbles, with green and red seaweed likely to be present (based on the surveyed biotopes; Figure 3-1).

Along the upper shore line, LS.LSa.St Strandline was identified due to the lack of any physical features seen on the aerial and extrapolated from the LS.LSa.Lt.Tal biotope identified in the survey. LS.LSa.MuSa Polychaete/bivalve-dominated muddy sand shores was extrapolated out from the LS.LSa.MuSa.MacAre biotope to the revised offshore cable corridor width, and could be seen below the LS.LSa.St biotope.

Along the mid shore, areas of LR.LLR.F Fucoids on sheltered marine shores, were identified due to the presence of a green colouration on the aerial imagery, with LS.LSa.MuSa located further down the shore. LR.FLR.Eph Ephemeral green or red seaweed communities (freshwater or sand-influenced) could potentially be found at the southern or northern extents of the mid shore.

At lower shore, LS.LSa Littoral sand was identified due to the beige sandy environment and lack of flora or faunal discolouration to the aerial imagery. Furthermore, this biotope can likely be attributed to the ‘not surveyed’ biotope within the surveyed area.

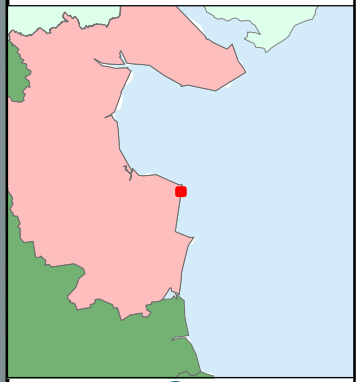
Beyond the low water mark, the subtidal broadscale habitat type is expected to be a mix of infralittoral coarse sediment, sand and mud.



Legend

- TN1 - Damaged *Fucus vesiculosus*
- Application Boundary
- Intertidal Survey Area
- High Water Mark
- Low Water Mark

Data Sources: Client, Ordnance Survey Ireland.



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Project

Oriel Wind Farm Project

Title

Figure 3-1
Landfall Intertidal Survey Habitats

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Table 3-1: Littoral biotopes present at the landfall location (adapted from JNCC, 2015; see Figure 3-1).

Shore Position	Biotope/NVC Code	Biotope Name	Biotope Description
Upper shore	LS.LSa.St*	Strandline	The strandline is the shifting line of decomposing seaweed and debris which is typically left behind on sediment (and some rocky shores) at the upper extreme of the intertidal at each high tide. These ephemeral bands of seaweed often shelter communities of sandhoppers. A fauna of dense juvenile mussels may be found in sheltered firths, attached to algae on shores of pebbles, gravel, sand, mud and shell debris with a strandline of fucoid algae.
	LS.LSa.St.Tal	Talitrids on the upper shore and strand-line	A community of sandhoppers (talitrid amphipods) may occur on any shore where drift lines of decomposing seaweed and other debris accumulate on the strandline. The biotope occurs most frequently on medium and fine sandy shores but may also occur on a wide variety of sediment shores composed of muddy sediment, shingle and mixed substrata, or on rocky shores.
	LR.LLR.F.Fves	*Fucus vesiculosus* on moderately exposed to sheltered mid eulittoral rock	Moderately exposed to sheltered mid eulittoral bedrock and large boulders characterised by a dense canopy of the wrack *Fucus vesiculosus* (Abundant to Superabundant). Beneath the seaweed canopy the rock surface has a sparse covering of the barnacle *Semibalanus balanoides* and the limpet *Patella 9ulgate*. The mussel *Mytilus edulis* is confined to pits and crevices. A variety of winkles including *Littorina littorea* and *Littorina saxatilis* and the whelk *Nucella lapillus* are found beneath the seaweeds, whilst *Littorina obtusata/mariae* graze on the fucoid fronds. The calcareous tube-forming polychaete *Spirorbis spirorbis* may also occur epiphytically on the fronds. In areas of localised shelter, the wrack *Ascophyllum nodosum* may occur, though never at high abundance. Damp cracks and crevices often contain patches of the red seaweed *Mastocarpus stellatus* and even the wrack *Fucus serratus* may be present. The crab C*arcinus maenas* may be present in pools or among the boulders.
Mid shore	LR.LLR.F*	Fucoids on sheltered marine shores	Dense blankets of fucoid seaweeds dominating sheltered to extremely sheltered rocky shores and/or in locally sheltered patches on exposed to moderately exposed rocky shores. Typically, the wrack *Pelvetia canaliculata* (Pel) occurs on the upper shore, with the wrack *Fucus spiralis* (Fspi) below. The middle shore is dominated by vast areas of the wrack Ascophyllum nodosum or the wrack *Fucus vesiculosus* (Asc, Fves) or a mixture of both. The wrack Fucus serratus covers lower shore bedrock and boulders (Fser). Sheltered to very sheltered mixed substrata (pebbles and cobbles overlying muddy sand and gravel) shores can support fucoid communities
	LR.FLR.Eph.EntPor	*Porphyra purpurea* and *Enteromorpha* spp. on sand-scoured mid or lower eulittoral rock	Exposed and moderately exposed mid-shore bedrock and boulders which occur adjacent to areas of sand which significantly affects the rock. As a consequence of sand-abrasion, wracks such as *Fucus vesiculosus* or *Fucus spiralis* are scarce and the community is typically dominated by ephemeral red or green seaweeds, particularly the foliose red seaweed *Porphyra purpurea* and green seaweeds such as *Enteromorpha* spp. Under the blanket of ephemeral seaweeds, the barnacles *Semibalanus balanoides* or *Elminius modestus* and the limpet *Patella 9ulgate* may occur in the less scoured areas, along with the occasional winkles *Littorina littorea* and *Littorina saxatilis*. Few other species are present.

Shore Position	Biotope/NVC Code	Biotope Name	Biotope Description
	LR.FLR.Eph*	Ephemeral green or red seaweed communities (freshwater or sand-influenced)	Ephemeral seaweeds on disturbed littoral rock in the lower to upper shore. Dominant green seaweeds include Ulva intestinalis, *Ulva lactuca* and the red seaweeds *Rhodothamniella floridula* and *Porphyra purpurea*. Winkles such as *Littorina littorea* and *Littorina saxatilis*, the limpet *Patella vulgata* and the barnacles *Semibalanus balanoides* can occur, though usually in low abundance. The crab *Carcinus maenas* can be found where boulders are present, while the barnacle *Austrominius modestus* is usually present on sites subject to variable salinity. On moderately exposed shores, the biotope is Ulva spp. on freshwater-influenced or unstable upper shore rock (Ent) or P. purpurea and/or *Ulva* spp. on sand-scoured mid to lower eulittoral rock (EntPor). Eulittoral mixed substrata subject to variations in salinity and/or siltation characterised by dense blankets of ephemeral green and red seaweeds (EphX), or if the substratum is too mobile or disturbed to support a seaweed community (BLitX). These are biotopes with a low species diversity and the relatively high number of species in the characterising species list are due to a variation in the species composition from site to site, not to high species richness on individual sites.
	LS.LSa.MuSa*	Polychaete/bivalve-dominated muddy sand shores	Muddy sand or fine sand, often occurring as extensive intertidal flats on open coasts and in marine inlets. The sediment generally remains water-saturated during low water. The habitat may be subject to variable salinity conditions in marine inlets. An anoxic layer may be present below 5 cm of the sediment surface, sometimes seen in the worm casts on the surface. The infauna consists of a diverse range of amphipods, polychaetes, bivalves and gastropods.
	LS.Lsa.MuSa.MacAre	*Limecola (Macoma) balthica* and *Arenicola marina* in littoral muddy sand	This biotope is characterised by the lugworm *Arenicola marina* and the Baltic tellin *L. balthica*. The sediment is typically muddy sand or fine sand, often occurring as extensive intertidal flats both on open coasts and in marine inlets. An anoxic layer is usually present within 5 cm (0.5 cm within the survey area) of the sediment surface and is often visible in worm casts. The habitat on site differed slightly from the JNCC description in that *L. balthica* was not recorded and instead the closely related thin tellin *Macomangulus tenuis* was observed via a dig-over of the sediments. The fine sand was relatively clean (low mud content) and generally lacked an anoxic layer; conditions which favour *M. tenuis.*
Lower shore	LS.Lsa.MuSa.MacAre	*Limecola (Macoma) balthica* and *Arenicola marina* in littoral muddy sand	This biotope is characterised by the lugworm *Arenicola marina* and the Baltic tellin *L. balthica*. The sediment is typically muddy sand or fine sand, often occurring as extensive intertidal flats both on open coasts and in marine inlets. An anoxic layer is usually present within 5 cm (0.5 cm within the survey area) of the sediment surface and is often visible in worm casts. The habitat on site differed slightly from the JNCC description in that *L. balthica* was not recorded and instead the closely related thin tellin *Macomangulus tenuis* was observed via a dig-over of the sediments. The fine sand was relatively clean (low mud content) and generally lacked an anoxic layer; conditions which favour *M. tenuis.*
	LS.Lsa.MuSa.Lan	*Lanice conchilega* in littoral sand	This biotope usually occurs on flats of medium fine sand and muddy sand, most often on the lower shore but sometimes also on waterlogged mid shores. The sand may contain a

Shore Position	Biotope/NVC Code	Biotope Name	Biotope Description
			proportion of shell fragments or gravel. This biotope an also occur on the lower part of predominantly rocky or boulder shores, where patches of sand or muddy sand occur between scattered boulders, cobbles and pebbles. Conditions may be tide-swept, and the sediment may be mobile, but the biotope usually occurs in areas sheltered from strong wave action. The sediment supports dense populations of the sand mason *Lanice conchilega*. Other polychaetes present are tolerant of sand scour or mobility of the sediment surface layers and include the polychaetes *Anaitides mucosa, Eumida sanguinea, Nephtys hombergii, Scoloplos armiger, Aricidea minuta, Tharyx* spp. and *Pygospio elegans*. The mud shrimp *Corophium arenarium* and the cockle *Cerastoderma edule* may be abundant. The Baltic tellin *Macoma balthica* may be present. On boulder shores, and where pebbles and cobbles are mixed in with lower shore tide-swept sand with dense *L. conchilega* between the cobbles, the infaunal component is rarely sampled. The infaunal community under these circumstances, provided that the cobbles are not packed very close together, is likely to be similar to that in areas without the coarse material.
	LS.LSa*	Littoral	Shores comprising clean sands (coarse, medium or fine-grained) and muddy sands with up to 25% silt and clay fraction. Shells and stones may occasionally be present on the surface. The sand may be duned or rippled as a result of wave action or tidal currents. Littoral sands exhibit varying degrees of drying at low tide depending on the steepness of the shore, the sediment grade and the height on the shore. The more mobile sand shores are relatively impoverished (MoSa), with more species-rich communities of amphipods, polychaetes and, on the lower shore, bivalves developing with increasing stability in finer sand habitats (FiSa). Muddy sands (MuSa), the most stable within this habitat complex, contain the highest proportion of bivalves.

* Habitat has been extrapolated.

4 HABITATS OF CONSERVATION IMPORTANCE

The following habitat of conservation value has been considered in the context of the intertidal biotopes identified at the landfall location.

Intertidal Sand and Muddy Sand

The intertidal sand and muddy sand habitat as defined by the LS.LSa.MuSa.MacAre biotope on Figure 3-1 was recorded at the landfall location. This habitat as *"mudflats and sandflats not covered by seawater at low tide"* is offered protection under the EU Habitats Directive, however the landfall is not located within the Dundalk Bay SAC. No other intertidal habitats covered by the EU Habitats Directive were noted during the survey. Furthermore, where biotopes were extrapolated, the LS.LSA.MuSa identified along the upper shore could be categorised, based on the precautionary principle, as an extension of the LS.LSa.MuSa.MacAre.

The whelk Nucella lapillus was recorded within the landfall location and has been considered within the LR.LLR.F.Fves biotope.

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APPENDIX A: PLATES

Plate 1: LR and LR.FLR.Eph.EntPor Barren rock patches of *Enteromorpha intestinalis* and *Porphyra umbilicalis* at the landfall.

Plate 2: LR.FLR.Eph.EntPor at the landfall.

Plate 3: Soft sediments at LS.LSa.MuSa.MacAre and LS.LSa.MuSa.Lan interface at the landfall.