

5 TERRESTRIAL ECOLOGY

5.1 Introduction

This chapter outlines the terrestrial ecology and nature conservation interests in the vicinity of the proposed Carlingford Ferry. The focus of this chapter is on terrestrial habitats, higher plants, mammals and the environmental protection that exists in the study area for these groups. Marine ecology, marine mammals and fisheries are dealt with separately in Chapter 7 (Marine Ecology & Fisheries). Birds are also excluded here and are dealt with separately in Chapter 6 (Ornithology). Other groups such as lower plants, fungi and reptiles are discussed within this chapter where relevant.

The Chapter should be read with the following Figures and Appendices:

- Figure 5.1 Proposed Development Location;
- Figure 5.2 Greencastle Habitat Map;
- Figure 5.3 Greenore Habitat Map;
- Appendix 5.1 Natura Impact Statement/Habitat Regulations Assessment;
- Appendix 5.2 Bat Survey Report;
- Appendix 5.3 Designated Site Information;
- Appendix 5.4 Photographic plates.

This chapter should be read with particular reference to Chapter 3 (Project Description), Chapter 7 and Chapter 9 (Coastal Processes). Other Chapters are referred to where appropriate.

5.1.1 Study Area

Carlingford Lough is a shallow sea lough, which forms part of the border between Northern Ireland and the Republic of Ireland (Figure 5.1). The inner lough (Carlingford to Warrenpoint) is dominated by shallow waters and underlying muddy sand beds, with large areas of intertidal mud and sand flats exposed at low tide. The outer mouth of the lough (Greenore to Cranfield) presents deeper waters with a navigable channel, and an underlying mosaic of boulders, cobbles, pebbles and gravels, forming small scattered islands and reefs. The lough is of international and national importance for overwintering, passage and breeding seabirds, waders and waterfowl, which feed, roost and nest on the loughs intertidal flats and islands.

The study area extends across the northern and southern shores of Carlingford Lough incorporating the proposed Greenore terminal in County Louth and the Greencastle terminal in County Down (Figure 5.1). The study area also includes the waters and islands between the two footprints and the shorelines either side.

5.1.2 Chapter Scope

5.1.2.1 Scope of Ecological Surveys

Following consultation with Northern Ireland Environment Agency (NIEA) and National Parks and Wildlife Service (NPWS) (see Chapter 2 Scoping and Consultation), the following terrestrial ecological surveys were undertaken within the study area:

- Extended Phase 1 Habitat Survey;
- Badger Survey;
- Otter Survey;
- Bat Survey.

5.1.2.2 Appropriate Assessment (Habitats Regulations Assessment)

Republic of Ireland

European Directive 2009/147/EC on the Conservation of Wild Birds (The Birds Directive) and Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna (The Habitats Directive), together form the overarching nature conservation legislation in force on the island of Ireland today. Under these Directives the most important sites for biodiversity are protected through designation as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), under The Habitats Directive and The Birds Directive respectively. SACs and SPAs are known as Natura 2000 sites, which are of European-wide importance. Together they form a network of nature conservation areas throughout European Member States, known as the Natura 2000 Network.

The Habitats Directive was initially transposed into Irish Law in 1997 by the European Communities (Natural Habitats) Regulations, 1997 (as amended). In 2011, The European Communities (Birds and Natural Habitats) Regulations, 2011 consolidated the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats (Control of Recreational Activities) Regulations, 2010.

These regulations provide a mechanism for competent authorities to consider the possible implications of any plan or project on the Natura 2000 site network, before any decision is made to allow a plan or project to proceed. This consideration is known as an Appropriate Assessment (AA), which may be defined as:

"a focused and detailed impact assessment of the implications of a plan or project, alone and in combination with other plans and projects, on the integrity of a Natura 2000 site in view of its conservation objectives".

AA is required to be undertaken on the basis of scientific evidence, which is informed by information on the project and on the site and any analysis of potential effects on the site. This is then presented in a Natura Impact Statement (NIS) as required under Part XAB of the Planning and Development Act, 2000 as amended by section 57 of the Planning and Development (Amendment) Act, 2010.

The proposed development impinges upon two Natura 2000 sites on the southern Carlingford Lough shoreline: Carlingford Lough SPA (Site Code: IE0004078) and Carlingford Shore SAC (Site Code: IE0002306). The proposal also impinges on the Carlingford Lough pNHA (Site Code: NH452).

Northern Ireland

The Birds and Habitats Directives are transposed into Northern Irish legislation through The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) (as amended), referred to as The Habitats Regulations. The Habitats Regulations place a statutory duty on all competent authorities to act in accordance with the Directives and require a Habitats Regulations Assessment (HRA), previously referred to as an AA, to be carried out on any proposed plan or project, which has the potential to impact on a Natura 2000 site.

The proposed development impinges upon on Natura site on the northern shore of Carlingford Lough: Carlingford Lough SPA (Site Code: UK9020161). The proposal also impinges on the Carlingford Lough Ramsar Site (UK12004).

As this Environmental Statement / Environmental Impact Statement (ES/EIS) is being submitted for planning simultaneously in Ireland and Northern Ireland, the legal term of a Natura Impact Statement (or NIS) as defined in Irish planning law is used for the Habitats Regulations Assessment which has been undertaken. An NIS has been prepared and is provided in Appendix 5.1 to assist in the completion of AA/HRA.

5.1.3 Project Description

A full description of the proposed development is provided in Chapter 3, along with drawings which accompany that chapter. This information has been fully considered in preparing the terrestrial ecological impact assessment and NIS.

5.2 Methodology

5.2.1 Key Sources

A desktop review was carried out to identify features of ecological importance within the study area and surrounding region. From a biodiversity perspective, the proposed development area and a surrounding 2km buffer zone was included in a trawl to collate relevant environmental data and anecdotal information to assist with the ecological assessment and evaluation. Reference was made to the following key legislation and documents:

European

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (The Habitats Directive);
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (codified version of Directive 79/409/EEC as amended) (The Birds Directive);

- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (The Water Framework Directive);
- Council Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage (The Environmental Liability Directive);
- Directive 2006/44/EC of the European Parliament and of the Council of 6 September 2006 on the quality of fresh waters needing protection or improvement in order to support fish life (The Fish Directive (consolidated)).

All-Ireland

- Ireland Red List No. 1: Water beetles (Foster *et al.*, 2009).

Republic of Ireland

- The Wildlife Act 1976 as amended by the Wildlife Act 1976 (Protection of Wild Animals) Regulations, 1980, the Wildlife (Amendment) Act 2000 and the Wildlife (Amendment) Act 2010 (The Wildlife Act);
- European Communities (Conservation of Wild Birds) Regulations 1985 (S.I. 291/1985) as amended by S.I. 31/1995;
- European Communities (Natural Habitats) Regulations, S.I. 94/1997 as amended by S.I. 233/1998 & S.I. 378/2005 (The Habitats Regulations);
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011);
- The Flora (Protection) Order, 1999 (S.I. No. 94/1999);
- The Planning & Development Acts, 2000-2010;
- National Biodiversity Plan, 2002;
- Louth County Development Plan 2009-2015;
- Threat Response Plan: Otter 2009-2011 (DEHLG, 2009).

Northern Ireland

- The Wildlife (Northern Ireland) Order 1985 (S.I. 1985/171 (N.I. 2)) as amended by The Wildlife (Amendment) (Northern Ireland) Order 1995 (S.I. 1995 No. 761 (N.I. 6)) (The Wildlife Order);
- The Nature Conservation and Amenity Lands (Northern Ireland) Order 1985 (S.I. 1985/170) (The Nature Conservation and Amenity Lands Order);
- The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (S.R. 1995 No. 380) as amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2004 (S.R. 2004 No. 435), The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2007 (S.R. 2007 No. 345) and The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2009 (S.R. 2009 No. 8) (The Habitat Regulations);
- Northern Ireland Biodiversity Strategy (EHS, 2002);
- The Environment (Northern Ireland) Order 2002 (S.I. 2002/3153 (N.I. 7)) (The Environment Order);
- The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003 (S.R. 2003 No. 544);
- The Wildlife and Natural Environment (Northern Ireland) Act 2011 (The WANE Act); and
- Banbridge/Newry and Mourne Area Plan 2015.

The following Databases were consulted to retrieve ecological data:

- National Parks & Wildlife Service (NPWS) Maps & Data (<http://www.npws.ie/en/MapsData/>);
- Northern Ireland Environment Agency (NIEA) Maps;
- National Biodiversity Data Centre (NBDC) Records & Mapping (<http://www.biodiversityireland.ie/>);
- National Biodiversity Network (NBN) database (<http://data.nbn.org.uk/>);
- Flora of Northern Ireland database (www.habitas.org.uk/flora).

The following websites were also consulted:

- Botanical Society of the British Isles (BSBI) (<http://www.bsbi.org.uk/>);
- Joint Nature Conservancy Committee (JNCC) (<http://www.jncc.gov.uk/>);
- Invasive Species Northern Ireland (<http://www.habitas.org.uk/invasive/>);
- Invasive Species Ireland (<http://www.invasivespeciesireland.com/>);
- Institute of Ecology & Environmental Management (IEEM) (<http://www.ieem.net/>).

There are a number of previous reports and studies which have examined the ecological interests within the vicinity of the proposed development, and have been made available for the purpose of this chapter. These include:

- Greenore Port Development draft Environmental Impact Statement (Unpublished, 2009);

- Louth County Council (2012) Narrow Water Bridge - Environmental Impact Statement/Environmental Statement;
- Louth County Council (2012) Narrow Water Bridge - Natura Impact Statement.

5.2.2 Consultation

A full list of consultees contacted during the Environmental Impact Assessment (EIA) is provided in Chapter 2 of this ES/EIS.

Formal consultations were undertaken with the following organisations, which were felt to be of particular relevance to terrestrial ecology and nature conservation:

- Northern Ireland Environment Agency (NIEA);
- National Parks and Wildlife Service (NPWS);
- Northern Ireland Bat Group (NIBG);
- Bat Conservation Ireland (BCI);
- Department of Environment, Heritage & Local Government (DEHLG).

5.2.3 Field Survey Methodology

5.2.3.1 Extended Phase 1 Habitat Survey

The proposed Greenore and Greencastle terminals were visited on several occasions over an extended survey window between October 2011 and September 2012 in order to carry out an Extended Phase 1 Habitat Survey. The survey methodology was a combined approach using the UK industry standard Joint Nature Conservation Committee (JNCC) Phase 1 methodology (JNCC, 2010), and the Heritage Council's *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.*, 2011). Habitat assessment categories used were consistent with those outlined in *A Guide to Habitats in Ireland* (Fossitt, 2000) and JNCC *Handbook for Phase 1 Habitat Survey – a technique for environmental audit* (JNCC, 2010). Reference was also made to IEEM Technical Guidance Series *Guidelines for Preliminary Ecological Appraisal* (JNCC, 2012). All habitats encountered were recorded and mapped and an intensive search was undertaken for protected and invasive species.

The Extended Phase 1 Habitat Survey is a multipurpose survey, which aims to identify any or all of the following several ecological features:

Plant habitats

- Dominant plant species;
- Protected, priority, and rare plant species.

Invasive Flora & Fauna species

- These species “cause considerable risk to biodiversity” via predation, competition, or interbreeding with native species, or are general pest species;
- Schedule 9 Part 2 of The Wildlife Order, lists non-native plant species established in the wild in Northern Ireland and states “if any person releases or allows to escape into the wild any [listed plants]...he shall be guilty of an offence”;
- Regulation 49 and 50 of The Birds and Natural Habitats Regulations places restrictions on the introduction of any species listed in the Third Schedule of the Regulations;
- Other invasive and potentially economically damaging flora and fauna species not subject to legal penalties for release into the wild are listed on the Invasive Species Ireland Website.

Invertebrates

- Protected and rare invertebrates listed on Schedule 5 of The Wildlife Order;
- Protected and rare invertebrates listed on the Third Schedule of The Birds and Natural Habitats Regulations;
- Invasive invertebrates (see above).

Protected Amphibians: Potential Smooth Newt *Lisotriton vulgaris* breeding habitat

- Smooth newts are fully protected in Northern Ireland under Schedules 5 to 7 and Articles 10 to 13 and 28 of The Wildlife Order and are afforded additional protection under Annex III of the Habitats Directive;
- Smooth newts are protected in the Republic of Ireland under Section 23 of The Wildlife Act;

- Newts are found in a diversity of habitats including uplands, farmland and urban areas, but are most likely to be found in small to medium sized ponds (Inns, 2009). The breeding habitat varies from large to small ponds to densely weeded ditches. Newts are more likely to be found in ponds (non-linear) than in ditches (linear) (O'Neill *et al.*, 2004), and show a strong preference for fish-free waterbodies (Inns, 2009). In 2004 a Quercus survey of newts in Northern Ireland concluded that it remains difficult to predict the likelihood of newt presence based on habitat, and highlighted that there is a clear requirement for surveys of sites proposed for development (O'Neill *et al.*, 2004). Notes were made of potential breeding waterbodies recorded within the development footprints and immediate surrounds along with the presence of frogs/tadpoles, fish, and predatory birds.

Protected Reptiles: Potential Common Lizard breeding habitat

- Common lizards are protected in Northern Ireland under Schedules 5 to 7 and Articles 10 to 13 and 28 of the Wildlife Order;
- Common lizards are protected in the Republic of Ireland under Section 23 of The Wildlife Act;
- Live sightings of common lizard are very rarely observed outside of formal survey. Field signs are generally limited to the rare discoveries of shed skins. Nevertheless, care was made to search for lizards where appropriate habitat was identified. Common lizard habitat is varied, and can include a range of dry habitats including open woods, heaths and grassland. Potential refuges (e.g. sheets of plastic or metal) within the survey area were overturned to look for sheltering individuals.

Seasonality of Survey

Seasonality is a key issue in ecological surveys as the timing of survey may dictate whether certain groups are under-recorded or missed altogether. It is impossible to survey for all organisms in one survey visit due to the staggered nature of the life histories of different species. For example, different butterfly species are in flight and different flower species bloom at different times throughout the year. The extended survey timeframe and series of site visits adopted here, facilitated the capture of data from optimum survey windows for many species of flowering plants and wildlife.

5.2.3.2 Badger Survey

During survey, a careful examination of all habitat features was made for signs of badger activity. Searches for signs of activity were undertaken in accordance with relevant guidance documents including *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA, 2009), *Badger Survey – Specific Requirements* (NIEA, 2009) and with reference to *Badgers & Development* (EHS, 2004). Habitat features of potential interest to badger recorded during the habitat survey were revisited and searched for setts and field signs indicating badger activity in the locale of the proposal, particularly in areas of agricultural use with field boundaries and where land was more freely draining.

Field signs are characteristic and sometimes quite obvious and include tufts of hair caught on barbed wire fences, conspicuous badger paths, footprints, small excavated pits or latrines in which droppings are deposited, scratch marks on trees, and snuffle holes, which are small scrapes where badgers have searched for insects and plant tubers (NIEA, 2009).

5.2.3.3 Otter Survey

During survey, a careful search of all potentially suitable otter habitat, including all shoreline habitats and any watercourses within 100m of the project footprint was made for field signs indicative of otter activity. Guidance was sought from *Otter Survey – Specific Requirements* (NIEA, 2011) and *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA, 2009). Field signs indicative of otter presence include:

- Spraints;
- Food remains;
- Rolling places;
- Slides down river banks;
- Footprints or paths and;
- Shelters (either holts or couches).

5.2.3.4 Bat Survey

A bat survey was undertaken over the months of June, September and December 2012 at the proposed Greenore and Greencastle development footprints and along the Greencastle Pier Road. A full copy of the commissioned bat report, which includes a trawl of existing bat records, is provided in Appendix 5.2.

The aims of the survey were:

- To describe any evidence of bats in the study area;
- To describe bat usage of the site;
- To assess the potential impacts of a change in use of the study area;
- To suggest mitigation measures if appropriate.

Day Survey

A day survey for bats and signs of bat activity was carried out on the 4th, 12th, and 24th of June and 21st December 2012 at Greenore and Greencastle, by walking along the Greencastle Pier Road and examining the exterior of buildings close to the proposed terminals.

Night Surveys

Night bat detector surveys were carried out on the 4th, 12th and 24th June and the 9th of September at Greenore and Greencastle 20-30 minutes before sunset. A predawn survey was also undertaken on 25th June, one hour before sunrise.

Surveys were carried out using a Pettersson D240X time expansion bat detector and digital recording equipment for later analysis using BatSound4 (Pettersson) on a laptop computer running Windows 7 Ultimate.

5.2.4 Impact Assessment

In the assessment stage, impact assessment was undertaken in accordance with the Institute of Ecology and Environmental Management (IEEM) *Guidelines for Ecological Impact Assessment in the United Kingdom* (2011), and also using experience of 'best practice' in the ecological assessment of similar developments. Ecological features are firstly valued (Table 5.1). The magnitude of an impact is assessed using criteria set out in Table 5.2. The impact significance (Table 5.3) is a combined function of the ecological value of the affected feature and the magnitude of the impact. It is important to note that there is no universally recognised definition of what constitutes significance. A combination of data, experience and the precautionary principle were therefore employed to select the appropriate ecological value, and magnitude categories.

The ecological value of a feature is generally relatively easy to categorise. However, the magnitude of potential impact may be difficult (or in certain cases impossible) to categorise. The following parameters were therefore considered:

- Physical nature;
- Type (+ve/-ve, Direct/Indirect);
- Range of species & habitats affected;
- Population sizes of species & habitats affected;
- Geographic scale;
- Duration;
- Cumulative effects.

Once identified, and characterised for magnitude, each potential impact was assigned a likelihood of occurrence (after mitigation):

- Certain (100%);
- Near-certain (95-100%);
- Probable (50-95%);
- Unlikely (5-50%);
- Extremely Unlikely (0-5%).

Table 5.1: Ecological Value of Features

Value	Criteria	Examples
Very high	High importance and rarity, international scale and limited potential for substitution	Internationally designated sites
High	High importance and rarity, national scale, or regional scale with limited potential for substitution	Nationally designated sites. Regionally important sites with limited potential for substitution.
Medium	High or medium importance and rarity, local or regional scale, and limited potential for substitution	Regionally important sites with potential for substitution. Locally designated sites.
Low	Low or medium importance and rarity, local scale	Undesignated sites of some local biodiversity and earth heritage interest
Negligible	Very low importance and rarity, local scale	Other sites with little or no local biodiversity and earth heritage interest

Potential impacts described in later sections assume no specific mitigation measures. Specific mitigation measures are therefore proposed where required to neutralise impacts identified as likely.

Table 5.2: Criteria for Determining the Magnitude of Potential Ecological Impact

Magnitude	Criteria
Major negative	The proposal (either on its own or with other proposals) may adversely affect the integrity of the site, in terms of coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and / or the population levels of species of interest.
Intermediate negative	The site's integrity will not be adversely affected, but the effect on the site is likely to be significant in terms of its ecological objectives. If, in the light of full information, it cannot be clearly demonstrated that the proposal will not have an adverse effect on integrity, then the impact should be assessed as major negative.
Minor negative	Neither of the above applies, but some minor negative impact is evident. (In case of Natura 2000 sites a further appropriate assessment may be necessary if detailed plans are not yet available).
Neutral	No observable impact in either direction.
Positive	Impacts which provide a net gain for wildlife overall.

Table 5.3: Estimating the Overall Ecological Appraisal Category

Magnitude of Potential Impact	Ecological value of sites damaged or improved				
	Very high	High	Medium	Low	Negligible
Major negative	Very large adverse	Very large adverse	Moderate adverse	Slight adverse	Neutral
Intermediate negative	Large adverse	Large adverse	Moderate adverse	Slight adverse	Neutral
Minor negative	Slight adverse	Slight adverse	Slight adverse	Slight adverse	Neutral
Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Positive	Large beneficial	Large beneficial	Moderate beneficial	Slight beneficial	Neutral

5.3 Baseline Assessment

5.2.5 Consultation

A full list of consultees contracted as part of EIA and the responses received is presented in Chapter 2 of this ES/EIS.

The responses of authorities of particular relevance to terrestrial ecology and nature conservation include:

- Northern Ireland Environment Agency (NIEA);
- National Parks and Wildlife Service (NPWS).

5.2.6 Sites Designated for Nature Conservation in Northern Ireland

This section should be read with reference to Figure 5.1.

The proposed Greencastle terminal on the northern shore of Carlingford Lough is located within three statutory sites designated for nature conservation in Northern Ireland:

- Carlingford Lough Special Protection Area (Site Code: UK9020161);
- Carlingford Lough Area of Special Scientific Interest (Site Code: ASSI 103);
- Carlingford Lough Ramsar Site (Site Code: UK12004).

All site citation documents, Natura Standard Data Forms and conservation objectives are provided in Appendix 5.3.

5.3.4.1 Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)

SPAs along with Ramsar Sites are considered in Chapter 6. There are no UK designated SACs located within 2km of the Greencastle Terminal.

5.2.6.1 Areas of Special Scientific Interest (ASSIs)

Other pertinent National Legislation in relation to designated sites and protected species in Northern Ireland includes The Wildlife Order and The WANE Act 2011 (hereafter jointly referred to as The Wildlife Order), The Nature Conservation and Amenity Lands (Northern Ireland) Order 1985 and The Environment (Northern Ireland) Order 2002. ASSIs are designated under The Wildlife Order and their protection strengthened under The Environment (Northern Ireland) Order 2002.

Carlingford Lough ASSI (Site Code: ASSI 103)

Carlingford Lough has been designated an ASSI by virtue of its flora, fauna and geological interests. The limestones of Carlingford Lough were deposited in a shallow sea basin during the Carboniferous period 339 million years ago. They contain numerous fossils, such as brachiopods (*Delepinea carinata*) and solitary corals (*Siphonodendron martin*). Moraines and deposited sediments provide evidence of the movement of ice sheets and glaciers and provide a vital link in understanding the Carboniferous basin evolution in north-east Ireland.

The site supports a range of unusual and rich littoral communities, including sheltered sands, muddy sands, muds and boulder shores. The lower beach at Cranfield Point (c.2.5km to the east of the Greencastle footprint), holds the highest intertidal densities of the sea potato (*Echinocardium cordatum*) in Northern Ireland. Mill Bay (south-eastern extent, located c.600m west of the Greencastle footprint) supports a unique community association in Northern Ireland, with a boulder based fucoid zonation superimposed on a wide mud and sand dominated intertidal sedimentary flat. Examples of three out of the four major intertidal sedimentary communities found in Northern Ireland are present in Mill Bay: 'moderate/sheltered sand community containing the thin tellin bivalve *Tellina tenuis*', 'muddy sands supporting common cockle *Cerastoderma edule*, the Baltic tellin *Macoma balthica* and a high polychaete worm diversity' and 'a muddy community consisting of laver spire shell *Hydrobia ulvae*, the peppery furrow shell *Scrobicularia plana* and sand gaper *Mya arenaria*.

The botanical interest of the ASSI is also centred within Mill Bay and related to the saltmarsh vegetation located along the foreshore and to localised but frequent beds of dwarf eelgrass *Zostera noltii*. Large areas of saltmarsh are rare and under threat in Northern Ireland as a result of grazing pressure, erosion or commercial development. Mill Bay supports the largest remaining intact block of saltmarsh in Northern Ireland.

The ASSI is of significant interest for wintering birds including pale-bellied Brent geese *Branta bernicla hrota*, great-crested grebes *Podiceps cristatus*, shelduck *Tadorna tadorna*, scaup *Aythya marila*, redshank *Tringa totanus* and oystercatchers *Haematopus ostralegus*. The site is also of significant interest for breeding terns, with three species of national significance including sandwich tern *Sterna sandvicensis*, common tern *Sterna hirundo* and Arctic tern *Sterna paradisaea*. Carlingford Lough is also an internationally important site for roseate tern *Sterna dougallii*.

5.2.7 Non-Designated Sites for Nature Conservation in Northern Ireland

Sites of Local Nature Conservation Interest (SLNCIs) in Northern Ireland are local designations within Northern Ireland, and derive from the Regional Development Strategy for Northern Ireland 2025 under SPG-Env 1.2. They are designated in council area plans and development plans, with the aim to manage suitable sites, particularly in urban and urban fringe situations, as Local Nature Reserves, where habitat creation and conservation is combined with public access and environmental education. The relevant Area Plan for this study area is the Banbridge/Newry and Mourne Area Plan 2015.

There are no SLNCIs located within 2km of the Greencastle terminal. The nearest sites include:

- Cranfield Moraine;
- White Water River;
- Western Mourne Habitat & Geology;
- Mourne Park.

5.2.8 Designated Sites for Nature Conservation in the Republic of Ireland

This section should be read with reference to Figure 5.1.

The proposed Greenore terminal on the southern shore of Carlingford Lough is located within two statutory sites designated for nature conservation in the Republic of Ireland:

- Carlingford Shore Special Area of Conservation (Site Code: IE002306) and;
- Carlingford Lough proposed Natural Heritage Area (Site Code: NH452).

The proposed Greenore terminal is also located adjacent to The Carlingford Lough SPA, which is considered in Chapter 6. All site citation documents, Natura Standard Data Forms and conservation objectives are provided in Appendix 5.3.

5.2.8.1 Special Areas of Conservation (SACs)

Carlingford Shore SAC (Site Code: IE0002306)

The Carlingford Shore SAC stretches for c.15km along the shoreline to the Low Water Mark from Omeath to Ballagan Point. The underlying rock within the SAC is carboniferous limestone, which outcrops over sections

in the form of bedrock shore or reefs. Granite boulders are occasionally found. Intertidal mudflats and sand/gravel banks also occur.

The site qualifies for designation by supporting two habitats listed on Annex I of The Habitats Directive namely:

- *Perennial vegetation of stony banks (1220)* and;
- *Annual vegetation of drift lines (1210)*.

The presence of the Irish Red Data Book Species oyster plant (*Mertensia maritima*) within the SAC adds to the ecological interest. This species is listed on the Standard Data Form for the site, but it is not a feature of the designation. Oyster plant is protected under the Flora Protection Order.

Relatively extensive expanses of intertidal sand/mud flats occur particularly between Greenore Point and Carlingford Harbour, which correspond to Annex 1 *Habitat Mudflats and sandflats not covered by seawater at low tide (1140)*. The flats in this area are broken by outcropping carboniferous reeds and some shingle deposits and saltmarsh on the higher, drier rocks. These flats are very important feeding grounds for wildfowl and waders. Patches of green algae (filamentous, *Ulva* spp. and *Enteromorpha* spp.) and lugworm casts occur in places, while fucoid seaweeds are common on the more stone flats. Abundant barnacle shells and lichens are also present on many of the rocks. Eelgrass (*Zostera* spp.) beds, which correspond to Annex 1 *Habitat Atlantic salt meadows (1330)* are found on the intertidal flats, the main food source for the internationally importance population of overwintering pale-bellied Brent geese at the site. Small tufts of cord-grass (*Spartina* spp.) are also present.

Grey seals (*Halichoerus grypus*) also use the site. Approximately 25-30 haul out on reefs between Greenore and Carlingford. The grey seal is listed in Annex II of The Habitats Directive.

5.2.8.2 Natural Heritage Areas (NHAs)

Carlingford Lough is a proposed NHA (NH452). The boundary similar to that of the Carlingford Shore SAC but extends seawards to the limits of Irish territorial waters. No information has yet been published for the pNHA. The proposed development is partially located within the pNHA.

5.2.9 Protected Species (Existing Records)

The National Biodiversity Network (NBN) and National Biodiversity Data Centre (NBDC) websites were trawled to search for any protected flora or fauna species present within the vicinity of the project footprint.

Protected species included those listed on:

- Annex II of Habitats Directive;
- Schedules of The Wildlife Order;
- Schedules of The Wildlife Acts;
- The First Schedule of the Birds and Natural Habitats Regulations (all species listed in Annex IV and V of The Habitats Directive) and;
- The Flora Protection Order 1999.

The 10km Grid Square J21, which incorporates Greenore and Greencastle was chosen for the search area. Table 5.4 presents protected species identified within J21.

Table 5.4: Protected species recorded in J21 by NBN and NBDC databases

Species	Conservation Status
Badger <i>Meles meles</i>	WA, WO
Common Frog <i>Rana temporaria</i>	WA, B&NH
Common Seal <i>Phoca vitulina</i>	Annex II, WA
Eurasian Otter <i>Lutra Lutra</i>	Annex II, WO, B&NH
Grey Seal <i>Halichoerus grypus</i>	Annex II, WA
Pine Marten <i>Martes martes</i>	WA, WO, B&NH
Red Squirrel <i>Sciurus vulgaris</i>	WO, WA, B&NH
Small Cudweed <i>Filago minima</i>	FPO
Key to Table 5.4	
WO - The Wildlife Order	

WA - The Wildlife Acts
 B&NH - The Birds and Natural Habitat Regulations;
 Annex II - Annex II of The Habitats Directive
 FPO - The Flora Protection Order

5.2.10 Extended Phase 1 Habitat Survey Results

This section should be read with reference to Figures 5.2 and 5.3 and Photographic Plates presented in Appendix 5.4. Only terrestrial habitats above the Mean High Water Mark (MHWM) are detailed here. Intertidal, sub-tidal and marine habitats below the MHWM are detailed in Chapter 7.

5.2.10.1 Greencastle and Greencastle Pier Road

Table 5.5 lists the diversity of habitats found within the Greencastle and Greencastle Pier Road survey area and their classification according to the JNCC Phase 1 Habitat Methodology (2003). No protected or invasive flora was found within the Greencastle footprint.

Habitat Descriptions

Improved grassland (B6)

The proposed Greencastle terminal will largely be located within an improved grassland field, bounded by a derelict stone wall and defunct hedgerows (Plate 5A). Improved grasslands are those meadows and pastures, which have been heavily modified by intensive grazing, drainage and the application of herbicides and fertilisers. As a consequence they have lost much of the forb diversity of an unimproved sward.

This habitat is characterised by a high proportion of agricultural grasses (e.g. *Lolium perenne*, *Agrostis capillaris*, *Dactylis glomerata*, *Holcus lanatus*) and the presence of clovers (*Trifolium* spp.). Docks (*Rumex* spp.), daisy (*Bellis perennis*), buttercups (*Ranunculus* spp.) also typical of improved swards were present along with ribwort plantain *Plantago lanceolata*. Common nettle (*Urtica dioica*) and thistles (*Cirsium* spp.) present indicated localised nutrient enrichment by grazing animals.

Left ungrazed and untreated improved fields may develop a richer sward diversity, as species within the soils seedbank establish and seeds from adjacent habitats blow in. Floristically poor improved pastures are of low ecological value, but often provide valuable feeding areas for mammals, invertebrates and birds.

Shingle/gravel above high-tide mark (H3)

Shingle is the term applied to sediments with particle sizes larger in diameter than sand (>2mm) but smaller than boulders (<200m). A predominant particle size of over 2mm separates shingle from sand (King, 1972).

Above the mean high water mark the Greencastle shoreline comprises a narrow band of shingle, which merges into improved grassland at the site of the proposed car parking and ticket office facilities (Plates 5B-G). The shingle at Greencastle can be described as fringing or pocket shingle, where a narrow strip of shingle shore is in contact with the land at the top of the beach (Doody & Randall, 2003). The shingle here is interspersed with varying amounts of sand and is largely unvegetated. Regular inundation up to the top of the beach and human disturbance is likely preventing any significant colonisation.

The Greencastle shingle is often smothered by varying amounts of drift seaweeds and deposits of garden waste, which often spill over the top of the beach (Plates B-G). Sea sandwort (*Honckenya peploides*) and sea beet (*Beta vulgaris*) were recorded growing amongst the shingle at Greencastle, but were not recorded growing directly on the shingle within the proposed development footprint during visits to the site in 2012. Sea sandwort was noted some distance (c.200m) to the east of the proposed footprint. The narrow interface between the shingle and improved grassland showed a more significant colonisation, supporting a mixture of rank grasses and ruderal species growing on a sandy soil. Species noted included Yorkshire fog *Holcus lanatus* and bent grasses (*Agrostis* spp.), sea beet, common ragwort (*Senecio jacobaea*), sea radish (*Raphanus raphanistrum* subsp. *maritimus*) and tree mallow (*Lavatera arborea*).

Vegetated shingle beyond the mean high water mark corresponds to Annex 1 Habitat *Perennial vegetation of stony banks* [1220] (Box 5.1). As detailed above sea beet and sea sandwort were the only species recorded growing amongst the shingle at Greencastle but not directly within the project footprint. Significant colonisation was noted between the shingle and improved grassland where rank grasses, sea beet and tree mallow dominated a sandy soil substrate (<2mm in diameter). This does not correspond to the Annex 1 type (Box 5.1).

Strandline Vegetation (H5)

The shingle along the mean high water mark at Greencastle supports a regular band of drift line seaweeds (unmapped), the width and depth varying throughout the year. The drift line vegetation is sparse within the vicinity of the footprint and limited to sea sandwort and sea beet growing amongst interspersed sands to the southeast of the proposed development (Plates C). Coastal squeeze, the narrowness and regular disturbance of the shingle by tidal inundation is likely inhibiting colonisation.

Vegetated strandlines correspond to Annex 1 Habitat *Annual vegetation of driftlines* [1210] (Box 5.2). However having considered the varying presence of tidal litter, it is not considered that the habitat recorded within the proposed Greencastle development footprint corresponds to this type or associated NVC types.

Within the UK and Ireland, this Annex I type is often difficult to classify because it is highly variable between sites and from year to year at the same site. Fringing shingle beaches with annual drift-line vegetation may therefore exist in one location in one year but not another. Areas where the habitat persists are rare and the presence of a sub-ordinate species (e.g. sea sandwort and sea beat) does not necessarily classify it as the Annex I habitat.

Amenity grassland (J2.1)

Private gardens of dwellings adjacent to the Greencastle footprint were included here. The sward composition of amenity grasslands varies with the degree of mowing and the application of sward/turf seed mixtures. Small areas of tarmac/flagstones are often interspersed. Permission was not granted to survey private lands outside the development footprint. No land take is proposed within this habitat type.

Defunct hedge (J2.2)

Defunct ivy, hawthorn, gorse and bramble hedgerows are also a prominent feature along the Greencastle Pier Road. Coppiced ash trees were also recorded but were not a dominant feature of hedgerows.

Wall/Fence (J2.5)

A derelict stone wall and post and wire fence partially surrounds the improved grassland field at the site of the proposed Greencastle terminal (Plate H & I). The wall is largely derelict and earthed over appearing as an earth bank vegetated with Gorse (*Ulex europaeus*). Such features are the dominant boundary type along the length of the Greencastle Pier Road.

Buildings (J3.6)

There are two residential dwellings either side of the Greencastle footprint. Numerous dwellings and agricultural buildings are also located along the Greencastle Pier Road.

Other (J5)

The existing wooden Greencastle Pier to the northwest of the proposed terminal is included here (Plate J). Chapter 7 provides a detailed account of ecological communities identified here.

Table 5.5: Habitats Recorded within Greencastle Survey Area

JNCC Habitat	Plates	Nature Conservation Value	NI Priority Habitat	Links with EU Annex 1 Habitats	Relevant Scheme Elements	Notes
Improved grassland (B4)	A	Low	-	-	Hardstanding	
Shingle/gravel above high-tide mark (H3)	B - G	High	Coastal Vegetated Shingle	Perennial vegetation of stony banks (1220)	Suspended Concrete Pier	Upper Greencastle Shoreline
Strandline Vegetation (H5)	C	High		Annual vegetation of drift lines (1210)	Suspended Concrete Pier/Slipway	Unmapped narrow and varying belt of drift seaweed along MHW
Amenity grassland (J2.1)		Low	-	-	Adjacent Lands	Private gardens
Defunct hedge (J2.2)		Low	-	-	Hardstanding and Greencastle Pier Road	Intermittent field boundaries along Greencastle Pier

JNCC Habitat	Plates	Nature Conservation Value	NI Priority Habitat	Links with EU Annex 1 Habitats	Relevant Scheme Elements	Notes
						Road
Fence/Wall (J2.5)	H & I	Low	-	-	Hardstanding and Greencastle Pier Road	Field Boundaries along Greencastle Pier Road
Buildings (J3.6)		Low (if bats absent) or High (if bats present)	-	-	Adjacent Lands	Residential and agricultural buildings
Other (J5)	J	Low	-	-	Adjacent Lands	Greencastle Pier

5.2.10.2 Greenore

Table 5.6 lists the diversity of habitats found within the survey area and their classification according to *A Guide to Habitats in Ireland* (Fossitt, 2000).

No protected or invasive flora were found within the proposed Greenore development footprint. The rare oysterplant (*Mertensia maritima*) has previously been recorded along the Greenore shoreline but at a considerable distance (>5km) to the south of the proposed development.

Table 5.6: Habitats Recorded within Greenore Survey Area

Fossitt Habitat	Plate	Nature Conservation Value	Links with EU Annex 1 Habitats	Relevant Scheme Elements	Notes
Amenity grassland (GA2)	K	Low	-	Adjacent Lands	Managed amenity grassland
Ornamental/non-native shrub (WS23)		Low	-	Hardstanding	Amenity planting
Buildings and artificial surfaces (BL3)	L	Low (bats/birds absent) or High (bats/birds present)	-	Hardstanding	Greenore Port compound and Security Gate Lodge
Recolonising bare ground (ED3)	M	Moderate (nesting birds)	-	Hardstanding	Small unmapped area behind security gate lodge
Shingle and gravel banks (CB1)	K	High	Annual vegetation of drift lines (1210)	Slipway	Greenore shoreline
Sea walls, piers and jetties (CC1)	N	Moderate (nesting birds)	-	Hardstanding/Slipway	Greenore Port Quay wall, wooden breakwater and rock armour

Box 5.1: Perennial Vegetation of Stony Banks (1220)

Perennial vegetation of stony banks (1220) - NPWS (2008)

Perennial vegetation of stony banks is vegetation that is found above the high tide mark on beaches comprised of shingle (cobbles and pebbles). It is dominated by perennial species (i.e. plants that continue to grow from year to year). The degree of exposure, as well as the coarseness and stability of the substrate will determine species diversity. Some of the typical species include sea beet (*Betula vulgaris* subsp. *maritima*), rock samphire (*Crithmum maritimum*), yellow horned-poppy (*Glaucium flavum*), sea sandwort (*Honckenya peploides*), curled dock (*Rumex crispus*), sea campion (*Silene vulgaris* subsp. *maritima*), and sea mayweed, (*Tripleurospermum maritimum*). A number of rare species, including sea pea (*Lathyrus japonicus*), oysterplant (*Mertensia maritima*) and sea-kale (*Crambe maritima*) are also found in this habitat.

Perennial vegetation of stony banks (1220) - JNCC (2007)

Shingle structures develop when a sequence of foreshore beaches is deposited at the limit of high tide. More permanent ridges are formed as storm waves throw pebbles high up on the beach, from where the backwash cannot remove them. Several beaches may be piled against each other and extensive structures can form. The ecological variation in this habitat type depends on stability, the amount of fine material accumulating between pebbles, climatic conditions, width of the foreshore and past management of the site. The ridges and lows formed also influence vegetation patterns, resulting in characteristic zonations of vegetation and bare shingle.

The NVC only described part of the pioneer phase of perennial shingle vegetation namely SD1 *Rumex crispus*-*Glaucium flavum* shingle community. Narrow, less-stable structures are more exposed to waves or salt spray. Where wave energy causes movement of the shingle, the plant communities have affinities with *annual vegetation of drift lines* (1210). The presence of the yellow-horned poppy and the rare sea-kale and sea pea, all species that can tolerate periodic movement is significant. In more stable area above this zone, where sea spray is blown over the shingle, plant communities with a high frequency of salt-tolerant species such as thrift *Armeria maritima* and sea campion *Silene uniflora* occur.

Perennial vegetation of stony banks (1220) - EUR 27 (2007)

Perennial vegetation of the upper beaches of great shingle banks formed by *Crambe maritima*, *Honckenya peploides* and other perennial species. A wide range of vegetation types may be found on large shingle structures inland of the upper beach. On more mature, stable, shingle coastal forms of grassland, heath and scrub vegetation may develop. Some area of unusual vegetation dominated by lichens and bryophytes are found on more mature shingle.

Plant species: Sea kale (*Crambe maritima*), sea sandwort (*Honckenya peploides*), lyme grass (*Leymus arenarius*), sea pea (*Lathyrus japonicus*), rock samphire *Crithmum maritimum*.

Corresponding UK Classification: "SD1 *Rumex crispus*-*Glaucium flavum* shingle beach community".

Box 5.2: Annual Vegetation of Drift lines (1210)

Annual vegetation of drift lines (1210) - NPWS (2008)

Annual vegetation of drift lines is found on beaches along the high tide mark, where tidal litter accumulates. It is dominated by a small number of annual species (i.e. plants that complete their life-cycle within a single season). Tidal litter contains the remains of marine algal and faunal material, as well as a quantity of seeds. Decaying detritus in the tidal litter releases nutrients into what would otherwise be a nutrient poor environment. The habitat is often represented as patchy, fragmented stands of vegetation that are very short-lived and subject to frequent reworking by the tide. The habitat is mainly associated with a sandy substrate. The vegetation is limited to a small number of highly specialised species that are capable of coping with salinity, wind exposure, an unstable substrate and lack of soil moisture. Typical species include spear-leaved orache (*Atriplex prostrata*), frosted orache (*Atriplex latifolia*), sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*) and prickly saltwort (*Salsola kali*).

Annual vegetation of drift lines (1210) - JNCC (2007)

This habitat type occurs on deposits of shingle lying at or above the mean high-water spring tides. The types of deposits involved are generally at the lower end of the size range of shingle (2-200mm diameter), with varying amounts of sand interspersed in the shingle matrix. These shingle deposits occur as fringing beaches that are subject to periodic displacement or overtopping by high tides and storms. The distinctive vegetation, which may form only sparse cover, is therefore ephemeral and composed of annual or short-lived perennial species. In the UK this Annex 1 type is not always easy to classify using the NVC because it is highly variable between sites and from year to year at the same site. It can include NVC types SD2 *Honckenya peploides*-*Cakile maritima* strandline community and SD3 *Matricaria maritima*-*Galium aparine* strandline community on stony substrates. MC6 *Atriplex prostrata*-*Beta vulgaris* ssp. *maritima* sea-bird cliff community and other vegetation with abundant orache *Atriplex* spp. may also occur on shingle shores. Drift lines on essentially sandy beaches are assessed as sand dune communities and are not included in this Annex I type. The mobility of shingle foreshores is an overriding consideration, and colonising species are able to tolerate periodic disturbance, which may involve the total removal of the surface and subsequent re-colonisation with vegetation. Species are also tolerant of saltwater inundation, as the beaches are often over-topped by the tide or subject to spray from waves breaking over the beach. Level or gentle-sloping, high-level mobile beaches, with limited human disturbance, support the best examples of this vegetation.

Annual vegetation of drift lines (1210) - EUR 27 (2007)

Formations of annuals or representatives of annuals and perennials, occupying accumulations of drift material and gravel rich in nitrogenous organic matter (*Cakiletea maritimae* p.).

Corresponding UK Classification: "SD2 *Honckenya peploides*-*Cakile maritima* strandline community" and "SD3 *Matricaria maritima*-*Galium aparine* shingle beach community".

Habitat Descriptions

Amenity grassland (GA2)

A narrow strip of managed amenity grassland with interspersed ornamental shrubs runs south from the car park at Greenore Port to the concrete slipway adjacent to the Greenore Coast Guard Station c.300m south of the proposed development footprint (Plate K). Amenity grasslands are typically improved and botanically species-poor, and undergo regular re-seeding, fertilising and mowing.

Buildings and artificial surfaces (BL3)

The existing built surfaces and buildings at Greenore Port including the security gate lodge and derelict store are included here (Plate L). Surfaces are interspersed with varying amounts of recolonising bare ground (ED3), particularly at the rear of the security gate lodge (Plate M). Dominant species included ragwort (*Senecio* spp.), brambles (*Rubus* spp.), nettle and perennial grasses (*Agrostis* spp. and *Holcus lanatus*).

Sea walls, piers and jetties (CC1)

The Greenore Port quay wall, breakwater and rock armour are included here (Plate K, N & O). The low sea wall which runs south of Greenore Port abutting the rock armour is also included here. Rock armour lines the Greenore Port seaward boundary and runs south above the mean high water mark in a narrowing belt, to the slipway adjacent to the Greenore Coastguard Station (Plate L). A small number of perennial species grow amongst the rock armour including sea beet (*Beta vulgaris*), sea radish (*Raphanus raphanistrum*), ragwort, yarrow (*Achillea millefolium*), sea mayweed (*Tripleurospermum maritimum*) and creeping bent (*Agrostis stolonifera*).

Shingle and gravel banks (CB1)

The national shingle beach survey classified Greenore as vegetated fringing beach of medium conservation interest (NSBS, 1999). A rank of medium implies the site may be extensive but not of particular interest either geomorphologically or botanically.

The type of shingle beach found at Greenore is a good example of a fringing or *pocket* shingle, where a narrow strip of shingle coast is in contact with the rock armour along the top of the beach (Doody & Randall, 2003). This shingle is subject to regular marine inundation up to the sea wall during spring tides and storm events. The shingle at Greenore between the port and the Greenore Coastguard Slipway is sparsely vegetated, with regular inundation and amenity footfall resulting in trampling. This in itself is likely preventing any significant colonisation above the MHW. Colonisation is limited to sea sandwort largely along the high water mark, which prevails where varying amounts of sand lies interspersed between the shingle. This corresponds to Sneddon and Randall (1993) *Honckenya peploides* (sea sandwort) dominated community (SH31a). Sea sandwort was not recorded within the proposed development footprint in 2012 but noted to the south of the slipway.

Vegetated shingle and gravel banks correspond to Annex 1 habitat 'Perennial vegetation of stony banks (1220)'. However, it is not considered that the habitat recorded within the proposed Greenore development footprint corresponds to this type as prevalent colonisation above the mean high water mark occurs amongst the boulders (particle size >200mm) of the rock armour and not on the shingle. The shingle in this part is considered to be highly disturbed on a regular basis.

Beyond the Greenore Coastguard slipway, the shingle and gravel bank continues south with the absence of rock armour i.e. free of coastal squeeze. Here the vegetation predominantly grows above the high tide line at the base of the bank with a mixture of ruderal species present. Species noted along this part included sea radish (*Raphanus raphanistrum*), corn marigold (*Chrysanthemum segetum*), wild carrot (*Daucus carota*), common ragwort (*Senecio jacobaea*), sea beet, common poppy (*Papaver rhoeas*), common vetch (*Vicia sativa*), yarrow (*Achillea millefolium*), cleavers (*Gallium aparine*), sea mayweed (*Tripleurospermum maritimum*), perennial sow-thistle, wild carrot, pineapple weed, groundsel, oraches, sea spurge, knotgrass and scarlet pimpernel (*Anagallis arvensis*). Species richness increases further south from Greenore however, there remains a lack of clear vegetation succession due to regular inundation during storm events. The habitat beyond the slipway is considered to correspond to Annex 1 habitat 'perennial vegetation of stony banks (1220)' - albeit an underdeveloped form, which is a qualifying feature of the Carlingford Shore SAC.

Recolonising bare ground (ED3)

As detailed above.

5.2.11 Badger Survey Results

No signs of badger activity were recorded within 100m of the proposed Greenore and Greencastle development footprints during Extended Phase 1 Habitat Surveys in 2012.

In 2007 five badger setts were recorded to the southeast of Greenore Port during a faunal study undertaken as part of the Greenore Port Development. These setts are located over 500m from the Greenore footprint and absence of predicted impact excludes them for further consideration within the scope of this current survey and assessment. Badgers are likely to forage throughout the semi-improved grasslands to the south of Greenore Port and to the south of the Greenore Coastguard Slipway which will be unaffected by the proposed development.

5.2.12 Otter Survey Results

No signs of otter activity were recorded within 100m of the proposed Greenore and Greencastle development footprints during Extended Phase 1 Habitat Surveys in 2012.

Subsequently a single otter sighting was made during bird surveys in February 2012 - an adult swimming in the direction of Greenore Golf Course from Greenore Point on the 17th February 2012 (N. Robinson, *Pers Obs*).

Otter spraints have previously been noted by RPS surveyors in 2010/11 along the Greenore to Ballagan shoreline during bird survey work, undertaken as part of the proposed Greenore Port Development (N. Robinson, *Pers Obs*). Spraints were recorded between the slipway adjacent to the Greenore Coastguard Station and the townland of Ballynatrasna. Spraints were also more extensively recorded along the Greenore to Carlingford shoreline during the faunal study work undertaken in 2007 as part of the Greenore Port Development. Seven well-used sprainting sites were found within the intertidal saltmarsh bay immediately adjacent to the Greenore Golf Course approx 500m from the current Greenore development site. Spraints found in 2007 and 2010/11 contained mainly fish, crabs and crayfish remains.

The intertidal bay adjacent to the Greenore Golf Course and freshwater ponds within the Golf Course itself, provide ideal otter foraging habitats with an abundance of crabs, crayfish and fish. The widespread nature of otter spraints indicates an extensive use of the southern Carlingford shoreline by otters however, no active holts were found in the near vicinity of the proposed Greenore ferry development footprint. It is thought an active otter holt is present within the Greenore Golf Course, however this site was beyond the survey scope and will not be directly impacted by the proposed development. There were no signs of holts at the rock armour at Greenore Port and this zone is not considered to be highly valuable otter breeding habitat due to a high level of existing disturbance.

5.2.13 Protected and Invasive Invertebrates

No protected or invasive terrestrial invertebrates were recorded within the proposed Greenore or Greencastle development footprints during the Extended Phase 1 Habitat Survey.

5.2.14 Protected Reptiles and Amphibians

No protected reptiles or amphibians were recorded within the Greenore or Greencastle development footprints. No observations of common frog were made at Greenore however, the species can be found within ponds of the Greenore Golf Course. No suitable habitat (e.g. freshwater pools, ponds, wet ditches) occur within the development footprint here. No observations of smooth newt were made, with no suitable breeding ponds occurring within either development footprint.

Sightings of common lizard during formal surveys are rare with field signs largely restricted to shed skins. Suitable common lizard habitat is variable but the species generally shows a preference for open, relatively undisturbed habitats with good exposure to the sun for basking (Inns, 2009). Such

habitats therefore occur along the Greenore and Greencastle shorelines and the species may be present within the vicinity of the proposed development.

5.2.15 Bat Survey

A bat survey was undertaken at the proposed Greenore and Greencastle footprints and along the Greencastle Pier Road. A full copy of the survey report is available in Appendix 5.2. The results of day, night and predawn surveys are summarised below.

5.2.15.1 Day Survey

Greencastle

The dominant habitats to the south of the Greencastle Pier Road is comprised of improved grasslands, species poor hedgerows, sporadic broadleaf and coniferous trees, detached domiciles with gardens and a small area of sand. The habitat north of Greencastle Pier Road is largely improved grassland pasture grazed by sheep and cattle with sporadic broadleaf and coniferous trees.

No indication of bat activity was observed during the June day survey along the Greencastle Pier Road and Greencastle footprint. The domiciles to the east and west of the footprint appeared to have no visible cavities where bats could roost.

Greenore

The proposed Greenore footprint is an existing port facility with a small area of rough ground holding foraging potential. A large concrete store in poor repair and the security gate lodge had many potential access points for roosting bats. On inspection the roof void of the date lodge had a tarred felt lining but was very dusty, had many cobwebs and neither building was found to have any indications of bat activity on the external or internal surfaces.

5.2.15.2 Night Survey

Greencastle

- 4th June: Commenced 21h20 (Sunset 21h53)
 - 22h04 a Leisler's bat *N. leisleri* was heard faintly but not seen;
 - 22h06 a Leisler's bat was observed in the direction of a derelict two storey former ferry hotel east of the proposed project footprint and foraged at 7-10m high over grassland adjacent to the project footprint;
 - 22h26 between two and three a Leisler's bats foraged over the site and into the surrounding fields and road;
 - 22h46 a common pipistrelle *P. pipistrellus* were observed foraging up to c.60m towards Greencastle village but there was no bat activity in the village.

Greencastle Pier Road

- 9th September: Commenced at 20h15 (Sunset 20h02)
 - Foraging activity of Leisler's, soprano pipistrelle and common pipistrelle was noted. Leisler's activity was particularly noted in the vicinity of two areas of two to three low pressure sodium road lights;
 - Common pipistrelle activity recorded at 20h20, 21h11, 21h18, 21h32, 21h53, 22h00 and 22h09;
 - Soprano pipistrelle activity recorded at 21h22 and 22h00;
 - Leisler's activity recorded at 20h36, 20h57 and 21h44.

Greenore

- 12th June: Commenced at 21h30 (Sunset 21h57)
 - 22h16 a distant a Leisler's bat was heard but not seen;
 - 22h20 a common pipistrelle was observed flying at 5m at a small courtyard at the rear of the security gate lodge;
 - 22h26 the common pipistrelle was joined by a second common pipistrelle, which commuted from the directions of houses to the south;
 - 22h32 both pipistrelles foraged over the weighbridge on the southwest side of the gate lodge;

- 22h35 a Leisler's bat flew close to the gate lodge potentially foraging on insects which may have been attracted to floodlights with the harbour area;
- 22h51 an individual common pipistrelle continued to forage at the weighbridge and gate lodge, and a second common pipistrelle foraged over the intertidal zone;
- 23h00 rain, survey ended.
- 24th June: Commenced 21h40 (Sunset 22h01)
 - No bat activity within any part of the harbour area.

5.2.15.3 Predawn Survey

Greencastle

- 25th June: Commenced 03h55 (Sunrise 04h43)
 - 04h08 a common pipistrelle was observed commuting from a domicile approximately 70m east of the study site to fields north of the site probably returning to a roost;
 - 04h10 a Leisler's was heard distantly probably returning to roost;
 - 04h35 no further bat activity observed, survey ended.

5.4 Impact Assessment

An impact assessment has been undertaken in accordance with the Institute of Ecology and Environmental Management (IEEM) *Ecological Impact Assessment Guidelines* (IEEM, 2006), and also using experience of 'best practice' in the ecological assessment of proposed developments.

Where impacts are predicted the magnitude of the potential impact is assessed using the criteria set out in Tables 5.1 - 5.3. The impact significance (Table 5.3) is a combined function of the ecological value of the affected feature (Table 5.1) and the magnitude of the impact (Table 5.2). It is important to note that there is no universally recognised definition of what constitutes *significance*. A combination of data (where available), experience and the precautionary principle are therefore employed to select the appropriate ecological value, and magnitude categories. In cases where it is not possible to estimate magnitude, the precautionary principle is applied to assume the worst case scenario.

The ecological value is generally relatively easy to categorise. However, the magnitude of potential impact may be difficult (or in certain cases impossible) to categorize, and the following list of parameters are considered:

- Physical nature;
- Type (+ve/-ve);
- Range of features affected;
- Population sizes of features affected;
- Geographical scale;
- Duration;
- Cumulative effects.

Once identified and characterised for magnitude, each potential impact is assigned a likelihood of occurrence (after mitigation):

- Certain (100%);
- Near-certain (95-100%);
- Probable (50-95%);
- Unlikely (5-50%);
- Extremely Unlikely (0-5%).

Specific mitigation measures are proposed in Section 5.5 where required to offset impacts identified as likely and significant.

The nature of the proposed development may potentially disrupt ornithological interests directly and/or indirectly during the construction and operational phases. The main potential impacts results from the following broad categories:

- Whole or partial habitat loss;
- Pollution incidents resulting in faunal fatalities and habitat degradation and loss/reduction of foraging habitats;
- Habitat degradation as a result of changes in hydrological processes and sediment transport;
- Fragmentation or isolation of feeding corridors of faunal species as a result of habitat loss;
- Noise, physical, lighting and visual disturbance to faunal species during the construction and operational phases.

This Chapter should be read with particular reference to Chapter 4, Chapter 7 and Chapter 9.

All potential impacts of the proposed development are addressed both independently and with regard to any other project or plan that together may produce in-combination effects on terrestrial ecology.

5.4.1 Designated Sites

The nearest designated sites are Carlingford Shore SAC, Carlingford Lough ASSI and Carlingford Lough pNHA. Potential impacts to the two Carlingford Lough SPAs and any ornithological features of interest are dealt with in Chapter 6.

Potential impacts to designated sites for the proposed development fall into the following specific categories:

- **Potential Habitat Loss Impacts**
Permanent loss of Annex 1 and Priority Habitats
Indirect habitat loss/degradation as a result of built structures and ferry operation
- **Potential Pollution Impacts**
Direct pollution impacts to Annex 1 and Priority Habitats

5.4.1.1 Carlingford Shore SAC

Potential impacts on the Carlingford Shore SAC are summarised in Table 5.7.

The proposed terminal at Greenore is located partially within the Carlingford Shore SAC. Carlingford Shore SAC qualifies for designation by supporting the following habitats listed on Annex I of The Habitats Directive:

- Annual vegetation of drift lines [1210] and;
- Perennial vegetation of stony banks [1220].

Two further Annex 1 Habitats mudflats and sandflats not covered by seawater at low tide (1140) and Atlantic salt meadows (1330) are also found within the SAC but are not the primary feature for designation.

Before discussion of the potential impacts on Carlingford shore SAC detailed in Table 5.7, it should be noted that all potential impacts are considered to be neutralised by mitigation proposed in Section 5.5.

Construction

- The construction of the Greenore terminal will result in the direct and permanent loss of approx 0.22ha of the Carlingford Shore SAC (0.04%) however, Annex 1 Habitats 1210 and 1220 for which the site it designated were not recorded within the proposed development footprint. The terrestrial habitats to be directly lost above the mean high water mark include approx 0.26ha of buildings and artificial surfaces and recolonising bare ground (BL3/ED3), 0.05ha of sea walls, piers and jetties (CC1), 0.04ha of unvegetated shingle and gravel banks (CB1) and 0.02ha of recolonising bare ground (ED3). The Greenore terminal will largely be built on the existing hardstanding within Greenore Port. The impact of permanent habitat loss from the Carlingford Shore SAC is considered to be insignificant to the conservation objectives, structure and functioning of the SAC.
- The construction of the slipway at Greenore will require a temporary working area for access by construction plant on to the beach to the south of the Greenore footprint. This area will be

subject to trafficking but given the likely plant loads, it is expected that timber mats may be required to support crawler tracks or vehicle wheels. This will result in the temporary disturbance to a wider area of shingle and gravel banks (CB1) within the SAC outwith the permanent project footprint. Following the removal of construction plant it is anticipated that the shingle beach will recover very quickly given the highly mobile nature of the sediments at this location. This impact is therefore considered temporary and non-significant.

- There is potential for pollution incidents as a result of cement use (for pre-cast deck elements and tubular piling), spills or leakages from construction plant or infilling materials. Should an incident occur at the Greenore or Greencastle construction site, pollutants may impact over a wider area if carried by tidal currents. There is potential for pollutants to lead to the degradation of Annex 1 Habitats 1210 and 1220 through the inhibition of plant growth adjacent to the development site, although it is considered very unlikely after mitigation as proposed.

Operational

- During the operational phase the presence of the Greenore slipway will result in highly localised impacts on sediment transport along the Greenore shoreline. An assessment of littoral currents modelled under severe weather events in Chapter 9, concludes that the presence of the slipway at Greenore will result in a change to the littoral current speed (by $\pm 0.3\text{m/s}$) extending 400m east along the shoreline. This may result in a small increase in sedimentation but is not considered to significantly impact upon the shoreline shingle and gravel bank (CB1) habitat, which supports Annex 1 Habitats 1210 and 1220 to the south of the Greenore Coastguard Slipway. In Chapter 7 it is concluded that the deposition of finer sediments at Greenore may seek to increase the density of the substrates infauna.
- During the operation of the ferry there may be potential for pollution of Annex I Habitats from oils, diesels or chemicals, which may arise from the ferry itself, vehicles using the ferry or any potential contaminants stored within the Greenore or Greencastle terminals. It is considered that the likelihood is very low, as there are no records of serious polluting incidents from the existing shipping traffic travelling through the lough.

The NIS/HRA appended to this ES/EIS concludes that the development does not independently or in combination with any other plan or project adversely affect the conservation objectives, structure, functioning or integrity of any Natura 2000 site.

5.4.1.2 Carlingford Lough pNha

For the purposes of impact assessment, qualifying features of the pNHA are treated under assessment of the Carlingford Shore SAC and Carlingford Lough SPA.

The construction of Greenore terminal will result in the direct loss of approx 0.47ha of the Carlingford Lough pNHA. 0.22ha are described above under Carlingford Shore SAC in Section 5.4.1.1. The remaining 0.25ha is comprised of intertidal LS.LSC.SH 'Shingle (Pebble) and Gravel Shores' and a sub-tidal mosaic of SS.SCS.CCS.PomB '*Pomatoceros triqueter* with barnacles and bryzoan crusts on unstable circalittoral cobbles and pebbles' and SS.SMx.CMx.Oph.Mx '*Ophiothrix fragilis* and/or *Ophiocoma nigra* brittlestar beds on sublittoral mixed sediment as identified in Chapter 7.

5.4.1.3 Carlingford Lough ASSI

The Greencastle terminal is located partially within the Carlingford Lough ASSI. Potential impacts on the Carlingford Lough ASSI are summarised in Table 5.8.

Management objectives for qualifying features of interest are presented in Appendix 5.3 Designated Site Information. The qualifying features of interest for Carlingford Lough are summarised as follows:

- Coastal Saltmarsh;
- Mudflats;
- *Zostera* (Seagrass) Beds;
- The Geological Series;
- Wintering Waterbirds;
- Breeding Terns.

Impacts on ornithological features i.e. Wintering Waterbirds and Breeding Terns are discussed separately in Chapter 6. Impacts on intertidal habitats including mudflats (sedimentary habitats) are discussed in detail within Chapter 7.

Construction

- The direct and permanent loss of habitats from the ASSI associated with the Greencastle jetty will be small, as the berth will be suspended on steel tubular piles forming an open structure. This is to maintain access and the flow of water and sediment beneath. Only the combined footprint of the piles will therefore constitute the direct area loss from the ASSI. Coastal saltmarsh and *Zostera* (Seagrass) beds were not recorded during Marine Ecology Surveys along the Greencastle shoreline or within the immediate vicinity of the proposed berthing facilities (Chapter 7). Instead the Greencastle shoreline was characterised by shingle in the upper shore, with fine and medium sands dominating mid and lower shore and the intertidal zone. Only sedimentary communities were present within the Greencastle development footprint. Approx 20 steel tubular piles of approx 1219mm in diameter are proposed to be located within the ASSI. This constitutes an approx area of 24m².
- The construction of the slipway at Greencastle will require a temporary working area for access by construction plant on to the beach to either side of the Greencastle footprint. This area will be subject to trafficking but given the likely plant loads, it is expected that timber mats may be required to support crawler tracks or vehicle wheels. This will result in the temporary disturbance to a wider area of sedimentary habitats within the ASSI outwith the permanent project footprint. Following the removal of construction plant it is anticipated that the shingle and sedimentary beach will recover very quickly given the highly mobile nature of the sediments at this location. This impact is therefore considered temporary and non-significant.
- There is potential for pollution incidents as a result of cement use (for pre-cast deck elements and tubular piling), spills or leakages from construction plant or infilling materials. Should an incident occur at the Greenore or Greencastle construction site, pollutants may impact over a wider area if carried by tidal currents. There is potential for pollutants to lead to the degradation of ASSI habitats through the inhibition of plant growth adjacent to the development site, although it is considered very unlikely after mitigation as proposed.

Operational

- Chapter 9 indicates that changes in littoral currents and sediment transport as a result of the construction of the proposed slipway at Greencastle will be restricted to within 100m of the project footprint. This is largely due to the open nature of the slipway. Predicted increases and/or decreases in current flow are unlikely to impact on the existing sediment transport regime at Greencastle, which may result in the degradation of Coastal Saltmarsh, Mudflats and *Zostera* Beds. Mill Bay which supports these sensitive habitats is located c.600m from the Greencastle footprint and will be unaffected by any predicted changes in coastal processes.
- During the operation of the ferry there may be potential for pollution of ASSI habitats from oils, diesels or chemicals, which may arise from the ferry itself, vehicles using the ferry or any potential contaminants stored within the Greenore or Greencastle terminals. It is considered that the likelihood is very low, as there are no records of serious polluting incidents from the existing shipping traffic travelling through the Lough.

Table 5.7: Impacts upon Carlingford Shore SAC

Impact	Nature	Magnitude	Ecological Value of Feature	Significance of Impact	Impact Type	Phase of Occurrence	Duration	Direct/ Indirect	Occurrence	Mitigation Proposed	Residual Impact
Loss of Annex 1 Habitat 1210 as a result of land take for Greenore components.	-ve	Major	High	Very Large Adverse	Habitat Loss	Construction	Permanent	D	Extremely Unlikely	No	Not significant (N.S)
Loss of Annex 1 Habitat 1220 as a result of land take for Greenore components.	-ve	Major	High	Very Large Adverse	Habitat Loss	Construction	Permanent	D	Extremely Unlikely	No	N.S
Pollution of Carlingford Lough during construction leading to degradation of Annex 1 Habitats 1210 and 1220.	-ve	Major	High	Very Large Adverse	Habitat Loss	Construction	Temporary	D	Unlikely	Yes	N.S
Pollution of Carlingford Lough during operation leading to degradation of Annex 1 Habitats 1210 and 1220.	-ve	Major	High	Very Large Adverse	Habitat Loss	Operation	Permanent	D	Unlikely	Yes	N.S
Degradation of Annex 1 Habitats 1210 and 1220 as a result in changes in the sediment budget.	-ve	Major	High	Very Large Adverse	Habitat Loss	Operation	Permanent	I	Unlikely	Yes	N.S

Table 5.8: Impacts upon Carlingford Lough ASSI

Impact	Nature	Magnitude	Ecological Value of Feature	Significance of Impact	Impact Type	Phase of Occurrence	Duration	Direct/ Indirect	Likelihood of Occurrence	Mitigation Proposed	Residual Impact
Loss of Coastal Saltmarsh, Mudflats and <i>Zostera</i> Beds as a result of land take for Greencastle Berthing Facilities.	-ve	Major	High	Very Large Adverse	Habitat Loss	Construction	Permanent	D	Unlikely	No	N.S
Pollution of Carlingford Lough leading to degradation of Coastal Saltmarsh, Mudflats and <i>Zostera</i> Beds.	-ve	Major	High	Very Large Adverse	Habitat Loss	Construction	Temporary	D	Unlikely	Yes	N.S
Pollution of Carlingford Lough leading to degradation of Coastal Saltmarsh, Mudflats and <i>Zostera</i> Beds.	-ve	Major	High	Very Large Adverse	Habitat Loss	Operation	Permanent	D	Unlikely	Yes	N.S
Degradation of Coastal Saltmarsh, Mudflats and <i>Zostera</i> Beds as a result in changes in the sediment budget.	-ve	Major	High	Very Large Adverse	Habitat Loss	Operation	Permanent	I	Unlikely	Yes	N.S

5.4.2 Local Habitats and Wildlife

Potential impacts on local habitats and wildlife are summarised in Table 5.9. Potential impacts to designated site qualifying features of interests are not re-discussed here. Before discussion of the potential impacts on Local Habitats and Wildlife, all impacts are considered to be offset by the mitigation proposed in Section 5.5.

Potential impacts to local habitats and wildlife for the proposed development fall into the following specific categories:

- **Potential Habitat Loss Impacts**
Permanent loss of habitats
Indirect habitat loss/degradation as a result of built structures and ferry operation
- **Potential Pollution Impacts**
Direct pollution impacts to Annex 1 and Priority Habitats

5.4.2.1 Habitats

The potential impacts on habitats as a result of the proposed development are summarised as follows:

- Whole or partial habitat loss;
- Potential pollution impacts during construction and operation causing the degradation of habitats;
- Potential degradation of habitats following changes in coastal processes.

Construction

The construction of car parking and ticket office facilities at Greencastle will result in the permanent loss of 0.32ha of improved grassland (B4) and replacement with a hardstanding surface. The existing stone wall and defunct hedgerow boundary will be retained where possible but approx 100m will be lost in total along the northern and southern boundary. This is to provide adequate sight lines for traffic and the positioning of the beach crossing. The open piled nature of the Greencastle berth will result in a negligible direct loss of shingle habitat and will equate to the combined footprint of steel tubular piles located within it. Approx 4 steel piles will be located within the shingle habitat equating to a footprint of 7m². Overall the habitats at Greencastle are considered to be of low ecological value, given the low floristic diversity recorded within the shingle and grassland but provide some foraging potential for fauna. The loss of these habitats is considered non-significant.

It is proposed to upgrade and widen parts of the existing Greencastle Pier Road to provide improved access for local vehicles and ferry traffic. It is proposed that road widening will occur between existing verges minimising the need to remove defunct hedgerow and stonewall field boundaries. 510m defunct hedge habitat will be removed to accommodate the road widening and shall be replaced. 40m of stone wall boundary will be removed. The loss of these habitats is considered non-significant.

The construction of traffic queuing, parking and ticket office facilities will require the permanent land take of 0.26ha of buildings and artificial surfaces (BL3), 0.05ha of sea walls, piers and jetties (CC1) and 0.02ha of scrub. The construction of the slipway at Greenore will the permanent land take of 0.04ha of shingle and gravel banks (CB1). These habitats are considered to be of low ecological value and there loss is considered to be non-significant.

The relocation of Greenore Ports existing security gate lodge and weighbridge (to be demolished) will take place within the port compound on existing hardstanding. The relocation of these structures is not considered part of this application.

5.4.2.2 Protected Flora

No protected flora were recorded within the project footprint at Greenore or Greencastle.

5.4.2.3 Badger

The potential impacts on badgers as a result of the proposed development are summarised as follows:

- Potential noise, lighting and visual disturbance to badgers during construction and operation;
- Potential pollution impacts during construction and operation causing direct fatalities of badgers or degradation of badger foraging habitats;
- Potential fatalities as a result of car collisions due to increased traffic on the Greenore Shore Road/R175.

Construction

No badger setts or signs of badger activity were recorded within 100m of the proposed Greenore or Greencastle footprints during the Extended Phase 1 Habitat Survey. Badgers are likely to forage within semi-improved grasslands and along the shoreline to the south east of Greenore Port beyond the Coastguard Slipway, where an active sett is known to exist. There will be no loss of badger setts or foraging habitat as the result of the proposed development.

In general construction activities will likely take place within daylight hours. Nocturnal badger activities within grassland foraging habitats to the southeast of the Greenore project footprint are therefore unlikely to be hindered by day time construction noise.

Operation

The Greenore to Ballagan shoreline adjacent to grassland foraging habitats is already considered to be moderately disturbed by recreational beach users during daylight hours. Pedestrian activity during ferry operation is not expected to increase significantly during either daylight hours or during the hours of darkness.

It is possible badgers associated with setts to the south east of Greenore Port commute across the Shore Road/R175 at Greenore between grassland foraging habitats along the shoreline and suitable foraging habitat within Greenore Golf Course. The expected increase in vehicular traffic along this road throughout the duration of the project may increase the risk of fatality to badgers as a result of car collisions. This risk is however negligible given the operation of the vehicle ferry during daylight hours only (07h00 to 21h00 with curtailed hours during the winter season).

5.4.2.4 Otter

The potential impacts on otters as a result of the proposed development are summarised as follows:

- Potential noise, lighting and visual disturbance to otters during construction and operation;
- Potential pollution impacts during construction and operation causing direct fatalities of otters or pollution Carlingford Lough resulting in the degradation of otter foraging habitats.

Construction

It is likely otters forage extensively throughout Carlingford Lough including the Greenore to Ballagan/Carlingford shoreline to the south east and south west of Greenore Port respectively. The impact on foraging activity and loss of foraging habitat along these shorelines and within the immediate development footprint during construction is however expected to be minor and temporary. Chapter 11 Noise and Vibration concludes that elevated noise levels during the construction phase (modelled in a worst case scenario) at Greenore will attenuate with increasing distance from the project footprint. Elevated noise levels at Greenore Golf Course located >400m from the project footprint will be within permissible construction noise levels (61dBA). Disturbance to potential otter holts within the golf course and within noted foraging habitats at this distance adjacent to the golf course as a result of construction noise is considered unlikely.

In general construction activities will likely take place within daylight hours. Otter activities within the immediate vicinity of the project footprints are unlikely to be impacted by construction noise.

The risk of pollution incidents occurring during construction is very low as described previously. Adverse effects are considered unlikely.

Operation

The operation of the vehicle ferry will result in very small increase in vessel traffic within this part of Carlingford Lough, which whilst having the potential to impact on otter activity to the south east of Greenore Port along the Greenore to Ballagan shoreline, is very unlikely. Otters currently appear to be relatively tolerant of shipping entering and leaving Carlingford Lough from Warrenpoint and Greenore with their activity either side of Greenore Port undeterred although lessened along the Greenore to Ballagan shoreline. Activity along the Greencastle and Greenore to Ballagan shorelines are potentially inhibited by foraging habitat preferences or proximity to holts.

The Greenore to Ballagan/Carlingford shorelines are already considered to be moderately disturbed by recreational beach users during daylight hours. Aquaculture activities also occur frequently during daylight and night time. Pedestrian activity during ferry operation is not expected to increase significantly during either daylight hours or during the hours of darkness.

5.4.2.5 Protected Reptiles and Amphibians

No protected reptiles or amphibians were recorded within the vicinity of the Greenore or Greencastle footprints.

5.4.2.6 Protected Invertebrates

No protected invertebrates were recorded within the vicinity of the Greenore or Greencastle footprints.

5.4.2.7 Bats

The development of terminals at Greencastle and Greenore should only result in a marginal loss of bat foraging habitat from the loss of semi-improved grassland at Greencastle. No bats roosts will be directly affected. No evidence of roosting bats was found within the security gate lodge or concrete store to be demolished/partially demolished at Greenore.

The proposed widening of the Greencastle Pier Road is not expected to cause any demolition, tree felling or disruption to bat activity. No low flying gleaner bat species such as Brown long-eared bats *P. auritus* or Natter's bat *M. nattereri* were found so an increase in vehicular traffic is not be expected to cause road collision casualties.

Inappropriate lighting has the potential to disrupt bats from roosting, commuting and foraging. Being nocturnal, bats rely on critical light levels to signify roost emergence and foraging time. Changes in artificial lighting can therefore lead to disruptions of the normal 24-hour patterns of light and dark, in turn affecting the natural behaviour of bats. Lighting near a roost access point will likely delay bats from emerging, shortening the amount of foraging time available to them and causing them to miss peak levels of insect activity at dusk. Illumination may also cause bats to desert their roosts or affect the availability of insect prey, which become attracted to light sources. Whilst some bat species such as Leisler's and pipistrelles recorded at Greenore and Greencastle will opportunistically feed on these insect attractions, the majority of Irish bat species will avoid heavily illuminated areas. Night time lighting of the development is proposed only while operating. No significant bat activity or roosting locations are recorded at the development footprint. No significant negative effects are predicted.

Table 5.9: Impacts upon local habitats and wildlife

Impact	Nature	Magnitude	Ecological Value of Feature	Significance of Impact	Impact Type	Phase of Occurrence	Duration	Direct/ Indirect	Occurrence	Mitigation Proposed	Residual Impact
Loss of semi-improved grassland at Greencastle	-ve	Intermediate	Medium	Moderate Adverse	Habitat Loss	Construction	Permanent	D	Certain	No	N.S
Loss of stone wall habitat at Greencastle	-ve	Intermediate	Low	Slight Adverse	Habitat Loss	Construction	Permanent	D	Probable	Yes	N.S
Loss of stone wall and hedgerows along the Greencastle Pier Road	-ve	Minor	Low	Slight Adverse	Habitat Loss	Construction	Temporary	D	Certain	Yes	N.S
Loss of buildings at Greenore Port	-ve	Minor	Low (bats absent)	Slight adverse	Habitat Loss	Construction	Permanent	D	Certain	No	N.S
Loss of rock armour (CC1)	-ve	Minor	Low	Slight adverse	Habitat Loss	Construction	Permanent	D	Certain	No	N.S
Loss of shingle and gravel bank (CB1)	-ve	Minor	Low	Slight adverse	Habitat Loss	Construction	Permanent	D	Certain	No	N.S
Potential disturbance to roosting, commuting and foraging bats through inappropriate lighting.	-ve	Intermediate	Very High	Large Adverse	Disturbance	Operation	Permanent	D/I	Unlikely	Yes	N.S
Degradation of Coastal Saltmarsh, Mudflats and <i>Zostera</i> Beds as a result in changes in the sediment budget.	-ve	Major	High	Very Large Adverse	Habitat Loss	Operation	Permanent	I	Unlikely	Yes	N.S

5.5 Mitigation

Mitigation of the identified potential impacts in Section 5.4 is addressed by both avoidance of impact and management or reduction of impact. Mitigation has additionally been undertaken during the design phase of the scheme to minimise the potential impact of the project on sensitive ecological receptors. Design of both slipways has been undertaken to result in least possible loss of habitat, particularly those designated under the Habitats Directive and Birds Directive, and disruption to the coastal processes has been minimised. The pier and slipway at Greencastle has been designed so that it is elevated above the existing beach and intertidal zone within the SPA. This design made use of piles, which result in a much lower loss of habitat and disruption to the coastal processes in comparison to direct construction of a pier and slipway in the intertidal area. At Greenore the design has been optimised to result in the least possible loss of SAC habitat and the slipway has been aligned with the natural beach gradient over the main tidal range resulting in minimal impedance of tidal flows.

5.5.1 Designated Sites

5.5.1.1 Pollution Mitigation

Prior to the commencement of construction a Construction Stage Environmental Management Plan (CEMP) will be prepared to assist the main contractor in preventing, managing and/or minimizing significant environmental impacts during the construction phase. In order to achieve this, the CEMP shall comprehensively incorporate all environmental commitments given in this ES/EIS and provide a method of compliance with these.

Detailed mitigation as outlined in ES/EIS Chapter 8, Sections 8.4.2.1 and 8.4.2.2 seeks to protect the water environment. In doing so, it also protects the sensitive ecological resource of the study area.

The CEMP will be submitted to the Planning Authorities and relevant nature conservation agencies (e.g. NIEA, NPWS, Loughs Agency) for comment and approval prior to the commencement of any works.

5.5.2 Local Habitats and Wildlife

5.5.2.1 Pollution Mitigation

See Section 5.4.1.

5.5.2.2 Impact-specific Mitigation

- **Potential disturbance to otters during construction**

Significant disturbance effects are not predicted upon otters. Measures to reduce the potential for pollution benefit otters too by protecting their food sources.

Wildlife sensitive lighting measures will also be outlined in the CEMP. Temporary lighting erected during construction will be sensitive to foraging otters. Lighting will be directional so as to prevent spill into intertidal and sub-tidal foraging habitats outwith the development footprints.

- **Potential disturbance to bats and loss of roosts during construction**

There was no evidence of roosting bats within the security gate lodge to be demolished or within the concrete store to have its gables removed at Greenore in 2012. This should be re-confirmed by a competent bat expert prior to any works. Should evidence of roosting bats be found, NPWS will be consulted and a derogation licence sought to exclude the bats. Compensatory measures may be required as part of this derogation procedure in consultation with NPWS. No trees are required to be removed as part of this development.

Any temporary lighting erected during construction should be sensitive to roosting, foraging and commuting bats. There will be no floodlight spill which could affect the derelict two storey

building east of the Greencastle footprint where Leisler's activity in May 2012 indicated a potential roost in that area.

- **Loss of Hedgerows/Stone Walls along the Greencastle Pier Road**

The loss of hedgerows and/or stone walls along the Greencastle Pier Road to facilitate road widening will be kept to an absolute minimum, as outlined on road design drawings. 660m of hedgerow comprising native species in keeping with the setting of this rural road will be planted. The planting proposed will be specified by the contractor in the CEMP, which is subject to approval by the Planning Authority. Such linear features provide important ecological corridors, foraging and nesting habitats for small mammals, birds and invertebrates.

5.6 Residual Effects

With the successful implementation of the mitigation measures proposed throughout this ES, the residual impact on designated sites, local habitats and their associated wildlife is not considered to reach significant level of impact.

Significant residual effects upon protected, fragile or rare habitat types within the local or regional landscape is not likely; and significant residual effects upon the distribution, abundance or continued viability of protected or rare species is not likely.

The Habitats Regulations Assessment / Natura Impact Statement appended to this ES/EIS concludes that the development independently or in-combination with any other project or plan will not adversely affect the conservation objectives, structure, functioning or integrity of any Natura 2000 site.

5.7 References

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