# 5 TERRESTRIAL FLORA, FAUNA AND BIRDS

## 5.1 INTRODUCTION

This Chapter of the EIS outlines the terrestrial ecology and nature conservation interests in the vicinity of the proposed underground gas storage cavern scheme at Larne Lough, Co. Antrim in Northern Ireland. The focus of the report is on higher plants, mammals, and birds and the environmental protection that exists in the area for these groups. Other groups such as lower plants, fungi, and reptiles are discussed where relevant.

Under Article 6 (3) and (4) of the EC Habitats Directive 92/43/EEC, an assessment is required where a project may give rise to significant effects upon a Natura 2000 site. An Appropriate assessment has been written and is included as Appendix 5.1.

This report should be read with the following figures and appendices

- Figure 5.1 Conservation Designations (page 5-3)
- Figure 5.2 Ecology Survey Areas (page 5-4)
- Figure 5.3 Habitat Map (pages 5-25 and 5-26)
- Figure 5.4 Mammal Activity (page 5-46)
- Figure 5.5 Breeding Bird Territories (page 5-39 and 5-40)
- Figure 5.6 Black Guillemot Breeding Sites (page 5-41)

- Appendix 5.1 Appropriate Assessment
- Appendix 5.2 Photographic Plates
- Appendix 5.3 Larne Lough Wintering Bird Desktop Review
- Appendix 5.4 Bat Survey Report
- Appendix 5.5 Larne Lough SPA Natura (& ASSI) Site Synopses & standard data forms
- Appendix 5.6 RPS Open Coast Bird Survey Data (December 20008-August 2009) & BTO Species Codes
- Appendix 5.7 WeBS, NEWS, Seabird Data sets for Study Area
- Appendix 5.8 British Trust for Ornithology Bird Species Codes

This Chapter should also be read in conjunction with Chapter 4.0 Project Description, Chapter 6.0 Intertidal and Underwater Flora & Fauna, and Chapter 10.0 Geology & Hydrogeology.

### 5.1.1 Study Area

The study area is located on the east Antrim coast, in Northern Ireland and is dominated by farmlands on the Islandmagee peninsula adjacent to Larne Lough (Figure 5.1; Plate 5.1). Larne Lough is a sea lough separating the Co. Antrim mainland from the Islandmagee peninsula which is internationally important for both breeding and wintering seabirds and waterfowl. The Lough to the south of the site is shallow, having become extensively infilled with sediments of fine muddy sand, and at low tide, large areas of intertidal flats are exposed. The northern parts of the lough are wider and relatively deep, especially at the

mouth by the commercial port of Larne, where dredging is regularly carried out. This area of the Lough is very weakly tidal, and there are no mudflats exposed at low tide.
Please note that the respective survey areas for mammal, bird, and habitat surveys are markedly different. Survey areas for the various types of ecology surveys undertaken have been mapped in Figure 5.2.

### 5.1.2 Report Scope

#### 5.1.2.1 Scope of Ecological Surveys

Following consultation with Northern Ireland Environment Agency - Natural Heritage (see Chapter 2.0), the following ecology surveys were undertaken within the study area:

- Extended Phase 1 Habitat survey
- Breeding bird survey
- Wintering farmland bird survey
- Wintering & breeding open coastal bird survey
- Black Guillemot *Cephhus grylle* breeding survey
- Mammal survey

These surveys are described in detail later in this report.

#### 5.1.2.2 Appropriate Assessment

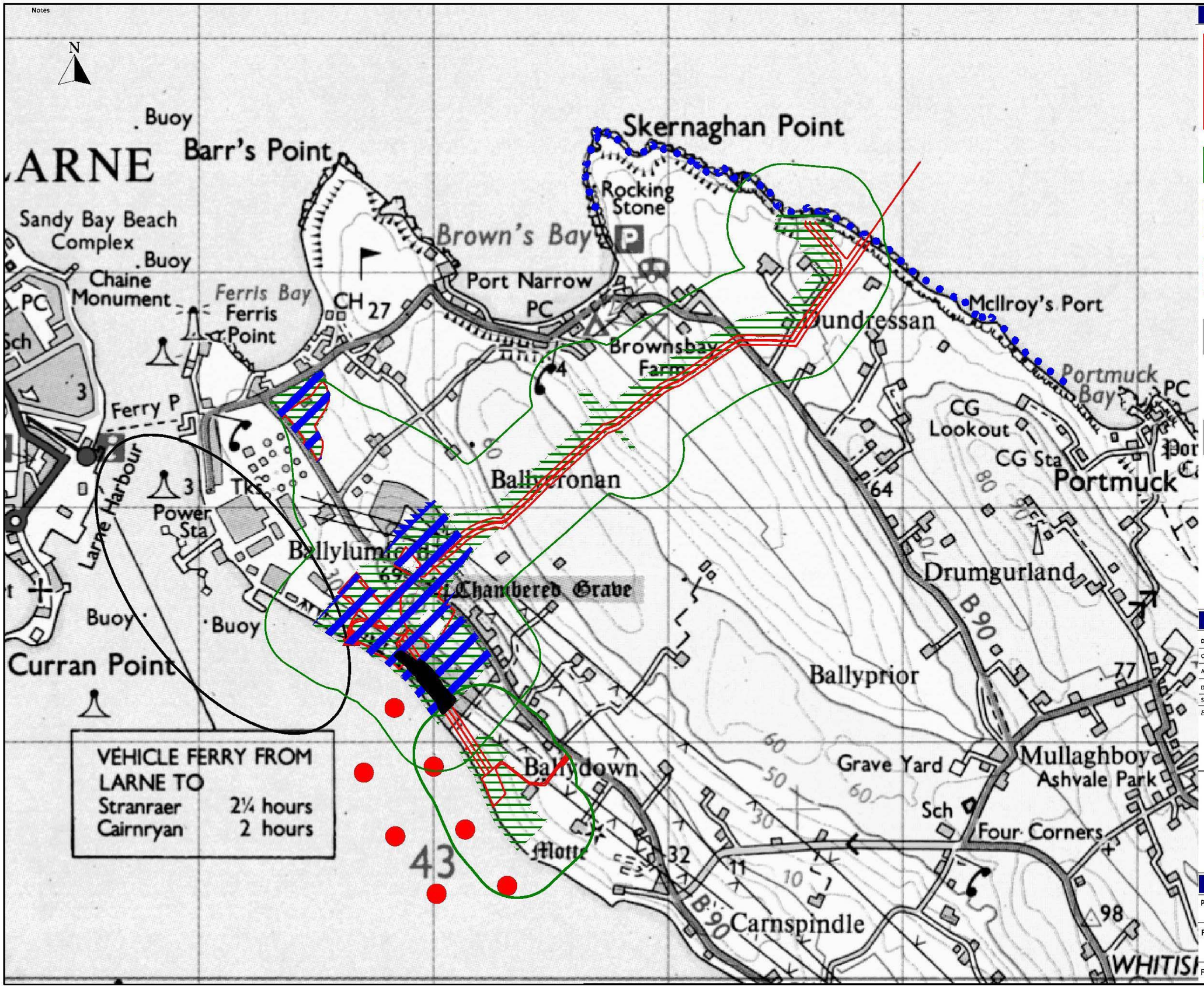
Under Article 6 (3) of the EC Habitats Directive 92/43/EEC, an assessment is required where a project may give rise to significant effects upon a Natura 2000 site. Natura 2000 is a European network of protected sites which includes Special Areas of Conservation (CSAC) and Special Protection Areas (SPA). Due to the location of the scheme within and adjacent to the Larne Lough SPA, an Article 6 Appropriate Assessment (or 'AA') has been produced and is included as Appendix 5.1 to this report.

### 5.1.3 Project Description

A full description of the scheme is provided in Chapter 4.0 Project Description. The location of the scheme is illustrated in Figure 5.2. The scheme entails creating an underground gas storage facility at Islandmagee, Co. Antrim. Gas will be stored beneath the eastern side of Larne Lough in caverns that are created within salt layers of Permian age. The complex of above-ground facilities for the proposed development is primarily located in farmland adjacent to the existing power station. However an additional element (Sea-Water Intake & Pumping Station) is located on the eastern shoreline of the Islandmagee peninsula at Castle Robin Bay. Sub-surface pipelines will be installed to interconnect the scheme elements.

The following is a list of the proposed elements of the scheme. The sites of many of these elements are illustrated by plates which have been included at the end of this Chapter. In addition, the habitats at each element are described in Table 5.3. Abbreviations are employed throughout this section to facilitate brief reference and are included in brackets:

Notes




## LEGEND

- Scheme Area
- Scheme Subsurface Cavern Location
- Scheme Vent Stack
- Mammal Survey Area
- Breeding Bird Survey Area
- Phase 1 Habitat & Wintering Farmland Bird Suvrey Area
- Black Guillemot Breeding Survey Area
- Open Coast Bird Surveys (All Year)
- No Access to survey (ca. 2.5ha)

## ISSUE DETAILS

| | | | |
|---|---|---|---|
| Drawn: | RF | Project No. | NI 1024 |
| Chkd: | JMC | File Ref. | A |
| Appd: | RH | | |
| Date: | March 2010 | Drawing No. | Rev. |
| Scale: | 1:15,000 | X | D01 |

*Environmental Consultants*

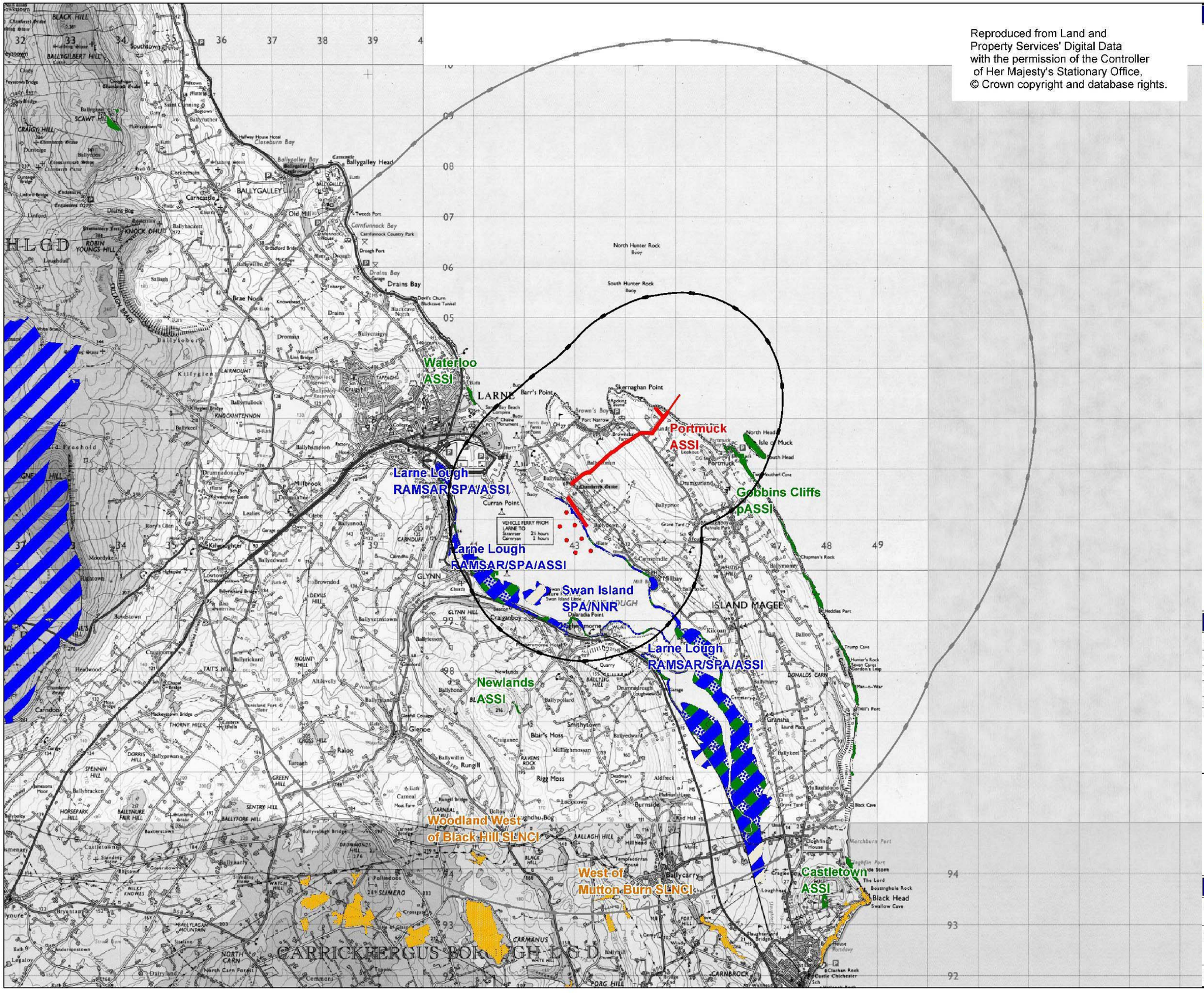
RPS

## PROJECT & FIGURE DETAILS

Project Title:
**Islandmagee Storage Project**

Figure Title:
**Ecology Survey Areas**

Figure Number: **5.2**






## LEGEND

- Scheme Area
- Scheme Subsurface Cavern Locations
- 2km Buffer Area
- 5km Buffer Area
- Special Protection Area (SPA)
- Area of Special Scientific Interest (ASSI)
- Ramsar
- Site of Local Nature Conservation Interest (SLNCI)

## ISSUE DETAILS

| | | | |
|---|---|---|---|
| Drawn: | RF | Project No. | NI 1024 |
| Chkd: | JMC | File Ref. | A |
| Appd: | RH | | |
| Date: | March 2010 | Drawing No. | X |
| Scale: | 1:7,000 | Rev. | D01 |

*Environmental Consultants*

RPS

## PROJECT & FIGURE DETAILS

Project Title:
**Islandmagee Storage Project**

Figure Title:
**Conservation Designations**

Figure Number: **5.1**

- Gas Plant Facilities (GPF) in farmland above eastern shore of Larne Lough (1.67ha)
- Sea-Water Intake Pumping Station (IPS) on shingle and farmland at Castle Robin Bay on the eastern coast of the Islandmagee Peninsula (0.02ha).
- Brine outfall pipe ca. 450m offshore of IPS location in northeasterly direction
- Seawater & Brine Pumping Facilities (Leaching Plant) on hardstanding by Ballylumford Road (0.61ha)
- Sub-surface Pipelines (SSP) connecting GPF and Wellpad, and connecting Leaching Plant with IPS by crossing Islandmagee farmland to reach outfall at Castle Robin Bay. Lengths of all pipelines provided in Chapter 4.0 Project Description
- Temporary Set Down and Storage Compound (TSCA) at junction of Ferris Bay Road and Ballylumford Road (2.7ha)
- Wellpad in farmland on eastern shore of Larne Lough south of GPF (0.48ha)
- Vent Stack between farmland and shingle above Larne Lough shoreline (0.8m$^2$)

Please note the existing Ballylumford power station is hereafter referred to as 'the power station'

## 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 site area and a surrounding buffer zone of 2 km 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:

**Europe**

- Council Directive 79/409/EEC on the conservation of wild birds ("The Birds Directive");
- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora ("The Habitats Directive");
- Council 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 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)');

**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 Department of the Environment (DOE) Review of The Wildlife (Northern Ireland) Order 1985 – A Consultation Paper ('The Wildlife Order Review Paper')
- 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) and The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2007 (S.R. 2007 No. 345) The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2009 (S.R. 2009 No. 8) ('The Conservation Regulations');
- The Nature Conservation and Amenity Lands (Northern Ireland) Order 1985 (S.I. 1985/170 (N.I. 1)) ('The Nature Conservation Order');
- 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);
- Larne Area Plan 1984 2010

The following websites were consulted:
- National Biodiversity Network (NBN) website and databases;
- Northern Ireland Environment Agency (NIEA) website and databases;
- Joint Nature Conservation Committee (JNCC) website and designation database;
- Invasive Species Northern Ireland Website and database;
- Invasive Species Ireland Website and database;
- National Biodiversity Network (NBN) Website;
- Northern Ireland Flora website;
- Butterfly Conservation website;
- Northern Ireland's Mammals, Amphibians, & Reptiles (NIMARS) website;

The following datasets are available for Larne Lough and the surrounding area. Where asterisked, these are included in this report, or in the Appropriate Assessment (Appendix 5.1).

- *JNCC Seabird 2000 Data for Black Guillemots (Appendix 5.7)
- *BTO Wetland Bird Survey Data 2001-2006 (WeBS) (Appendix 5.7)
- *Non-Estuarine Wetland Surveys 1998 & 2007 (NEWS) (Appendix 5.7)
- *CeDAR Records 1992-2006 (See report in Appendix 5.3)
- Northern Ireland Birdwatchers Association (NIBA) Monthly Reports (Not Included)
- *RSPB Bird Dataset Review Table (see Appendix 5.1)
- *JNCC Tern Datasets (Wilson et al., 2007)
- Swan Island Tern Colonies Survey Data (RSPB) (Not Included)

### 5.2.2 Consultation

The written responses received from consultees with particular relevance to terrestrial ecology are presented in Section 5.3.1 Consultation. Further details on consultation are contained within Chapter 2.0 "*Consultation*s".

### 5.2.3 Wintering Bird Desktop Study

Larne Lough SPA is primarily designated for internationally important populations of two breeding Tern populations and over-wintering Brent Goose *Branta bernicla hrota* (see

section 5.3.2.1 & Plate 5.2). As the breeding Tern populations are well documented, and located ca.1km southwest of the site, Terns were excluded from the review of all existing wintering bird data undertaken to assess potential gaps in wintering survey data prior to undertaking the EIS desktop study. This review is included as Appendix 5.3.

### 5.2.4 Field Survey Methodology

#### 5.2.4.1 Extended Phase 1 Habitat Survey

After the desktop ecological assessment was complete, the site was visited on the 4th and 5th June 2009 to carry out an extended Phase 1 Habitat survey (however additional observations were also noted during walkovers for other surveys (winter 2008-summer 2009). This survey was carried out according to the industry standard JNCC Phase 1 Habitat Survey Methodology (JNCC, 2003). Habitats were recorded and mapped and an intensive search was undertaken for protected species.

The extended Phase 1 habitat survey is a multipurpose survey that aims to identify any or all of the following seven 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 (Northern Ireland) Order 1985, as amended, 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".

  - 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, and The Wildlife Order Review Paper.

- Invertebrates
  - Protected and rare Butterflies listed on Schedule 5 of The Wildlife Order
  - Protected and rare Dragonflies listed on Schedule 5 of The Wildlife Order
  - Invasive invertebrates (see above)

- Protected Amphibians: Potential Common Newt *Lisotriton vulgaris* breeding habitat
  - Common newts are fully protected in NI under Schedules 5 to 7 and Articles 10 to 13 and 28 of the Wildlife Order (Northern Ireland) 1985 and as amended by S.I. 1995/761. Newts are provided additional protection under Annex III of the Habitats Directive. 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 they show a strong preference for fish-free waterbodies (Inns, 2009). However a Quercus survey of newts in Northern Ireland (O'Neill et al., 2004) concluded that it remains difficult to predict likelihood of newt presence based on habitat, and highlighted that there is a clear requirement for surveys of sites proposed for development. Notes were made of potential breeding waterbody habitat including notes on presence of frogs/tadpoles, fish, and predatory birds.

- Protected Reptiles: Potential lizard breeding habitat
  - Live sightings of Common Lizard are very rarely observed outside of formal survey. Field signs are limited to rare discoveries of shed skins, and sightings are equally rare. Nevertheless, care was made to search for lizards in appropriate habitat. This is varied, and can include a range of dry habitats including open woods, heaths and grassland. Where sheets of plastic or metal i.e. potential refuges) were located within the site boundary, these were overturned to look for sheltering individuals.

#### *5.2.4.1.1 Seasonality of Habitat Survey*

Seasonality is a key issue in ecological surveys as the timing of survey may dictate that certain groups are under-recorded or missed altogether. It is impossible to survey for all organisms in one trip due to the staggered nature of the life histories of different species. For example, different butterfly species are in flight and flowers in bloom at different times throughout summer.

The timing of the walkover survey in mid-June is ideal for many flowering plants and butterflies, and the majority of breeding birds. However later-flowering plants, certain butterflies, and most dragonflies are better surveyed in July/August. Habitat survey observations were therefore noted during early season breeding bird surveys, and late-season open coast and black guillemot breeding surveys to supplement the June Habitat results.

### 5.2.4.2 Bird Survey Methodology

This section should be read with Figure 5.2 (page 5-4). Due to the nationally and internationally important bird populations at Larne Lough, a variety of surveys were undertaken. Except where otherwise stated, all surveys below employed techniques described in Gilbert et al.(1998).

#### *5.2.4.2.1 Wintering Farmland Bird Survey*

The need for this survey was highlighted by the conclusions of a desktop review of wintering bird data for Larne Lough (RPS, 2008- see Appendix 5.3). There is no standardised Wintering Farmland Bird Survey Methodology. However, guidelines for the BTO Bird Atlas Wintering Surveys (BTO website, 2009) were pragmatically adopted. Following this protocol, there was therefore one survey on 5th December ('early' Winter: November-December), and two further surveys on 30th January and 20th February ('late' winter: January-February). The

pipeline routes were walked and peak counts were recorded and all protected species carefully observed.

Surveys were carried out between 8 and 11am and never in strong winds, or persistent or heavy rain or snow. In some cases this required pausing surveys until clement weather returned.

#### *5.2.4.2.2 Breeding Farmland Bird Survey*

The British Trust for Ornithology's Common Birds Census (CBC) was employed to survey breeding birds. Additional guidance from Gilbert et al., 1998 on species-specific survey strategies was absorbed into the CBC survey where required.

The site was visited three times to estimate bird territories within the survey area (a proxy for actual breeding pairs) by mapping bird activity over several visits. Surveys commenced an hour after dawn, and were completed within 4 hours (before 11am) to census during peak bird activity. Surveys were not carried out in adverse weather conditions. A map of breeding territories was produced by analyzing the mapped activity over three months. The survey area is illustrated in Figure 5.2. Territories were not mapped for the majority of the pipeline route as this would have significantly lengthened survey effort due to access and walking distance considerations. The justification for this slightly curtailed approach is that no significant habitat loss is envisaged along the pipeline, and it is also highly likely that works will be undertaken outside the breeding season.

#### *5.2.4.2.3 Open Coast Bird Surveys*

The open coast is the non-estuarine shore of the Islandmagee peninsula outside Larne Bay and Lough. The area surveyed was the 2.2km stretch of coast from the western (Browns Bay) edge of Skernaghan Point to the northern edge of Portmuck Bay. The aim was to locate any breeding/wintering seabirds within the vicinity (ca. 400m) of the Castle Robin Bay outfall location, and reveal the extent of foraging areas of birds from Portmuck ASSI and Gobbins Cliffs pASSI to the south, and Swan Island SPA to the east. Please note that seabird breeding sites further than 400m south of the IPS site on Portmuck ASSI cliffs were not surveyed (this area was surveyed for foraging seabirds however). Swan Island SPA, Portmuck ASSI and Gobbins pASSI are designated for breeding seabird species (see section 5.3.2), many of which are pelagic, returning from their wintering grounds in the open oceans to breed on-land in spring and summer. The focus of these surveys was therefore during the main seabird breeding season (May-July). The Wintering Bird Desktop Study found that the existing Non-Estuarine Wetland Surveys (NEWS) sufficiently cover this coast in the winter. However two winter surveys were additionally undertaken to complement the NEWS data, and to satisfy the comments by NIEA in formal consultation highlighting the usage of Skernaghan Point by Gobbins/Portmuck auks during the winter. This ensured up-to-date data on non-pelagic seabirds which are features of the ASSIs, and which are resident in the area (Shag, Cormorant).

#### *5.2.4.2.4 Wintering Open Coast Surveys*

Three surveys were undertaken between December and February 2008/9. Surveys were undertaken between 09h00, and 16h00, and generally took three hours. The coastline was

walked and all seabirds within 300m of the coast recorded, although notes were made on any other species, or flocks at distances greater than 300m. Weather conditions including swell and sea state were recorded. Equipment was a pair of 8 x 42 Pentax Binoculars & a Nikon ED50 Spotting Scope (to 75x magnification) mounted on a Manfrotto tripod.

#### *5.2.4.2.5 Breeding Open Coast Surveys*

A pragmatic combination of species-specific breeding seabird methodologies (Gilbert et al., 1998) was adopted to survey for seabirds, waders, gulls, and raptors with a particular focus on Gobbins/Portmuck breeding species (see section 5.3.2). Methodology as for Wintering open coast surveys above.

#### *5.2.4.2.6 Black Guillemot Breeding Survey*

Black Guillemots *Cepphus gylle* are a pelagic species, wintering in the open ocean to return to breed on-land in spring/summer. They breed in regionally important numbers in scattered populations within Larne Lough in the vicinity of the proposed scheme; in particular there are long-established colonies breeding in holes in the two jetties below the power station (Plates 5.3 and 5.4), and scattered thinly along the open Antrim coastline. The portion of the Seabird 2000 dataset obtained from the JNCC covers Larne Lough, while NIEA hold data on Black Guillemot Colonies at the ASSI sites (not obtained for this EIA). RPS undertook breeding surveys of the two Ballylumford jetties in April & July 2009. Two surveys were undertaken in April to estimate population size, with two further visits (in May & July) to estimate productivity (methods of Gilbert *et al*., 1998).

#### *5.2.4.2.7 Population Survey*

The April population surveys use a peak count of all adults in breeding plumage over the two visits to provide a measure of the total breeding population. Surveys were undertaken from first light to about two hours later. Birds observed were divided into three categories:

- Birds in summer plumage
- Birds in other plumage
- Birds >300m offshore

Other features recorded were detailed weather data (including sea state), presence of breeding gulls, signs of mammalian predators, and probable breeding habitat.

#### *5.2.4.2.8 Productivity Survey*

The May & July productivity surveys employed a non-invasive method for surveying inaccessible nest sites to provide a crude estimate of successful nest sites (i.e. productivity). This is achieved by recording both parent changeovers at the nest, and fish deliveries to the nest both of which indicate a successful nest site. The productivity index (p) is number of successful nest sites in July divided by number occupied in May.

### 5.2.4.3 Mammal Surveys

#### *5.2.4.3.1*

#### *5.2.4.3.2 Otter Survey*

The Otter survey was undertaken in accordance with the guidance document 'Survey specification for Otter surveys' (EHS, 2006). Careful examination of any watercourses observed during the Phase 1 habitat survey was undertaken to determine whether otter

shelters or otter habitat were likely to be affected by the proposal, particularly by the crossings of watercourses.

The range of field signs indicative of otter presence (SNH, 1997) include:

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

#### *5.2.4.3.3 Badger Survey*

The badger survey was undertaken in accordance with the guidance documents '*Survey specification for badger surveys*' (EHS, 2006), '*Survey specification for otter surveys'* (EHS, 2006), and with reference to 'Badgers & Development' (EHS, 2005). Habitat features encountered during the habitat survey were 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.

Harris *et al.* (1989) note that setts are assessed for level of use and the number of entrance holes, and thus classified into four types: main, annexe, subsidiary and outlying. These are defined below.

- Main sett: These are large, well-established setts, normally in continuous use. Each group will use only one main sett and it will form the most likely location for the raising of cubs;
- Annexe sett: These setts are usually found in close association with the main sett, and will often be linked to it by a well-worn path. Where a second litter of cubs is born they will be raised in the annexe sett;
- Subsidiary sett: Subsidiary setts will usually have five or less holes, although not all of these will be in continuous use;
- Outlying sett: These setts are used on an occasional basis and will usually consist of only one to three holes. Spoil heaps will generally be smaller than those associated with the other sett types, indicating a smaller underground structure.

The entrance holes to setts can provide an indication as to the level of use of the sett. Entrance holes can be classified as follows:

- Well used: These holes are in regular use and are therefore free of debris. They may have been recently excavated.
- Partially used: Debris, including leaves, twigs and other vegetation clutter the entrance to these holes, indicating they are not in regular use. The holes can be used after a minimum of clearance.
- Disused: A considerable amount of clearance is needed before these holes can be used. The holes may become so blocked that only a depression in the ground is visible where the hole used to be.

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 (SNH, 2001). The habitat surrounding the sett, soil type, and signs of human activity are also noted.

#### *5.2.4.3.4 Bat Survey*

The scheme area was subject to an intensive study for bats on 11th September 2008, and 18th and 19th August 2009. Bats were surveyed during the day, at predawn and at night. Trees were surveyed from the ground for entrance holes to potential roosts, night perches for bats, and related signs of bat usage. Observations were made at night (from sunset), and in the predawn using a Pettersson D240X bat detector. The results of this survey have been summarised in this report. For the detailed report, please refer to Appendix 5.4.

#### 5.2.4.4 Reptiles & Amphibians

See section 5.2.4.1

#### 5.2.4.5 Invertebrates

See section 5.2.4.1

### 5.2.5 Impact Assessment

In the assessment stage, impact assessment will be undertaken in accordance with the Institute of Ecology and Environmental Management (IEEM) Guidelines for Ecological Impact Assessment in the United Kingdom (2006), and also using experience of 'best practice' in the ecological assessment of proposed developments. The impact significance is a combined function of the conservation value of the affected feature (Table 5.1), and the magnitude of the potential impact. Magnitude of potential impact is often difficult or impossible to characterize, and the following list of parameters are considering when attempting to measure the magnitude of a potential impact:

- Physical nature
- Type: (positive (+ve) Negative (-ve), Direct/Indirect)
- Geographic scale
- Duration & Reversibility
- Range & status of species & habitats potentially affected
- Population sizes of species potentially affected

Once identified, and characterised for magnitude, each potential impact is assigned a likelihood of occurrence and a value is assigned to indicate the confidence in the prediction. The overall appraisal of the potential impact is then determined by combining the value of the feature (Table 5.1), with the magnitude and likelihood of potential impact. Mitigation is proposed to neutralize potential impacts identified as likely. Impacts remaining after mitigation are termed residual impacts. Compensation is proposed to neutralize or reduce residual effects.

**Table 5.1 Guidance on Describing the 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<br><br>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<br><br>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 |

## 5.3 BASELINE ASSESSMENT

### 5.3.1 Consultation

A full list of consultees contacted as part of the EIA is included in Chapter 2.0. Formal written consultation was undertaken with the following institutes of particular relevance to ecology and nature conservation. Please also note the datasets obtained from the sources in section 5.2.1.

- Northern Ireland Environment Agency
- The Royal Society for Protection of Birds Northern Ireland (RSPB NI)
- Agrifood & Biosciences Institute (AFBI)
- Northern Ireland Raptor Study Group (NIRSG)

### 5.3.2 Sites Designated for Nature Conservation in Northern Ireland

This section should be read with Figure 5.1 Conservation Designations (page 5-3). A number of designated ecological areas occur within Larne Lough itself, and within a 2km buffer zone (Figure 5.1). The Natura site synopses and Natura standard data forms for all these sites are located in Appendix 5.5.

#### 5.3.2.1 Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)

Council Directive 79/409/EEC on the Conservation of Wild Birds (The Birds Directive) and Council Directive 92/43/EEC, on the Conservation of Natural Habitats and of Wild Flora and Fauna (The Habitats Directive) form the overarching nature conservation legislation in force in Northern Ireland today. SACs along with SPAs are sites of European-wide importance and form a network of nature conservation areas throughout European Member States known as the Natura 2000 network. The Habitats Directive is implemented in Northern Ireland through The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (S.R. 1995/380), as amended by The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2004 (S.R. 2004/435) and The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2007 (S.R. 2007/345).

Larne Lough SPA qualifies under Article 4.1 of the Birds Directive by regularly supporting internationally important numbers of Light-bellied Brent Geese in winter. The extent of the habitat and the numerous roost site locations are additional selection features for Larne Lough. In addition to the Larne Lough designations, Swan Island, which is located near the western Lough shore, approximately 750m northwest of Dalaradia Point was assigned its own SPA status in 1992, and is also home to the tiny area (0.04Ha) designated as Swan Island National Nature Reserve (NNR). Swan Island qualifies under the same article because it supports nationally important breeding populations of Roseate and Common Tern Species which are both Birds directive Annex 1 species. Swan Island is additionally home to small numbers of Sandwich and Arctic Terns(NIEA Website, 2008).

There are no SAC sites within 2km of the scheme. The closest SAC is Garron Plateau SAC located 25km northwest of the scheme.

#### 5.3.2.2 Areas of Special Scientific Interest (ASSIs)

Other pertinent National legislation in relation to designated sites and protected species in Northern Ireland includes The Wildlife (Northern Ireland) Order 1985 (S.I. 1985/171); The Wildlife (Amendment) Order (Northern Ireland) 1995 (S.I. 1995/761); The Nature Conservation and Amenity Lands (Northern Ireland) Order 1985 (S.I. 1985/170) and The Environment (Northern Ireland) Order 2002 (S.I. 2002/3153). ASSIs are designated under S.I 1985/171, and their protection strengthened under S.I. 2002/3153. National Nature Reserves (NNRs) are designated under S.I. 1985/170. All habitats and/or species in Northern Ireland afforded legal protection are designated by statute under one or more pieces of the above legislation.

- Larne Lough has been designated an ASSI (Site no. RSAR003) by virtue of the diverse habitats found here ranging from artificial brackish lagoons in the northwest to mudflats, rocky shores and saltmarshes throughout. Additional selection features are nationally important wintering populations of:
  - Goldeneye
  - Great-crested Grebe
  - Red-breasted Merganser
  - Shelduck
  - Redshank (NIEA Website, 2008)
  - The boundaries of the Larne Lough Ramsar site, Area of Special Scientific Interest (ASSI), and Special Protection Area (SPA) are all entirely coincident.

- Castletown ASSI (Site no. ASSI193) is located approximately 1km southeast of the Lough (9.5km southeast of the proposed buildings). Castletown is a series of four traditionally managed hay meadow fields containing species-rich dry grassland notable for plant diversity. This type of grassland provides valuable feeding and roosting sites for a range of animals, including birds and invertebrates; the variety of butterflies recorded at the ASSI include small copper and large numbers of meadow brown and common blue. (NIEA Website, 2008)

- Gobbins Cliffs proposed ASSI is located 2.2km east of the Lough at its nearest point, but is included here. It is an area of maritime cliffs and slopes, and Intertidal rock, and is located along the eastern coast between Hills' Port and two-Mouthed Cave. At the time of the Seabird 2000 survey, the Gobbins held 1.6% of the all-Ireland populations of Kittiwakes and 1.1% of the all-Ireland populations of Razorbills. The site also supports the only mainland nesting Atlantic Puffins in Northern Ireland and significant populations of Fulmar, Cormorant, Shag and Common Guillemot. Peregrine Falcons also breed within the designated area (DoE, 2007). A detailed description of the site has been provided by the NIEA and is included with the RPS wintering bird desktop study in Appendix 5.3.

- Waterloo ASSI (Site No: ASSI084) is located approximately 0.5km northwest of the mouth of the Lough, and is designated for its geological rather than ecological features, and is home to some of the best and most accessible exposures of Upper Triassic and Lower Jurassic strata in Ireland.

- Portmuck ASSI (Site no. ASSI177) is located approximately 3km east of Larne Lough at its nearest point, and approximately 0.6km south of the IPS element of the scheme This site is valued for its geological formations, in particular the only exposure of the Cretaceous Hibernian Formation in Northern Ireland, and the only occurrence of the mineral sodalite in Ireland and the international type locality of Gobbinsite. The Isle of Muck which is a small island included in this ASSI is home to seacliff and calcareous grassland habitats and consequently holds notable breeding seabird populations including Razorbill, Guillemot, Puffin, Kittiwake and Fulmar.

- Gobbins pASSI (Site no. ASSI177) is located approximately 3.5km east of the Lough at its nearest point, and approximately 2.2km south of the IPS element of the scheme.

#### 5.3.2.3 Ramsar Sites

Sites designated for their nature conservation value, which are not statutorily protected, derive from International Treaties and Regional Planning Policy. The Ramsar Convention [The Convention on Wetlands of International Importance, especially as Waterfowl Habitat] is an international treaty for the conservation and sustainable utilization of wetlands designed to stem the progressive encroachment on and loss of wetlands. The Convention was developed and adopted by participating nations at a meeting in Ramsar, Iran in 1971 and came into force in 1975. The United Kingdom was one of the original signatory nations. Larne Lough qualifies under Criterion 2 of the Ramsar convention by virtue of the numerous vulnerable and endangered Irish Red Data Book bird species, and under Criterion 3c by regularly supporting internationally important numbers of Light-bellied Brent Geese in winter. The boundaries of the Larne Lough Ramsar site, Area of Special Scientific Interest (ASSI), and Special Protection Area (SPA) are all entirely coincident.

### 5.3.3 Non-Designated for Nature Conservation in Northern Ireland

Sites of Local Nature Conservation Importance (SLNCIs) 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 Larne Area Plan 1984-2010.

The Bentra Wood SLNCI is located approximately 1km southwest of Larne Lough at its nearest point (9km south of the GPF) and is characterised by woodland, grassland, scrub, stream, flushes.

The Antrim Coast (Black Head to Whitehead) SLNCI is approximately 1.5km southeast of the Lough at its nearest point (10km southeast of the GPF) and is characterised by scrub, grassland and sea cliffs.

### 5.3.4 Protected Rivers

In accordance with the requirements of The Water Framework Directive (2000/60/EC) and the Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003, NIEA have compiled a Register of Protected Rivers. There are two protected rivers within 2km of the study area. The river Glynn flows into the Lough on its western shore south of the village of Glynn, and is a protected for its drinking water and its economically significant Salmonid populations, as is the Larne River that flows into the Lough north of Poguestown. The Slaughterford Water tidal river flows from Larne Lough south to its mouth at Castle Chichester, but is not protected. In addition, Larne Lough is protected under the Shellfish Waters Directive (79/923/EEC) due to the economic significance of its shellfish stocks.

### 5.3.5 Protected Species (Existing Records)

The Protected Plant Database of the Flora of Northern Ireland Website and the National Biodiversity Network (NBN) website were trawled to search for any protected flora or fauna species present in either of these grid squares. The flora and fauna species listed in these resources are specially protected at all times in Northern Ireland under various schedules of The Wildlife Order (Northern Ireland) 1985 (as amended). The otter Lutra lutra, and all bat species are now protected as European Protected Species (EPS) under The Conservation Regulations.

The Northern Ireland Priority Species database (NIEA website, 2009) was also consulted for potential conservation target organisms in the study area. The scheme area lies within the 10km grid square D40, and all protected species are detailed in Table

**Table 5.2 Protected Flora & Fauna recorded in the grid square D40**

| Latin Binomial | Common Name | Habitat |
|---|---|---|
| *Dermochelys coriacea* | Leatherback Turtle | Marine Water |
| *Lutra lutra* | Common Otter | Freshwater, Marine, & Brackish Water |
| *Mertensia maritima* | Oysterplant | There are good populations still to be seen in the north of Co. Antrim and in Co. Down near Annalong. The plant grows on upper parts of shingle beaches where there is some supply of freshwater from the land behind and some protection from the worst storms. |
| *Primula vulgaris* | Primrose | Woodlands, hedgerows, shaded mountain-cliffs and north-facing banks |
| *Ophyrs apifera* | Bee Orchid | A species of limestone, chalk or calcareous dunes, rather frequent but local in Northern Ireland. In |

| Latin Binomial | Common Name | Habitat |
|---|---|---|
| | | North East Ireland it was first discovered as recently as 1923 by C. D. Chase at Magheramorne chalk quarry, where it still grows (1999). This species was found by RPS in the power station in 2008. |
| *Primula veris1* | Cowslip | Cowslip is a native species of pasture of the limestone areas in the west of the Province, and occurs as a garden escape elsewhere. Flowers early summer, occasionally hybridizing with the primrose. |
| Key to Table 5.2<br>[1]Not present in NBN database but found by RPS in the power station in 2007 (RPS, 2007). | | |

### 5.3.6 Habitat Survey Results

Table 5.3 lists the diversity of habitats found within the survey area and their classification according to the JNCC Phase 1 Habitat Methodology (2003). A column has been added to Table 5.3 detailing the relevant scheme element potentially crossing or located within a distance where disturbance is possible. Each habitat is then described, noting dominant species and species of conservation interest, and assigned an ecological value based on the criteria in Table 5.1.

**Table 5.3 Habitats Recorded within the Study Area**

| JNCC Habitat | Plate | Nature Conservation Value | NI Priority Habitat | Links with EU habitats | Relevant Scheme Element(s) (section 5.1.3) | Notes |
|---|---|---|---|---|---|---|
| Semi-natural broad-leaved woodland (A1.1.2) | | Low | - | - | SSP, Leaching Plant | Several Badger Setts & One Protected Flower (Cowslip). |
| Scrub (A2.1/A2.2) | | Low | - | - | SSP, Leaching Plant | |
| Neutral Semi-improved Grassland (B2.2) | 5.1<br>5.5 | Medium | Lowland Meadow | - | SSP, GPF | Includes Orchid swarms |

| JNCC Habitat | Plate | Nature Conservation Value | NI Priority Habitat | Links with EU habitats | Relevant Scheme Element(s) (section 5.1.3) | Notes |
|---|---|---|---|---|---|---|
| Improved Grassland (B4) | 5.6 | Low | - | - | SSP, GPF | - |
| Poor Semi-improved Grassland (B6) | | Low | - | - | - | - |
| Neutral Flush (E2.1) | 5.7 5.8 | Low | - | - | Vent Stack | - |
| Running Water (G2) | | Low | - | - | SSP | - |
| Shingle (H3) | 5.9 | High | Coastal Vegetated Shingle | Perennial vegetation of stony banks (Code:1220) | Vent Stack, IPS | - |
| Hard Maritime Cliff (H8.1) | | Medium | Maritime Cliff & Slope | - | IPS | - |
| Inland Rock Exposure (I1.4) | | Low | - | - | Leaching Plant | |
| Ephemeral/short perennial (J1) | | Low | - | - | TCA | - |
| Introduced Shrub (J1.4) | 5.10 | Medium (-ve) | - | - | | No WO-listed alien species |
| Intact native hedge (J2.1) | 5.6 | medium | - | - | SSP, GPF | One Protected Flower (Primrose) |
| Buildings (J3.6) | 5.11 | Low (bats absent) or High (bats present) | - | - | | Roosting Bat Potential |
| Hard Standing (J5) | 5.12 | Low | - | - | TCA | |

[1] Used to define habitat categories in the United Kingdom

[2] Used to define habitat categories in the Republic of Ireland

#### 5.3.6.1 Habitat Descriptions

**Scrub (A2)**

There are several areas of extensive scrub throughout the scheme, some scattered, and some dense and inaccessible. The most significant is the c. 6ha scrubland along the Larne Lough shoreline to the south of the power station (Plate 5.13). This area is largely inaccessible and apparently of limited floristic value. The canopy is approaching semi-maturity, dominated by Hawthorn, and Gorse, with Elder, Blackthorn and Honeysuckle *Lonicera periclymenum*. Accessible clearings show a patchy woodland ground flora dominated by Ivy and Brambles, and including Soft Shield Fern *Polystichum setiferum*, Hart's Tongue *Asplenium scolopdendrium* and Herb Bennet *Geum urbanum* (Plate 5.13).

Scrub elsewhere is generally similar, being Gorse-dominated with a species-poor ground flora.

A notable exception is the species-rich grassland flora associated with the scattered scrub north of the Moyle interconnector access path (Plate 5.5). Woodrushes *Luzula* spp., Sedges *Carex* spp. Meadow Vetchling *Lathyrus pratensis* and Common Bird's Foot *Lotus corniculatus* are frequent here amongst dominant Sweet Vernal Grass Anthoxanthum odoratum, and Crested Dogstail *Cynosurus cristatus*. This area has been mapped as neutral semi-improved grassland. The field layer of the small spreading Gorse scrub on the flat area below the proposed GPF is also diverse, containing many of the species in the surrounding neutral semi-improved grasslands as outlined below. There are generally frequent scattered Rowan *Sorbus acuparia*, and/or Alder *Alnus glutinosa*, particularly in the scrublands south of the power station, and in the transition to woodland by the Moyle Interconnector.

Regarding value for animals, the scrub habitat provides potential breeding habitat to the badger which is a protected species in Northern Ireland under the Wildlife Order. Two setts were located in scrub/woodland along the SSP route. A wide diversity of songbird species also breed in the shelter of scrub vegetation throughout the scheme including Amber-listed Linnets, and an abundance of warblers as detailed in section 5.3.7.3.

**Broad-leaved Semi-natural Woodland (A2.1)**

There is one area of woodland along the proposed SSP route, located either side of the Moyle interconnector access road (visible in Plate 5.6).This grades to Gorse scrub to the west. The canopy is dominated by Sycamore, Ash, and Hawthorn, with a relatively open understorey. The ground flora is varied and patchy, but high quality in scattered patches with Wood Meadow *Poa nemoralis* Grass, Bluebell *Hyacnthoides sp,* Male fern *Dryopteris sp.,* Herb Bennet, Hogweed *Heracleum sphondylium*, Violet Viola sp., Early Purple Orchid *Orchis mascula,* and the protected species Cowslip *Primula veris* occur*.* Interspersed with these rich communities are species-poor scrubby Bramble and Nettle-dominated areas.

**Neutral Semi-improved Grassland (B2.2)**

There are extensive areas of relatively species-rich neutral grassland throughout the scheme area. During the construction of the power station between 2000 and 2003, large volumes of fill material (demolition rubble and soils/rock) were placed on the fields immediately south of

the power station (proposed site of GPF) which are currently fenced-off for security reasons, and therefore ungrazed. The placement of fill has created several man-made plateaux and embankment slopes (Plate 5.1). The upper plateau and slope is considerably more diverse than the lower. A patch of Gorse scrub is located along the fenceline between the two plateaux and is spreading. On the more diverse upper slope where the GPF is proposed, Sweet Vernal Grass *Anthoxanthum odoratum,* Sheeps fescue *Festuca ovina* and *Agrostis* tenuis dominate a sward that also contains frequent Crested Dogs Tail, Downy Oat Grass *Helichtotrichon pubescens,* Tufted Hair Grass, Hop trefoil *Trifolium campestre*, Red Clover *Trifolium pratense* Smooth Meadow Grass *Poa pratensis*, Field Woodrush *Luzula campestre,* an unidentified *Geranium* sp. , and an occasional late-flowering yellow-flowered crucifer (unidentified).The upper field is free from scrub encroachment. The lower plateau and embankment are classed under poor semi-improved grassland (B6)

The farmlands along the SSP pipeline routes (Plate 5.6) are generally improved grasslands (B4) grazed by both cattle and sheep, but there is c. 1.3ha of diverse neutral grasslands in the southwest of the SSP route in the scrubby grassed areas around the Moyle interconnector access road. The sward here is diverse, grading into Gorse-dominated scrub to the north. Amongst the dominant Sweet Vernal Grass, Yorkshire Fog Fescue grasses and frequent Field Woodrush *Luzula campestre*, Ribwort Plantain *Plantago lanceolata* are Hybrid swarms of Heath-spotted Orchid *Dactylorhiza maculata* Common-spotted Orchid *Dactylorhiza fuchsia* (Plate 5.5). Also occurring here are Lady's smock *Cardamine pratensis,* Meadow Vetchling *Lathyrus pratensis,* Oxeye Daisy *Chrysanthemum leucanthemum*, Downy Oat Grass *Helichtotrichon pubescens,* Hammer Sedge *Carex hirta,* Glaucous sedge, Common Bird's Foot Trefoil, St. Johns Wort *Hypericum* sp., Bitter Vetch *Lathyrus linifolius,* Soft Brome *Bromus mollis*, and an Oat *Avena* sp.

Ragged Robin *Lynchnis flos-coculis*, Kidney Vetch *Anthyllis vulneraria*, Slender trefoil *Trifolium micranthum*, and a Hawkweed *Hieracium pilosella* occur with common sedges in a narrow strip along the northern edge of the short perennial vegetation at the site of the proposed TCSA

The site of the IPS at Castle Robin Bay, contains an area of moderately species-rich semi-improved grassland of distinctly maritime character (Plate 5.14). A weed-filled drainage ditch meanders down through this field to discharge onto the shoreline. The sward here is relatively lush and dominated by Yorkshire Fog, Red fescues (several subspecies present), and Meadow Foxtail, with frequent Downy Oat Grass, Common Sedge *Carex nigra*, and Hairy Sedge *Carex hirta*. Forbs include frequent Primrose *Primula vulgaris* (see section 5.3.6.2) Meadowsweet *Fillipendula ulmariai,* Common Bird's Foot Trefoil *Lotus corniculatus*, and the two coastal species Shoredock *Rumex crispus,* and Wild Carrot *Daucus carota.* Rabbits are abundant in the grass-topped cliffs to the north.

**Improved Grasslands (B4)**

Improved grasslands are artificially seeded with agricultural seed mixes which provide highly nutritious and highly digestible leafy material to grazing mammals, and have spongy tight matted growth forms that protect fields from becoming damaged through poaching which may occur with heavy grazing activity. The habitat is characterised by its high nutrient

content due to the presence of nitrogren-fixing Clovers *Trifolium* spp, and nutrient-rich animal dung. Perennial Rye Grass *Lolium perenne* and Clovers are the dominant seed species. When left ungrazed, improved fields may develop richer plant diversity as species present in the seedbank establish, and plants from adjacent habitats blow in to become poor semi-improved (B6). This is the predominant land-use in the wider scheme area, and along the SSP pipeline route (Plate 5.6). Floristically, this habitat is of low ecological value, but faunistically it provides a valuable feeding area to a range of invertebrate and vertebrate species including several protected species (most notably Badgers which may breed in the immediate vicinity – see section 5.3.8.2), and a range of grazing farmland bird species including thrushes, crows, Black-headed gulls, and Lapwings (see section 5.3.7.2).

**Poor Semi-improved Grassland (B6)**
This habitat contains a small number of species in addition to that of improved fields, and is of low floristic value. As for improved fields however, this habitat provides a significant ecological function as a faunal foraging area- primarily for invertebrates, birds and mammals (including foxes and badgers).

The lower plateau and slope below the proposed GPF is dominated by Tufted Hair Grass, and common grasses with pioneer species such as Smooth Hawksbit *Crepis capillaris* along the southern boundary where landslip has burst the rock gabion above the shoreline.

**Neutral Flush (E2.1)**
On a seaward slope below farmland, at the site of the Ventstack above the shingle beach, there is a small (0.1ha) rectangular neutral flush (Plate 5.7). This is permanently wet from a localised seepage, is uneven underfoot, and is dominated by Marsh Horsetail *Equisetum palustre* and *Tufted Hair Grass Deschampsia caespitosa.* Marsh Willowherb *Epilobium palustre,* Field Fescue *Festuca pratensis*, *Meadow Buttercup Ranunculus acris*, and Marsh Thistle *Cirsium palustre* are also frequent here.

There is also a very small (0.002ha) linear flush south of the power station below the slope upon which the main gas plant facilities are proposed (Plate 5.8). Here, the vegetation is dominated by rushes and sedges, namely Articulated Rush *Juncus articulates*, and Glaucous sedge *Carex flacca*, with frequent False Fox Sedge *Carex otrubae.*

**Running Water (G2)**
There are several drainage ditches within the scheme area. No protected species were found here amongst the common aquatic species such as Common Duckweed *Lemna minor*, Plicate Sweet Grass *Glyceria notate,* and Marsh willowherb. There is frequent fern cover along the ditch hedge banks.

**Shingle (H3)**
This habitat is located at the two extremities of the scheme; along the Larne Lough shoreline to the west, and the Antrim coastline in the bay at Castle Robin Bay (site of IPS) to the east. The shingle itself is largely unvegetated at both sites (see Plate 5.9 and Chapter 6 Intertidal and Underwater Flora and Fauna), but there is moderately developed vegetation on the strandline on the boundary of the shingle with the coastal scrubland/farmland (at both sites).

Similar species occur at both sites, with maritime species along the strandline including Wild Carrot *Daucus carota*, Shoredock *Rumex crispus*, Danish Scurvy Grass *Cochlearia danica*, Sea Mayweed *Triplospermum maritimum* and *Atriplex* sp. However, *Scilla verna* Spring squill, English Stonecrop *Sedum anglicum*, and Sea campion *Silene uniflora* occur in rockier situations towards the waters' edge at the Castle Robin Bay IPS only.

**Inland Rock Exposure (I1.4)**
The site of the Leaching plant is at a former quarry, currently dominated by hardstanding and intact farm buildings, and scattered marginal scrub vegetation (Plate 5.11). There are steep exposed rock slopes here, cut in basalt during past quarrying activity. Further detail is provided in Chapter 10 Geology and Hydrogeology.

**Ephemeral/Short Perennial (J1)**
This habitat is establishing on a c.1.9ha area of hardstanding off the Ballylumford Road that is the site of the proposed TSCA (Plate 5.12). The vegetation is establishing on flat, even stony ground, which has encroaching scrub from the margins. A small burn that discharges into Larne Lough at Ferris bay flows along the northern edge. The flora is moderately species-rich, dominated by Red Fescue and Common Bird's Foot trefoil, and including frequent Ox-eye Daisy, Clovers, Sweet Vernal Grass, and Scot's Pine *Pinus sylvestris* saplings encroaching from the treeline on the western boundary of the habitat. The habitat grades to a small area of species-rich neutral grassland (see B2.2) on the northern margin, where common sedges, Ragged Robin *Lynchnis flos-coculis*, Kidney Vetch *Anthyllis vulneraria*, Slender Trefoil *Trifolium micranthum*, and a Hawkweed *Hieracium pilosella* occur.

**Intact native species-poor Hedge (J2.1)**
There are no species-rich hedges with the scheme area. The majority are intact and dominated by Hawthorn and/or Gorse (Plate 5.6), and therefore of little floristic value but offer faunistic value as wildlife corridors and invertebrate or bird breeding habitat. Despite the otherwise low floristic value, two small populations of Primrose were located in two hedges within the scheme (see section 5.3.6.2, Figure 5.3 on pages 5-25 and 5-26 , and Plate 5.15).

**Buildings (J3.6)**
There are no rural residences in the immediate vicinity of the scheme, although there are several in the local area. There are no buildings along the proposed SSP route. There are two derelict stone buildings within 100m of the site of the proposed wellpad along the Larne Lough shoreline. There are two intact modern farm buildings on the site of the proposed Leaching Plant (Plate 5.11).

**Hardstanding (J5)**
There is currently very limited hardstanding within the scheme area. The only significant area is the fenced flat concrete area on the eastern side of the Ballylumford Road currently owned by Northern Ireland Electricity plc which is the proposed site of the TCA (Plate 5.12). This was mostly covered by patchy and spreading ephemeral and short perennial vegetation in spring and summer 2009 (see J1 above) but will revert to mostly bare concrete with some scattered scrub, bryophyte, and perennial herb cover in winter. There is also a small area of

hardstanding associated with the recently constructed farm sheds at the site of the Leaching Plant (Plate 5.11).

#### 5.3.6.2 Protected Floral Species & Habitats Recorded

Despite the variety of maritime and farmland habitats, there are no protected habitats listed on Annex I of The Habitats Directive within the study area. There are three Northern Ireland Priority Habitats however. UK priority habitats that occur in Northern Ireland are considered to be automatically selected as priority habitats in Northern Ireland. There are 37 such habitats which are already the subject of costed action plans at UK level (NIEA website, 2009).

There are three NI Priority Habitats within the scheme area, of which two are within the scheme footprint. These are presented in Table 5.4

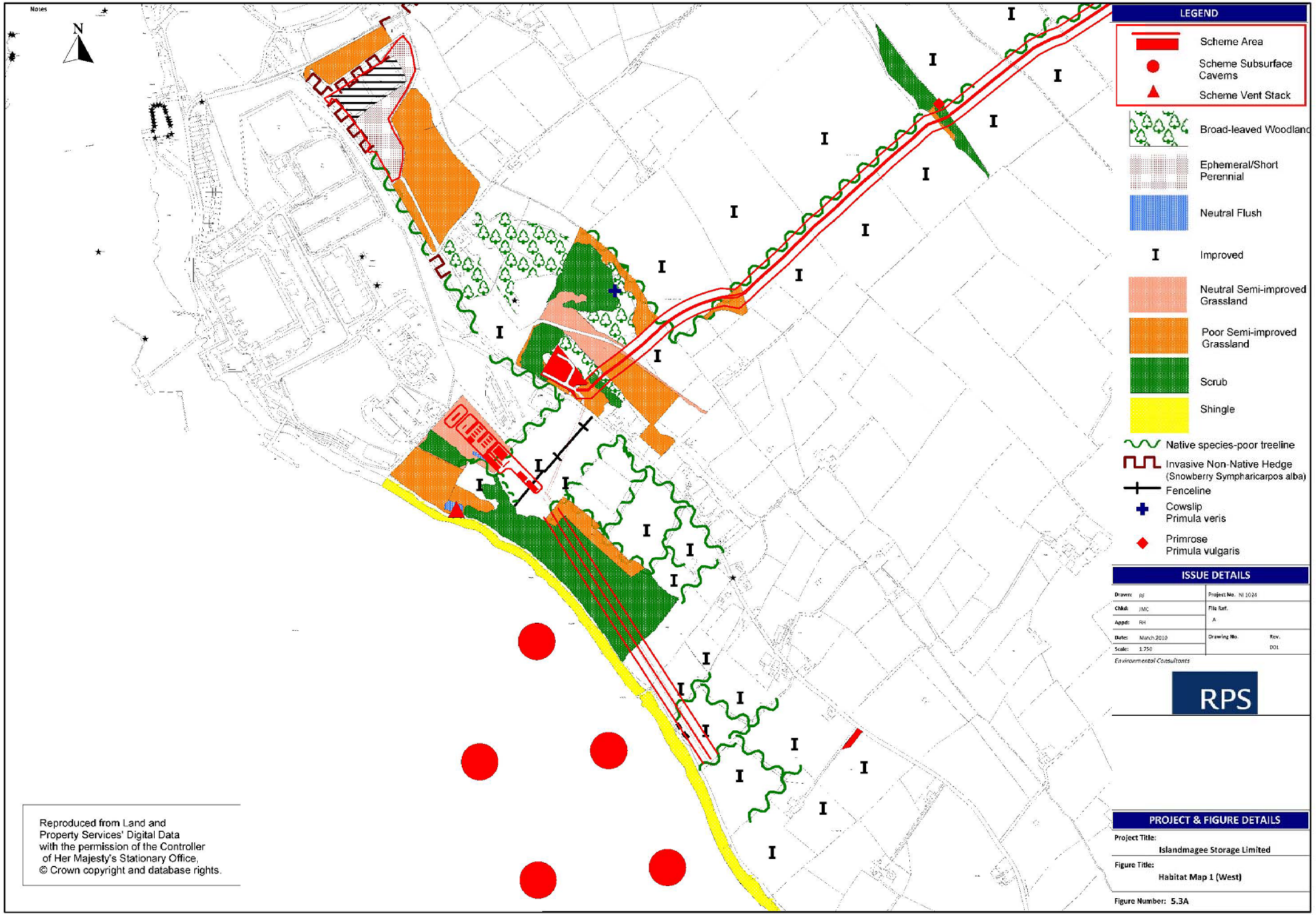
**Table 5.4 Priority Habitats within the Study Area**

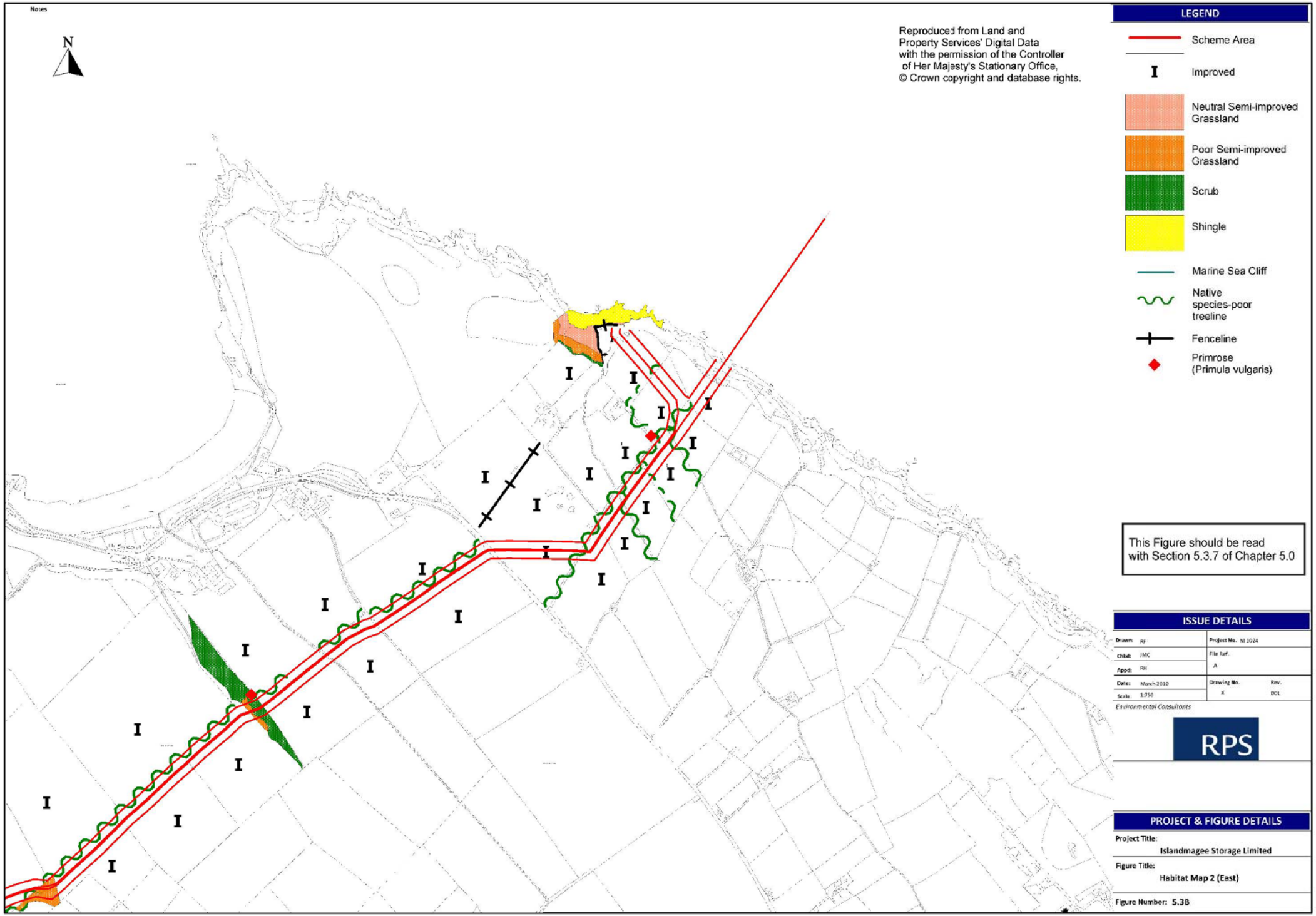
| Priority Habitat | Distribution | Within Scheme Footprint | Plate Ref |
|---|---|---|---|
| Coastal Vegetated Shingle | Shoreline below GPF & Shoreline at IPS at Castle Robin Bay | √ | X |
| Lowland Meadow | Site of GPF, and verges along SSP. Also roadside verges in locality. | √ | X |
| Maritime Cliffs & Slopes | Seacliffs east and west of Castle Robin Bay (IPS) | | X |

The shingle within the scheme corresponds to the fringing beach subtype identified in the Northern Ireland Habitat Action Plan (NIEA, date unknown) and occurs at two locations (Plate 5.9), forming the Larne Lough eastern shoreline south of the power station and the shoreline at Castle Robin Bay at the proposed IPS. A careful search was undertaken for the protected Oyster plant *Mertensia maritma* at both locations, but none was found.

Maritime Cliff & Slope is located at the northern end of the scheme at Castle Robin Bay at the proposed IPS (Plate 5.14). The cliffs stretch northwest from the IPS ending near Skernaghan Point, and southeast along the Islandmagee peninsula as far as Hill's Port

There are two small fields of lowland meadow within the study area. The first is the enclosed raised flat field at the site of the GPF (Plates 5.1 and 5.8), where it grades to scrub and poor semi-improved grassland on the lower embankment. This field is not currently subject to any grazing regime. The second is in a field along the SSP, and is bisected by the existing Moyle interconnector access road (Figure 5.5 on pages 5-39 and 5-40). There are also numerous roadside verges with diverse swards typically found in this habitat.


Notes
N
LEGEND
Scheme Area
Scheme Subsurface Caverns
Scheme Vent Stack
Broad-leaved Woodland
Ephemeral/Short Perennial
Neutral Flush
Improved
Neutral Semi-improved Grassland
Poor Semi-improved Grassland
Scrub
Shingle
Native species-poor treeline
Invasive Non-Native Hedge (Snowberry Symphoricarpos alba)
Fenceline
Cowslip Primula veris
Primrose Primula vulgaris
ISSUE DETAILS
Drawn: RF
Project No. NI 1024
Chkd: JMC
File Ref. A
Appd: RH
Dates: March 2010
Drawing No.
Rev. 001
Scale: 1:750
Environmental Consultants
RPS
Reproduced from Land and Property Services' Digital Data with the permission of the Controller of Her Majesty's Stationary Office, © Crown copyright and database rights.
PROJECT & FIGURE DETAILS
Project Title:
Islandmagee Storage Limited
Figure Title:
Habitat Map 1 (West)
Figure Number: 5.3A


Notes
N
Reproduced from Land and Property Services' Digital Data with the permission of the Controller of Her Majesty's Stationary Office, © Crown copyright and database rights.
LEGEND
Scheme Area
Improved
Neutral Semi-improved Grassland
Poor Semi-improved Grassland
Scrub
Shingle
Marine Sea Cliff
Native species-poor treeline
Fenceline
Primrose (Primula vulgaris)
This Figure should be read with Section 5.3.7 of Chapter 5.0
ISSUE DETAILS
Drawn: RF
Chkd: JMC
Appd: RH
Date: March 2010
Scale: 1:750
Project No.: NI 1024
File Ref.: A
Drawing No.: X
Rev.: DOL
Environmental Consultants
RPS
PROJECT & FIGURE DETAILS
Project Title:
Islandmagee Storage Limited
Figure Title:
Habitat Map 2 (East)
Figure Number: 5.3B

There were two protected flora species recorded within the scheme area, of which one was within the scheme footprint. These are detailed in Table 5.5, and both mapped in Figure 5.3.

**Table 5.5 Protected Flora within Scheme Area**

| Common Name | Latin Name | Status | Distribution | Within Scheme footprint | Plate Ref |
|---|---|---|---|---|---|
| Primrose | *Primula vulgaris* | WO | Two locations in hedges along SSP (Figure 5.3). | √ | 5.15 |
| Cowslip | *Primula veris* | WO | One in woodland north of Moyle interconnector road (north of SSP) | - | NA |

#### 5.3.6.3 Invasive Species

No invasive species listed on Schedule 9 to The Wildlife Order were recorded within the study area. However one species listed on The Wildlife Order Review Paper with known invasive potential was recorded in a hedgerow on Ballylumford Road near its junction with Ferris Bay Road. Here, Snowberry *Symphoricarpos alba* is the dominant species in a stretch of hedge approximately 150m long (Plate 5.10). The species was originally introduced as game cover, but is now spreading in scrub and woodland habitats in Northern Ireland. No other known invasive plant or animal species were recorded within the study area.

### 5.3.7 Bird Survey Results

#### 5.3.7.1 Survey Conditions

Table 5.6 presents survey conditions during all bird surveys

**Table 5.6 Bird Survey Weather Conditions**

| Survey | Date | Cloud | Wind | Rain | Visibility | Waves |
|---|---|---|---|---|---|---|
| Coastal (Wintering) | 2/12/2008 | 25%-100% | Wind NW Force 3-4 | NA | >2km | Choppy, slight swell |
| | 5/2/2009 | 50-100% | Wind NW Force 1-4 | Isolated Heavy snow and sleet showers | Variable 500m to >2km | Choppy, slight swell |
| | 20/2/2009 | 100% | Wind WNW Force 2-3 | NA | >2km | Slightly choppy, no swell |
| Coastal (Summer) | 9/5/2009 | 0-100% | Wind SW Force 2 | Light drizzle | >2km | Calm, slight swell |
| | 20/06/2009 | 75-100% | Wind NW Force 4 | NA | >2km | Choppy, slight swell |

| Survey | Date | Cloud | Wind | Rain | Visibility | Waves |
|---|---|---|---|---|---|---|
| | 10/8/2009 | 100% | Wind NE Force 2-3 | Occasional drizzle | >2km | Slightly choppy, no swell |
| Breeding Bird | 3/5/2009 | 0-25% | Wind SW Force 3 | NA | - | - |
| | 28/5/2009 | 50% | Wind WNW Force 4 | NA | - | - |
| | 18/6/2009 | 75-100% | Wind Var Force1-2 | NA | - | - |
| Wintering Farmland | 3/12/2008 | 25%-100% | Wind SW Force 3 | NA | - | - |
| | 9/01/2009 | 25%-100% | Wind NW Force 3 | NA | - | - |
| | 2/02/2009 | 0% | Wind Var Force1-2 | NA | - | - |
| Black Guillemot) | 10/4/2009 | 50-75% | Wind NW Force 2 | NA | 2km | Calm, no swell |
| | 17/4/2009 | 100% | Wind NE Force 3 | NA | >2km | Calm, no swell |
| | 29/5/2009 | 100% | Wind SE Force 3 | NA | >2km | Calm, no swell |
| | 16/7/2009 | 100% | Wind Var Force 0-1 | NA | >2km | Calm, no swell |

#### 5.3.7.2 Wintering Farmland Bird Survey Results

Table 5.7 lists peak counts for the wintering farmland bird surveys. Protected species are highlighted in bold text. Please note that the BoCCI listings have been omitted from the conservation status as the red and amber listings apply only to breeding populations.

**Table 5.7 Peak Counts of wintering Farmland Birds.**

| Species | Scientific Name | Peak Count | Conservation Status (see key below table) | Notes |
|---|---|---|---|---|
| Blackbird | *Turdus merula* | 25 | | |
| Blue Tit | *Parus caeruleus* | 22 | | |
| Bullfinch | *Pyrrhula pyrrhula* | 6 | NI | |
| **Buzzard** | ***Buteo buteo*** | **2** | **WO** | **Farmland throughout** |
| Chaffinch | *Fringilla coelebs* | 23 | | |
| Coal Tit | *Periparus ater* | 18 | | |
| Collared Dove | *Phylloscopus collybita* | 4 | | |
| Dunnock | *Prunella modularis* | 10 | | |
| Fieldfare | *Turdus pilaris* | 102 | | |
| Goldcrest | *Regulus regulus* | 2 | | |

| Species | Scientific Name | Peak Count | Conservation Status (see key below table) | Notes |
|---|---|---|---|---|
| Goldfinch | *Carduelis carduelis* | 12 | | |
| Great Tit | *Parus major* | 6 | | |
| Greenfinch | *Carduelis chloris* | 22 | | |
| Grey Wagtail | *Motacilla cinerea* | 2 | | |
| **Heron** | ***Ardea cinerea*** | **10** | **WO** | **Heronry located on in scrubby hill along SSP route east of Quarterland Road** |
| Hooded Crow | *Corvus corone cornix* | 9 | | |
| House Sparrow | *Passer domesticus* | 26 | NI | |
| Jackdaw | *Corvus monedula* | 75 | | |
| **Kestrel** | ***Falco tinnunculus*** | **1** | **WO** | **Hunting over Drill rig grasslands** |
| Lapwing | *Vanellus vanellus* | 72 | NI | Feeding fields along E-W pipeline route |
| Linnet | *Carduelis cannabina* | 12 | | |
| Magpie | *Pica pica* | 12 | | |
| Meadow Pipit | *Anthus pratensis* | 15 | | |
| **Merlin** | ***Falco columbarius*** | **1** | **WO** | **Coastal fields near Robinstack** |
| Mistle Thrush | *Turdus viscivorus* | 4 | NI | |
| Pheasant | *Phasianus colchicus* | 7 | | |
| Pied Wagtail | *Motacilla alba* | 5 | | |
| Redwing | *Turdus iliacus* | 60 | | |
| Reed Bunting | *Emberiza schoeniclus* | 5 | NI | |
| Robin | *Erithacus rubecula* | 30 | | |
| Rock Pipit | *Anthus petrosus* | 6 | | |
| Rook | *Corvus frugilegus* | 134 | | |
| Siskin | *Carduelis spinus* | 2 | | |
| Skylark | *Alauda arvensis* | 24 | | |

| Species | Scientific Name | Peak Count | Conservation Status (see key below table) | Notes |
|---|---|---|---|---|
| Song Thrush | *Turdus philomelos* | 6 | NI | |
| **Sparrowhawk** | ***Accipiter nisus*** | **2** | **WO** | **Farmland throughout** |
| Starling | *Sturnus vulgaris* | 190 | NI, UKBAP | |
| Stonechat | *Saxicola torquata* | 3 | | |
| Tree Sparrow | *Passer montanus* | 6 | | |
| **Twite** | ***Carduelis flavirostris*** | **4** | **WO** | **Mixed with Linnets in farmland near middle of E-W pipeline route** |
| Woodpigeon | *Columba palumbus* | 22 | | |
| Wren | *Troglodytes troglodytes* | 24 | | |
| Key to Table 5.7<br>WO = Protected at all times by The Wildlife Order<br>NI =Northern Ireland Priority Species<br>UKBAP = United Kingdom Biodiversity Action Plan Species | | | | |

A total of 42 species were recorded. The list of farmland/woodland/urban fringe species in Table 3 reflects the relatively homogenous nature of the habitats within the farmland bird survey area. There were no Brent nor other Geese recorded feeding in improved grassland fields within the wintering farmland bird survey area, however Brent are frequent visitors to the *Zostera* beds in the lough (Plate 5.2) . Lapwing was the only wetland species recorded feeding within improved fields. These were recorded in small flocks (peak 70)

#### 5.3.7.3 Breeding Farmland Bird Survey Results

This section should be read with Figures 5.2 (page 5-4) and 5.5 (page 5-39). Table 5.8 presents approximate numbers of breeding bird territories within the survey area which is illustrated in Figure 5.2 (page 5-4). In contrast to wintering farmland surveys, there were no protected species recorded breeding within the vicinity of the scheme.

## Table 5.8 Summary Table of Breeding Bird Territories within Survey Area

| Common Name | Scientific Name | Estimated Territories | Conservation Status (see key) | Notes |
|---|---|---|---|---|
| Blackbird | *Turdus merula* | 11 | | |
| Blackcap | *Sylvia atricapilla* | 2 | | |
| Blue Tit | *Parus caeruleus* | 6 | | |
| Bullfinch | *Pyrrhula pyrrhula* | 2 | | |
| Buzzard | *Buteo buteo* | 0 | WO | Single occasionally flying over improved fields along SSP route |
| Chaffinch | *Fringilla coelebs* | 7 | | |
| Chiffchaff | *Phylloscopus collybita* | 3 | | |
| Coal Tit | *Periparus ater* | 3 | | |
| Dunnock | *Prunella modularis* | 9 | | |
| Goldcrest | *Regulus regulus* | 1 | | |
| Goldfinch | *Carduelis carduelis* | 4 | | |
| Great Tit | *Parus major* | 2 | | |
| Greenfinch | *Carduelis chloris* | 7 | | |
| Grey Heron | *Ardea cinerea* | 0 | | Heronry located c.250m west of the SSP route, near junction of Quartlerland/Ballylumford road |
| Hooded Crow | *Corvus corone cornix* | 1-2 | | |
| House Martin | *Delichon urbica* | 0 | Amber | 1 pair feeding within site |
| Jackdaw | *Corvus monedula* | 0 | | Feeding flocks along SSP route farmland |
| Linnet | *Carduelis cannabina* | 4 | Amber | |
| Long-tailed Tit | *Aegithalos caudatus* | 1 | | |
| Magpie | *Pica pica* | 2 | | |
| Meadow Pipit | *Anthus pratensis* | 2 | | Few territories in fields along pipeline route |
| Mistle Thrush | *Turdus viscivorus* | 1 | NI | |
| Peregrine Falcon | *Falco peregrinus* | 0 | EU | Single hunting by Power Station in July (Plate 5.2) |
| Pheasant | *Phasianus colchicus* | 2 | | Common in locality due to release of stock from scrub hill along SSP route |
| Raven | *Corvus corax* | 0 | | Occasionally recorded over SSP route farmland |
| Ringed Plover | *Charadrius hiaticula* | 1 | Amber | Castle Robin Bay (IPS) |
| Robin | *Erithacus rubecula* | 8 | | |

| Common Name | Scientific Name | Estimated Territories | Conservation Status (see key) | Notes |
|---|---|---|---|---|
| Rook | *Corvus frugilegus* | 0 | | Rookerie in mature treeline outside northwestern site boundary |
| Skylark | *Alauda arvensis* | | Amber | |
| Song Thrush | *Turdus philomelos* | 1 | NI | |
| Sparrowhawk | *Accipiter nisus* | 0-1 | WO | Anecdotal record of breeding pair in scrublands south of power station (David Logan, Personal Communication) |
| Starling | *Sturnus vulgaris* | 1 | NI, UKBAP | |
| Stonechat | *Saxicola torquata* | 1 | | |
| Swallow | *Hirundo rustica* | 0 | Amber | Regularly feeding over grassland throughout study area |
| Whitethroat | *Sylvia communis* | 4 | | |
| Willow Warbler | *Phylloscopus trochilus* | 3 | | |
| Wood Pigeon | *Columba palumbus* | 4 | | |
| Wren | *Troglodytes troglodytes* | 17 | | |

Key to Table 5.8
EU = Birds Directive Annex I species whose Conservation requires designation of protected areas (SPA)
WO = Protected at all times by The Wildlife Order
Amber = All-Ireland Bird of Medium Conservation Concern as breeding species
NI =Northern Ireland Priority Species
UKBAP = United Kingdom Biodiversity Action Plan Species
Red = All-Ireland Bird of Medium Conservation Concern as breeding species

#### 5.3.7.4 Open Coast Waterbirds Survey Results

Table 5.9 presents Peak counts for open coast waterbirds on the Islandmagee coastline in Winter 2008-Summer 2009. Protected species in Table 5.9 are highlighted in bold.

**Table 5.9 Peak Counts for Open Coast Waterbirds**

| Common Name | Scientific Name | Open Water | Terrestrial | Peak Count | Conservation Status | Breeding in Study Area | Breeding at Gobbins/ Portmuck ASSIs | Notes |
|---|---|---|---|---|---|---|---|---|
| **Arctic Tern** | ***Sterna paradisaea*** | √ | | **2** | **EU, WO Amber, WO** | | | **See section 5.3.7.4.2** |
| Black-headed Gull | *Larus ridibundus* | √ | | 4 | Amber | | | |
| Black Guillemot | *Cepphus grylle* | | | 3 | Amber | | √ | |
| (Brent Goose) | *Branta bernicla* | √ | √ | (6) | | | | Not in study area (Browns Bay) |
| Common Guillemot | *Uria aalge* | √ | | 27 | Amber | | √ | |
| Common Gull | *Larus canus* | √ | | 16 | Amber | | √ | |
| **Common Tern** | ***Sterna hirundo*** | √ | | **5** | **EU, WO, Amber** | | | **See section 5.3.7.4.2** |
| Cormorant | *Phalacrocorax carbo* | √ | | 4 | Amber | | √ | |
| Curlew | *Numenius arquata* | √ | √ | 2 | NI, Red | | | |
| Eider | *Somateria mollissima* | √ | | 1 | Amber | | √ | |
| Fulmar | *Fulmarus glacialis* | √ | | 2 | | | | |
| Gannet | *Morus bassanus* | √ | | 3 | Amber | | √ | Outside study area (>300m from shore) |
| Great Northern Diver | *Gavia immer* | √ | | 2 | | | | |
| Herring Gull | *Larus argentatus* | √ | | 1 | Red | | √ | |

| Common Name | Scientific Name | Open Water | Terrestrial | Peak Count | Conservation Status | Breeding in Study Area | Breeding at Gobbins/ Portmuck ASSIs | Notes |
|---|---|---|---|---|---|---|---|---|
| Lesser Black-backed Gull | *Larus fuscus* | √ | | 3 | Amber | | √ | |
| Oystercatcher | *Haematopus ostralegus* | | √ | 5 | | | | |
| Razorbill | *Alca torda* | √ | | 5 | Amber | | √ | |
| Red-throated Diver | *Gavia stellata* | √ | | 3 | | | | |
| Redshank | *Tringa totanus* | | √ | 2 | NI, Red | | | |
| Ringed Plover | *Charadrius hiaticula* | | √ | 1 | Amber | √ | | |
| **Sandwich Tern** | ***Sterna sandvicensis*** | | √ | **13** | **EU, Amber** | | | **See section 5.3.7.4.2** |
| Shag | *Phalacrocorax aristotelis* | √ | | 10 | | | √ | |
| Shelduck | *Tadorna tadorna* | √ | | 1 | | | | |
| Snipe | *Gallinago gallinago* | | √ | 1 | Amber | | | |
| Turnstone | *Arenaria interpres* | | √ | 1 | | | | |
| Whimbrel | *Numenius phaeopus* | | √ | 11 | | | | Passage migrant |

**Key to Table 5.9**
EU = Birds Directive Annex II species whose Conservation requires designation of protected areas (SPA)
WO = Protected at all times by The Wildlife Order
Amber = All-Ireland Bird of Medium Conservation Concern as breeding species
NI =Northern Ireland Priority Species
UKBAP = United Kingdom Biodiversity Action Plan Species
Red = All-Ireland Bird of Medium Conservation Concern as breeding species

The survey area is outlined in Figure 5.2. (page 5-4) Full open coast survey results are located in Appendix 5.6. Please note that gulls in flight were excluded, but foraging Terns and Gannets in flight were included.

In total, 26 species were recorded including gull, tern, auk, wader, duck, and diver species. Gobbins/Portmuck breeding species were present from February onwards with several Black & Common Guillemot noted at this time.

Within Larne Lough, small numbers of foraging breeding duck species from Swan Island and the smaller adjacent Blue Circle island were noted during visits to the study area for other surveys. A single of pair of Red-breasted Merganser (Lough Larne ASSI feature), and

several pairs of Eider were noted feeding at high tide near the eastern Lough shoreline close to the Wellpad and Vent Stack elements.

There were no significant high tide (terrestrial) roosts located within the study area, although moderate flocks of Common Gull were recorded on open water near the high tide line at Castle Robin Bay at the site of the IPS on two occasions in February (15), and August (16).

Only Common Gulls and occasional single Cormorants and Shags were recorded in the water in the immediate vicinity of the IPS. All other birds were either in flight over it (Terns), or were passing at a distance off-shore.

#### 5.3.7.5 Key Species Accounts

The following species are of key interest because either they are listed as key feature species for Larne Lough ASSI/SPA, Portmuck ASSI, or Gobbins pASSI, or they are red-listed BoCCI or are EU Birds Directive Schedule 1 protected species.

- **Arctic Tern**
  This species is of conservation importance as an EU Birds Directive Annex 1 species. As with Common and Sandwich Tern, the species regularly commuted around the headland between Larne Lough and Portmuck often in singles or loose flocks. It was rarely recorded dive-fishing in deeper waters off the open coast instead feeding within Larne Lough where fish-feeding appears preferable.

- **Black Guillemot**
  See the detailed breeding survey results for the Ballylumford Jetty Colonies in Section 5.3.7.5. This species breeds in scattered small colonies along appropriate habitat (jetties, walls, and boulders) in Larne Lough and along the Antrim coastline. Along the open coast, small numbers of the species (usually singles) were seen to frequently commute along open water around the headlands between outer Larne Lough and Skernaghan Point. There is a notable breeding colony in Larne Port.

- **Black-headed Gull**
  This species is of conservation importance as a red-listed BoCCI. The main local breeding colonies are on Swan Island or off-shore islands off the Antrim Coast. Small numbers were observed in flight and in open water around the coastline. There is a regular roosting flock (ca. 30 birds) in Ballylumford Harbour, north of the power station

- **Brent Goose**
  This species is of key importance in this project as one of the primary designation features for Larne Lough SPA. The same flock of 6 was recorded feeding at Ballylumford power station intertidal seaweeds and on the beach at Ferris Bay. There were no larger flocks recorded.

- **Common Guillemot**
  This species is of importance in this project as one of the designation features for Portmuck ASSI and Gobbins ASSI. Only singles of this species were observed greater than 300m offshore in flight from Skernaghan Point.

- **Common Tern**
  This species is of key importance in this project as one of the primary designation features for Larne Lough SPA and an EU Birds Directive Annex 1 species. The species has been shown to forage 10km away from its breeding grounds in the UK (Wilson et al., 2010). The species regularly commuted around the headland between Larne Lough and Portmuck often in singles or loose flocks, but was only observed dive-fishing around Ballylumford Harbour, north of the power station within Larne Lough.

- **Cormorant**
  This species is of importance in this project as one of the designation features for Gobbins pASSI. Recorded frequently commuting around headland between inner Larne Lough and Portmuck, feeding in open water throughout study area, and roosting in small numbers on buoys or Ballylumford Harbour.

- **Curlew**
  This species is of conservation importance as a red-listed BoCCI. Scattered singles were frequently recorded feeding around the Larne Lough shoreline and open coast as far as Portmuck. No evidence of breeding was recorded along the coastal grasslands.

- **Fulmar**
  A single bird was recorded foraging near the IPS along the open coast sea cliffs between Skernaghan Point and Portmuck.

- **Razorbill**
  Singles in flight in the open water north of Portmuck were occasional. A flock of 23 was recorded in August in an open water roost more than 300m offshore of the IPS.

- **Sandwich Tern**
  This species is of key importance in this project as one of the primary designation features for Larne Lough SPA and an EU Birds Directive Annex 1 species. The species was the most numerous of the tern species within the study area with a peak count of 13 recorded foraging along the open coastline. This equates with the data of the JNCC Tern Tracking Project (Wilson et al., 2009) which showed that Sandwich Terns foraged further from their breeding grounds than the other Tern species. This was also the only tern species recorded crossing the Islandmagee peninsula by land and was frequently observed negotiating a bouncing flightpath through the numerous electricity pylons near the Moyle Interconnector throughout summer 2009. As with the other two recorded tern species, it was rarely recorded dive-fishing in deeper waters off the open coast instead feeding within Larne Lough where fish-feeding appears preferable.

- **Shag**
  This species is of importance in this project as one of the designation features for Gobbins pASSI. The species was frequently recorded as singles in flight in similar locations to cormorants (see above). A notable roost of 11 birds was recorded on the flat rocks by the existing Fog Horn building off Barrs Point in July.

#### 5.3.7.6 RPS Open Coast Results vs. BTO NEWS Results

Data from the BTO (NEWS) was obtained for approximately the same stretch of coastline (Site Code 450604). Table 5.10 below compares peak counts from the 2007 NEWS data set, with the RPS survey data from Table 5.9.

**Table 5.10 Peak Open Coast Bird Counts for RPS and NEWS**

| Common Name | RPS Peak Count (All year 2008/9) | NEWS Peak Count (Winter 2007) | NEWS Peak count (NEWS 1998) | Notes |
|---|---|---|---|---|
| Cormorant | 4 | 0 | 3 | Higher counts for some species explained by NEWs survey extent including Portmuck Bay & portions of Brown's Bay |
| Curlew | 2 | 16 | - | |
| Eider | 1 | 1 | - | |
| Great Northern Diver | 2 | 1 | - | |
| Oystercatcher | 5 | 31 | 12 | |
| Purple Sandpiper | - | 5 | - | |
| Redshank | 2 | 21 | - | |
| Red-Throated Diver | 1 | 1 | - | |
| Ringed Plover | 1 | 7 | - | |
| Shag | 10 | | -- | |
| Turnstone | 1 | 11 | - | |

#### 5.3.7.7 Black Guillemot Survey Results

The survey area is illustrated in Figure 5.2 (page 5-4). Results are illustrated in Figure 5.6. (page 5-41) Table 5.11 presents breeding population results. The count unit is *Adults associated with a colony*. The three structures shown to hold breeding pairs (Jetties A & B, and the power station wall) are illustrated in Plates 5.3 and 5.4.

**Table 5.11 Black Guillemot Breeding Population Survey Results**

| Date | Jetty | Adults assoc. with colony | Adults in non-breeding plumage | Adults >300m from Jetty | Adults in non-breeding plumage | Breeding Gulls |
|---|---|---|---|---|---|---|
| 10-4-2009 | A | 13 | 1 | 3[1] | 0 | 0 |
| | B | 4 | 0 | | 0 | 0 |
| 17-4-2009 | A | 8 | 2 | 5[1] | 2 | 0 |
| | B | 3 | 0 | | 0 | 0 |
| Peak Breeding Population | A | 13 (6-7 pairs) | - | - | - | - |
| | B | 4 (2 pairs) | - | - | - | - |
| Key to Table 5.11 *Probably associated with breeding colony in Larne Harbour | | | | | | |

Table 5.12 presents results for breeding productivity. The index for productivity (p) is:

*p = no. occupied sites in May/no. successful sites in July.*

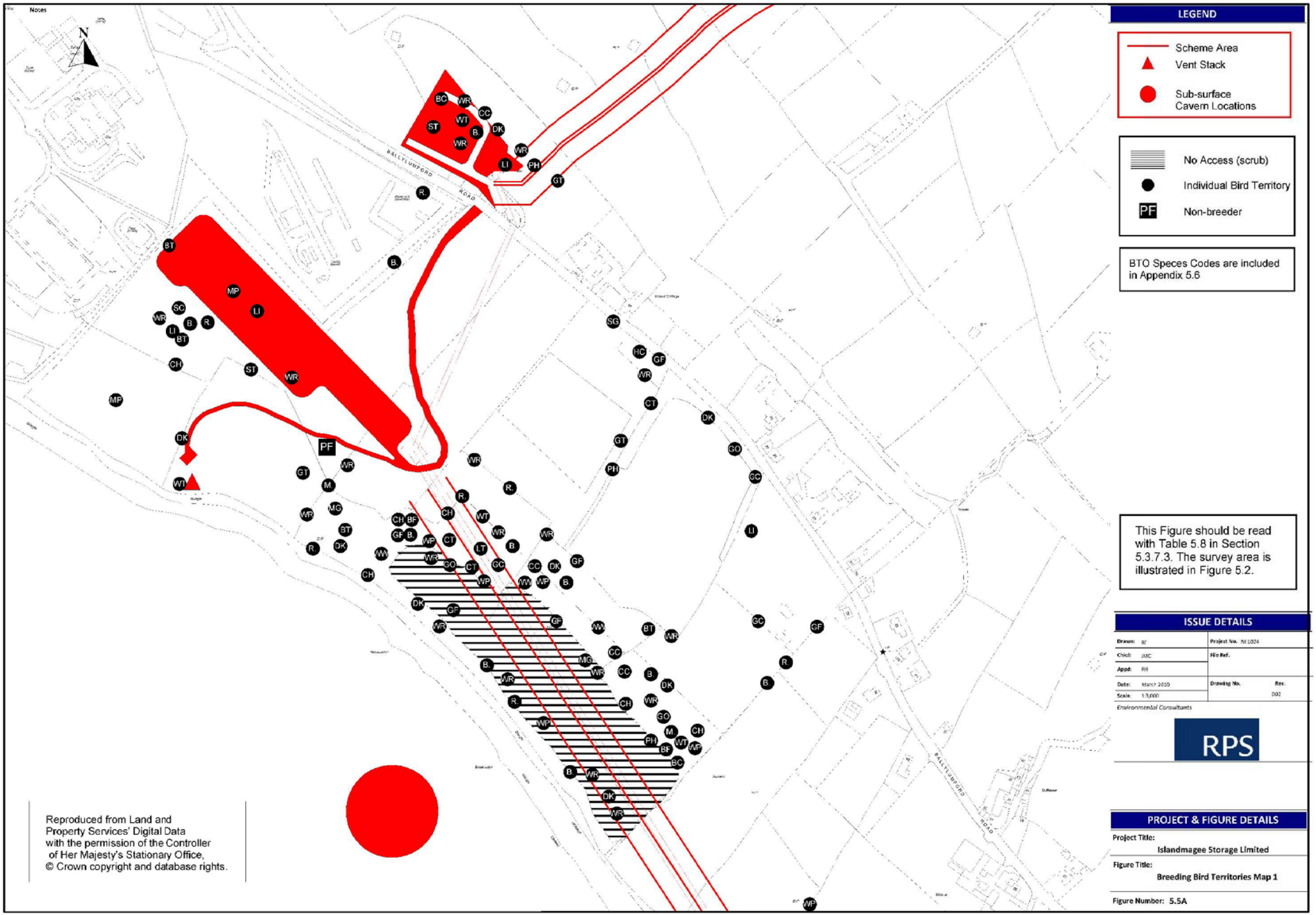
This table should be read with Figure 5.6 (page 5-41).

**Table 5.12 Black Guillemot Productivity Survey Results**

| Jetty | Occupied Nests (May) | Successful Nest Sites (July) | Productivity (p) |
|---|---|---|---|
| A | 6 | 5 | 0.83 |
| B | 2 | 2 | 1 |
| Power Station Wall | 1 | 1 | 1 |

The results show an overall total of 8 breeding pairs with 5 at Jetty A, 2 at Jetty B, and 1 on the Power Station wall (Figure 5.6 and Plate 5.16). As might be expected for most seabird colonies, the productivity at the larger colony (Jetty A: p = 0.83) was lower than the two small colonies both p =1).

Tables 5.11 and 5.12 show that not all of the breeding population identified in April 2009 (6-7 pairs) were breeding pairs in May and July. As with many seabird colonies, a certain percentage of non-breeding Black Guillemots will associate with the colony. In this case, of the 6-7 expected pairs at Jetty A, only 5 breeding pairs were confirmed in May and July, indicating approximately 25% of the adults associated with the colony in April were in fact non-breeders. This figure equates well with the 20% of the Copeland Island Black Guillemot colony that are non-breeders. (*Kerry Leonard, Personal Communication*).


Notes
N
BALLYLUMFORD ROAD
LEGEND
Scheme Area
Vent Stack
Sub-surface Cavern Locations
No Access (scrub)
Individual Bird Territory
Non-breeder
PF
BTO Speces Codes are included in Appendix 5.6
This Figure should be read with Table 5.8 in Section 5.3.7.3. The survey area is illustrated in Figure 5.2.
ISSUE DETAILS
Drawn: RF
Project No. NI1024
Chkd: JMC
File Ref.
Appd: RH
Date: March 2010
Drawing No.
Rev.
Scale: 1:5,000
002
Environmental Consultants
RPS
PROJECT & FIGURE DETAILS
Project Title:
Islandmagee Storage Limited
Figure Title:
Breeding Bird Territories Map 1
Figure Number: 5.5A
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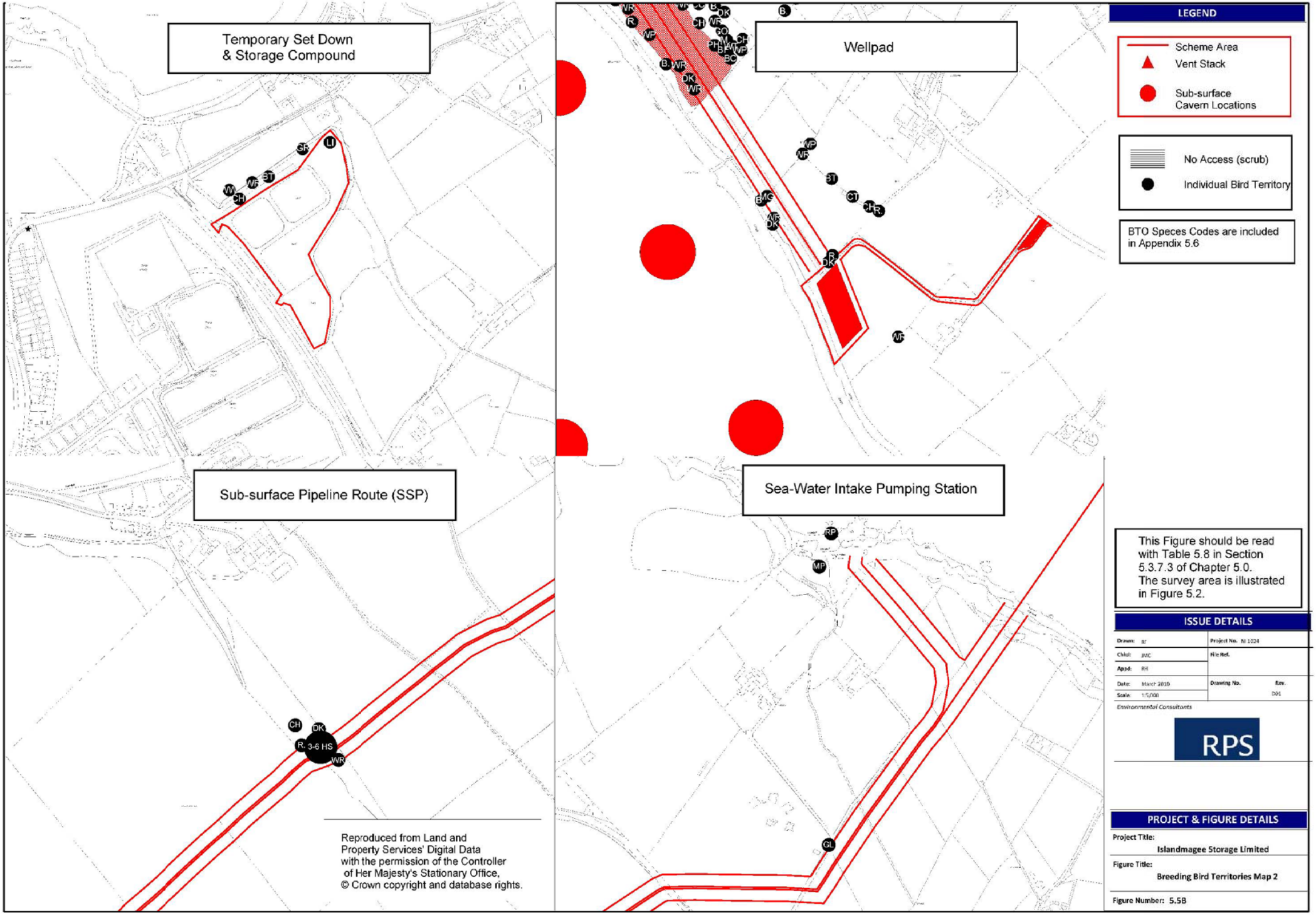
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& Storage Compound
Wellpad
Sub-surface Pipeline Route (SSP)
Sea-Water Intake Pumping Station
LEGEND
Scheme Area
Vent Stack
Sub-surface
Cavern Locations
No Access (scrub)
Individual Bird Territory
BTO Speces Codes are included
in Appendix 5.6
This Figure should be read
with Table 5.8 in Section
5.3.7.3 of Chapter 5.0.
The survey area is illustrated
in Figure 5.2.
ISSUE DETAILS
Drawn: RF
Chkd: JMC
Apprd: RH
Date: March 2016
Scale: 1:5,000
Project No. NI 1024
File Ref.
Drawing No.
Rev.
D01
Environmental Consultants
RPS
PROJECT & FIGURE DETAILS
Project Title:
Islandmagee Storage Limited
Figure Title:
Breeding Bird Territories Map 2
Figure Number: 5.5B
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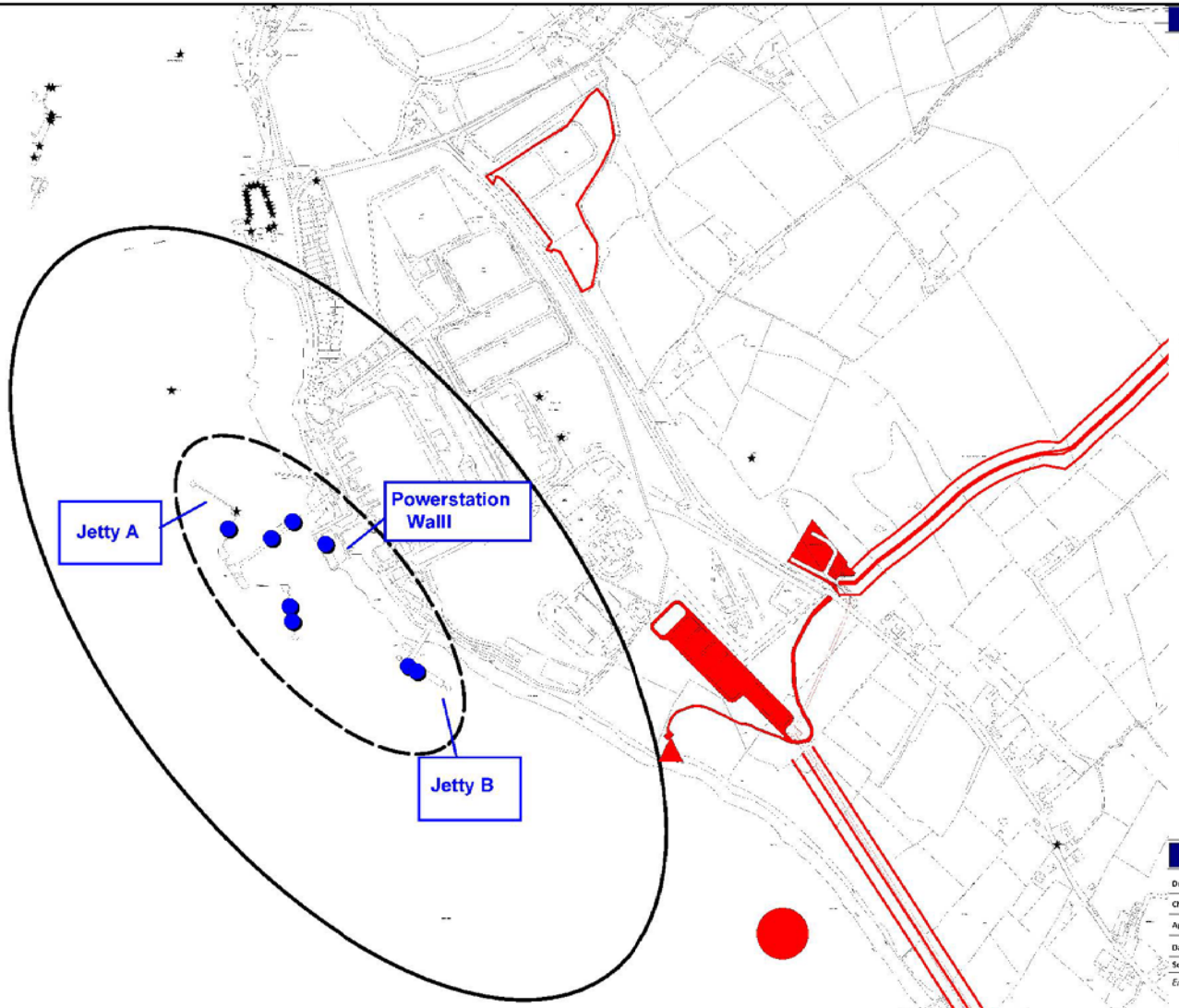
Notes


**LEGEND**

- Scheme Design
- Scheme Subsurface Cavern Locations
- Scheme Vent Stack
- Black Guillemot Cephhus grylle Breeding Population Survey Area (c. 500m from jetties)
- Black Guillemot Productivity Survey Area
- Confirmed Nest Site

This figure should be read with Section 5.3.7.4.4 of Chapter 5.0

**ISSUE DETAILS**

| | |
|---|---|
| Drawn: RF | Project No. NI 1024 |
| Chkd: JMC | File Ref. |
| Appd: RH | |
| Date: March 2010 | Drawing No. Rev. |
| Scale: 1:800 | 001 |

*Environmental Consultants*

RPS

**PROJECT & FIGURE DETAILS**

Project Title: Islandmagee Storage Limited

Figure Title: Black Guillemot Breeding Sites

Figure Number: 5.6

#### 5.3.7.8 Summary of Protected Bird Species Recorded

Table 5.13 summarises all protected bird species recorded throughout all survey types. Only the sparrowhawk may breed within the site (in scrub woodlands south of power station, or north of Ballylumford Road), although there is only anecdotal evidence (*David Galbraith, Personal communication*) to support this.

**Table 5.13 Summary Table of Protected Bird Species in All Surveys**

| Common Name | Protection | Peak | Breeder - site | Breeder-within 1km | Season | Survey | Notes |
|---|---|---|---|---|---|---|---|
| Arctic Tern | EU[1] | 2 | No | √ | Summer/ Autumn | Open Coast | |
| Buzzard | WO[2] | 1 | No | | Winter | Wintering Farmland | Hunting over SSP farmland |
| Common Tern | EU | 5 | No | √ | Summer/ Autumn | Open Coast | |
| Fieldfare | WO | 102 | No | | Winter | Wintering Farmland | |
| Heron | WO | 10 | No | √ | All Year | Wintering/ Breeding Farmland | |
| Merlin | EU | 1 | No | | Winter | Wintering Farmland | |
| Peregrine Falcon | EU | 1 | No | √ | Summer | Black Guillemot | Adult perched on mast (Plate 5.2) |
| Red-throated Diver | WO | 3 | No | | Winter | All year | |
| Sandwich Tern | EU | 13 | No | √ | Summer/ Autumn | Open Coast | |
| Sparrowhawk | WO | 2 | Possible | √ | All Year | Wintering/ Breeding Farmland | |
| Twite | WO | 4 | No | | Winter | Wintering Farmland | |

Key to Table 5.13
[1] EU = protected at European level under Annex 1 of The Birds Directive
[2] WO = protected at national level under Schedule 1 to The Wildlife Order

### 5.3.8 Mammal Survey Results

This section should be read with Figure 5.2 (page 5-4) which illustrates the survey area, and Figure 5.4 which illustrates key survey results.

#### 5.3.8.1 Otter

There were no otter scats, potential couches or holts located within the survey area.

#### 5.3.8.2 Badger

Survey of the pipeline route and wellpad area revealed numerous field signs of badger activity. Four Badger setts were recorded within 100m of the scheme. Scats and snuffle holes were also located at considerable distance from the nearest sett indicating foraging in the wider area. Setts and scat locations are illustrated in Figure 5.4 and detailed in Table 5.14 below.

**Table 5.14 Summary of Badger Setts along Pipeline Route**

| Ref in (Figure 5.4) | Plate | Location | Habitats | Entrances[1] | Distance to Pipeline | Distance to main sett | Type[2] | Activity |
|---|---|---|---|---|---|---|---|---|
| 1 | 5.17 | Southern end of Pipeline Route | Gorse scrub hillside | 3?*/3/0<br>*(Limited access) | 0m | 1000m | Sub-sidiary | 3 Well-used entrance, Fresh spoil, old scats, bedding. Linked to Sett 2 by well worn trail |
| 2 | - | Southern end of Pipeline Route (80m southeast of Sett 1) | Bank of treeline between scrub (S), and improved grassland (N) | 2/1/0 | 25m | 990 | Outlier | 1 Well used entrance, no scats or bedding. Linked to Sett 1 by well-worn trail |
| 3 | - | 100m north of Moyle interconnecto r access road | Ash & Sycamore Woodland/ Gorse | 2/1/0 | 100m | 850m | Outlier | 1 Well-used entrance, no scats or bedding |

| Ref in (Figure 5.4) | Plate | Location | Habitats | Entrances[1] | Distance to Pipeline | Distance to main sett | Type[2] | Activity |
|---|---|---|---|---|---|---|---|---|
| 4 | 5.18 | Middle of Pipeline route | Gorse & Hawthorn scrub at boundary with improved grassland (S) | 7/3/1 | 70m | - | Main | well used, 1 collapsed entrance, fresh scats and bedding |

Key to Table 5.14
[1]Details total /well-used/collapsed entrances[2]Defined in Section 5.2.4.3.

All four setts are located within 100m of the pipeline, with two setts located on the pipeline route. Starting at the southern route end, there is one subsidiary sett (Ref 1) on the pipeline route located on the NE-facing slope of scrublands north of Ballylumford Road. An outlier sett (Ref 2) is located a short distance east of this annex sett. Moving northeast along the route, the third sett is another outlier sett (Ref 3), located 100m north of the SSP route on the northeast-facing slope of Sycamore and Ash dominated broad-leaved woodland. Further northeast, the fourth and final sett is a main sett located 70m north of the SSP route on the boundary between a scrub covered hillock and adjacent improved grassland. A fox earth is adjacent to this fourth sett.

There was no badger activity located in the vicinity of the wellpad. It should be noted that the scrublands south east of the main gas plant facility were largely inaccessible; however careful searches were made around the fringe of the habitat for snagged badger guard hairs on brambles and gorse. Neither hairs nor tracks from the adjacent farmland were located here, and it appears unlikely that there are badgers active in these dense scrublands.

### 5.3.9 Reptiles & Amphibians

Common newts are fully protected in NI under Schedules 5 to 7 and Articles 10 to 13 and 28 of The Wildlife Order and as amended by S.I. 1995/761. There is limited potential for newts within the site boundary, and there are no ponds, or permanent pools. There is however one drainage ditch and one small burn within the study site, both along the SSP route (Figure 5.4). Only a formal survey can establish whether newts are present here, although it is considered unlikely due to the limited habitat available.

Common Lizard *Zootica vivipara* are protected under Schedule 5 to The Wildlife Order. There were no sightings of lizards recorded on site. Both shed skins, and live sightings of lizards are relatively rare occurrences, so the absence of such strong evidence does not rule out the presence of the species within a habitat. There are some habitats within the site which are suitable, such as the sea cliffs by the Castle Robin Bay IPS, and woodland along the SSP. Only a formal survey may reveal their presence within the vicinity of the site, but it is considered unlikely due to the limited habitat and preference of lizards for extensively farmed areas (Inns, 2009).

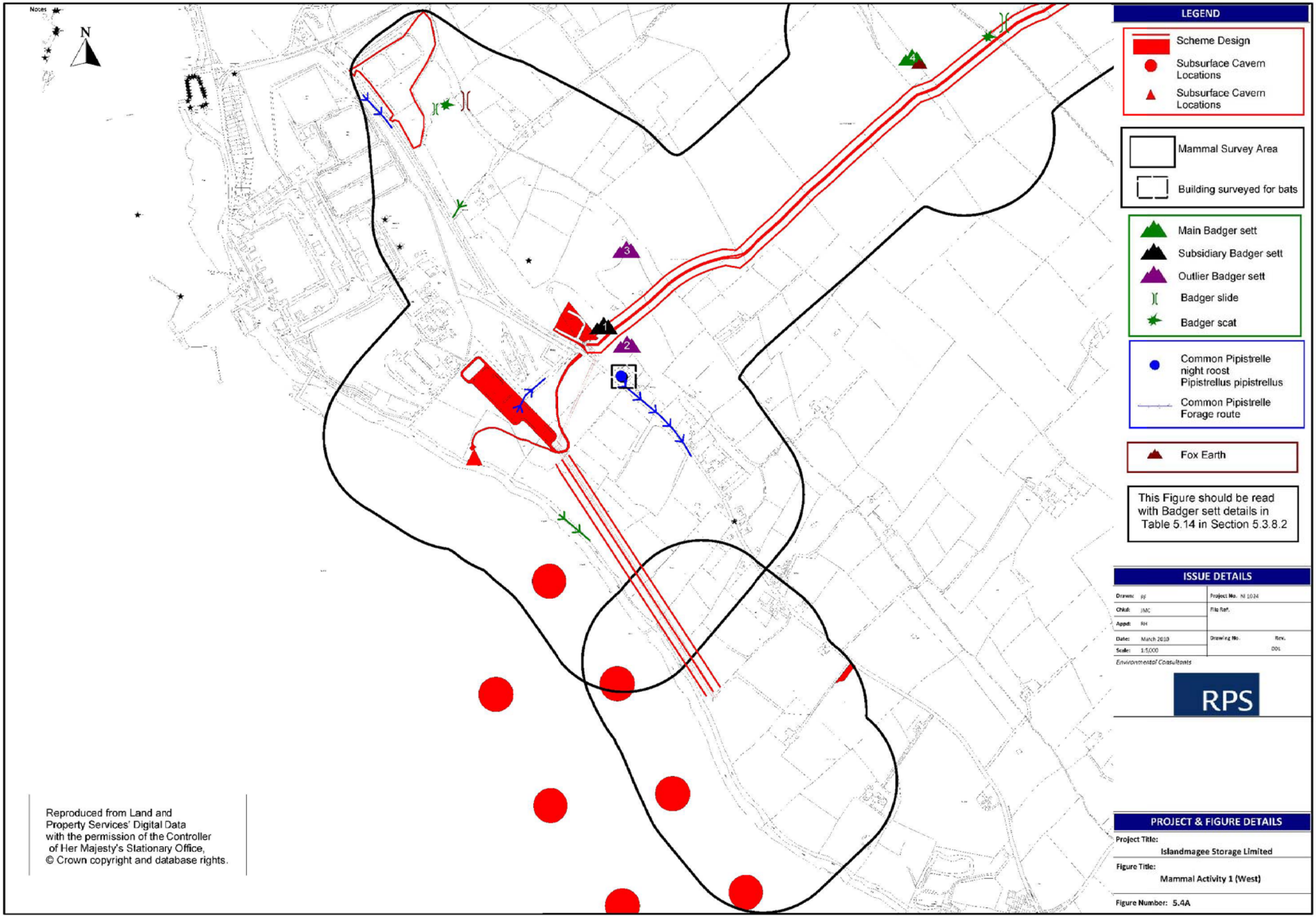
### 5.3.9 Invertebrates

No formal survey was carried out, but no protected species were recorded within the scheme area. Table 5.15 lists the butterfly species recorded within the scheme area including conservation status.

**Table 5.15 Butterflies Recorded in Scheme Area**

| Common Name | Scientific Name | Protection | Status[1] | Recorded within site |
|---|---|---|---|---|
| Common Blue | *Polyommatus icarus*, | - | Decreasing | √ |
| Green-veined White | *Pieris napi* | - | Stable | √ |
| Large White | *Pieris brassicae* | - | Decreasing | √ |
| Meadow Brown | *Maniola jurtina* | - | Increasing | √ |
| Orange-tip | *Anthocharis cardamines* | - | Stable | √ |
| Painted Lady | *Vanessa cardui* | - | Increasing | √ |
| Small Copper | *Lycaena phlaeas* | | Stable | √ |
| Small tortoise shell | *Aglais urticae*, | - | Stable | √ |
| Small White | *Pieris rapae* | - | Stable | √ |
| Speckled Wood | *Pararge Aegeria* | | Increasing | √ |

Key to Table 5.15
[1]Trends from Fox et al., 2006


Notes
N
1
2
3
4
LEGEND
Scheme Design
Subsurface Cavern Locations
Subsurface Cavern Locations
Mammal Survey Area
Building surveyed for bats
Main Badger sett
Subsidiary Badger sett
Outlier Badger sett
Badger slide
Badger scat
Common Pipistrelle night roost Pipistrellus pipistrellus
Common Pipistrelle Forage route
Fox Earth
This Figure should be read with Badger sett details in Table 5.14 in Section 5.3.8.2
ISSUE DETAILS
Drawn: RF
Chkd: JMC
Appd: RH
Date: March 2010
Scale: 1:5,000
Project No. NI 1024
File Ref.
Drawing No.
Rev.
001
Environmental Consultants
RPS
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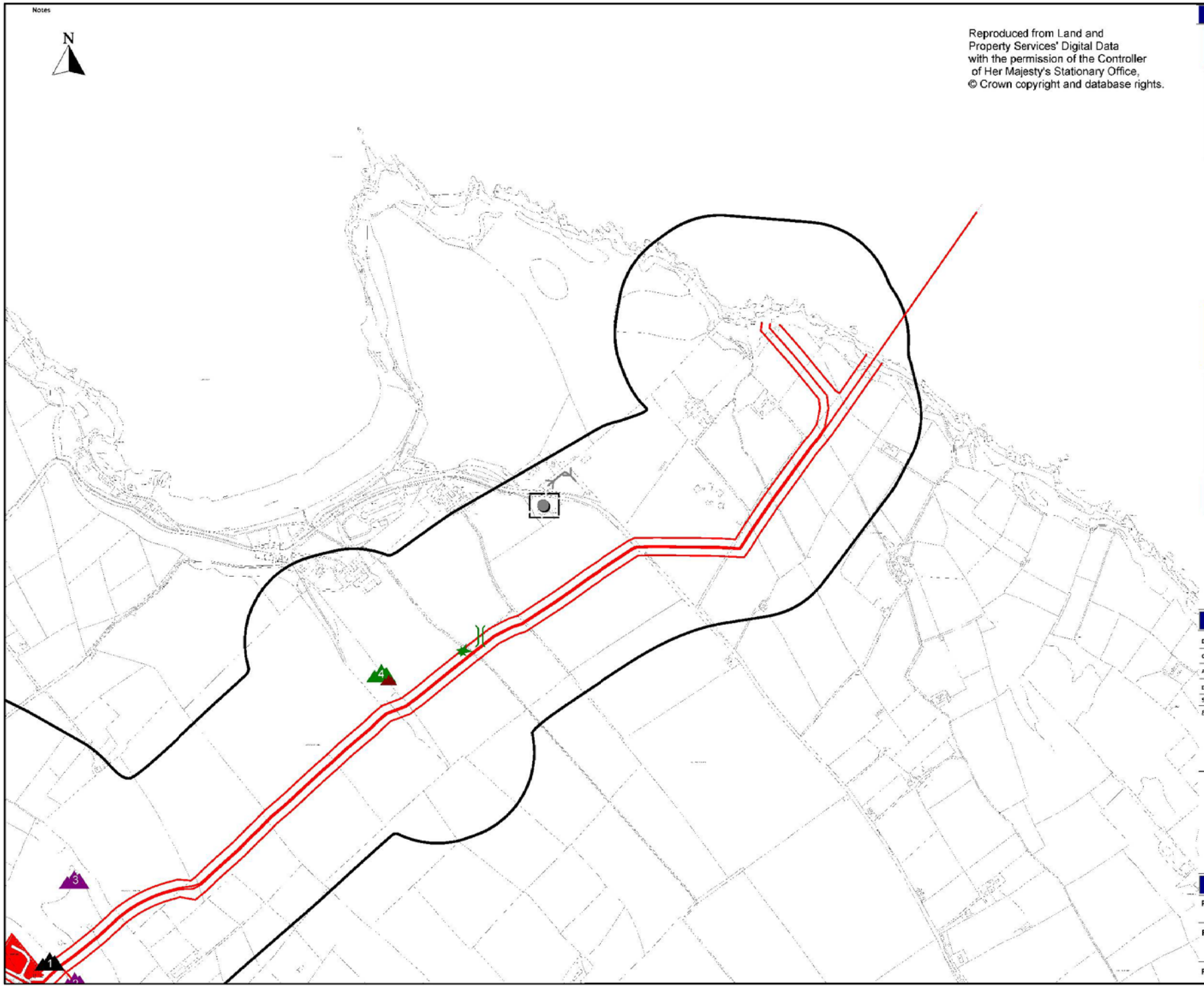
PROJECT & FIGURE DETAILS
Project Title:
Islandmagee Storage Limited
Figure Title:
Mammal Activity 1 (West)
Figure Number: 5.4A

Notes




**LEGEND**

- Scheme Design
- Mammal Survey Area
- Building survey (bats)
- Main Badger sett
- Subsidiary Badger sett
- Outlier Badger sett
- Badger slide
- Badger scat
- Common Pipistrelle Forage route Pipistrellus pipistrellus
- Leisler's individual day roost Nyctalus leisleri
- Leisler's Forage route
- Fox Earth

This Figure should be read with Badger sett details in Table 5.14 in Section 5.3.8.2

**ISSUE DETAILS**

| | | | |
|---|---|---|---|
| Drawn: | RF | Project No. | NI 1024 |
| Chkd: | JMC | File Ref. | A |
| Appd: | RH | | |
| Date: | December 2009 | Drawing No. | Rev. |
| Scale: | 1:8,000 | X | DRAFT |

*Environmental Consultants*

RPS

**PROJECT & FIGURE DETAILS**

Project Title:
**Islandmagee Storage Limited**

Figure Title:
**Mammal Activity 1 (East)**

Figure Number: **5.4B**

## 5.4 IMPACT ASSESMENT

Impact assessment has been undertaken in accordance with the Institute of Ecology and Environmental Management 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 criteria set out in Table 5.16. The impact significance (Table 5.17) is a combined function of the ecological value of the affected feature (Table 5.1), and the magnitude of the impact (Table 5.16). It is important to note that there is no universally recognised definition of what constitutes *significance* as described in Tables 5.1 and 5.16. 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 a 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, 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 is assigned a likelihood of occurrence (after mitigation):

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

Please note that potential impacts described below assume no mitigation as described in the following section 5.5 Mitigation. Mitigation (section 5.5) is proposed to neutralize impacts identified as likely.

**Table 5.16 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 5.17 Estimating the Overall Ecological Appraisal Category**

| Magnitude of Potential Impact | Ecological value of sites damaged or improved (Table 1) | | | | |
|---|---|---|---|---|---|
| | Very high | High | Medium | Lower | 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 |

The nature of the proposed development involves disruption of the local ecology directly during the operational and construction phases. The main potential impacts result from the following broad categories:

- Whole or partial habitat loss (and resulting breeding/feeding habitat loss)
- Fragmentation or isolation of breeding and/or feeding corridors of faunal species as a result of habitat loss
- Noise, physical and visual disturbance during the construction and operational phases

### 5.4.1 Designated Sites

The nearest designated sites are Larne Lough SPA, Larne Lough ASSI, Swan Island SPA /NNR, and Gobbins cliffs pASSI.

Potential Impacts to designated sites for the scheme fall into the following specific categories:

- **Potential Pollution impacts**
  Direct pollution impacts to wintering and breeding bird populations during construction (36 months of construction activity phased across a 48 month period)
  Indirect pollution impacts causing disturbance via food resource depletion (phased across a 48 month period)
  Direct pollution impacts to important saline plant habitats (phased across a 48 month period)
- **Potential Disturbance impacts**
  Direct collision impacts on swans and geese with construction plant (max 55m high drill rig, mobile cranes) for 18 months.
  Noise and visual disturbance to wintering birds during wellpad, SSP, GPF, construction (phased across a 48 month period)
- **Potential Habitat loss impacts**
  Permanent habitat loss of wintering improved grassland with potential as Brent goose feeding fields.

#### 5.4.1.1 Larne Lough SPA/Ramsar

Larne Lough SPA & Larne Lough Ramsar (boundaries coincident along with Larne Lough ASSI) are located along the Lough shorelines adjacent to the proposed caverns, and immediately west of the terrestrial wellpad, vent stack, and GPF elements of the scheme. Before discussion of the potential impacts on the SPA & Ramsar detailed in Table 5.18, it is important to note that all potential impacts are considered to be neutralised by the mitigation proposed in the following section 5.5.1 for designated sites. All birds other than the Brent goose listed as the primary feature in the SPA declaration (Appendix 5.5) are considered under Local Habitats and Wildlife (section 5.4.3).

Of potential impacts identified in Table 5.18, only one is probable, with the rest of unknown likelihood or unlikely. Two potential impacts are very large adverse (likelihood unknown), two are large adverse (one unlikely one probable), and one is slight adverse (unlikely).

Both very large potential adverse impacts are pollution-induced. One is the potential for direct bird fatalities/ injuries, and one is the potential for indirect disturbance via pollution-induced food resource depletion during construction or decommissioning. The likelihood of a serious pollution incident is difficult to predict.

Potential collision impacts on Brent Geese are deemed to be unlikely due to the temporary presence of all construction plant structures (drill rig and cranes for 36 months only). Only the vent stack (40m high) will remain a permanent feature. The small Brent populations in the

locality of the scheme (WeBS Peak Count 26; RPS Peak count 6) will further reduce collision risk. Brent geese are significantly less abundant in the outer Lough within the scheme area (WebS Peak 26) compared to the inner Lough where intertidal mudflats are located (WeBS Peak 212).

The remaining slight adverse impact is due to the permanent loss of potential grassland bird feeding fields.

All residual impacts are non-significant. (shown as N.S. in tables)

**Table 5.18 Summary Table of Potential impacts on Larne Lough SPA /Ramsar**

| Potential Impact | Nature | Magnitude[1] | Ecological Value of Habitat/Species/ Feature | Significance of Impact | Impact Type | Phase of occurrence | Duration | Direct/In direct | Likelihood of Occurence[2] | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Point pollution of Larne Lough during construction leading to degradation of plant habitats and Brent Goose feeding resources | -ve | Major | Very High | Very Large Adverse | Bird Death/Disturbance | Construction | Temporary (36 months) | D/I | Unlikely | Yes | N.S. |
| Point pollution of Larne Lough during decomissioning leading to degradation of plant habitats and Brent Goose feeding resources | -ve | Major | Very High | Very Large Adverse | Bird Death/Disturbance | Decommissioning | Temporary (Unknown) | D/I | Unlikely | Yes | N.S. |
| Collision impacts of | -ve | Intermediate | Very High | Large Adverse | Bird Death | Construction | Temporary (36 months) | D | Unlikely | Yes | N.S. |

| Potential Impact | Nature | Magnitude[1] | Ecological Value of Habitat/Species/ Feature | Significance of Impact | Impact Type | Phase of occurrence | Duration | Direct/In direct | Likelihood of Occurence[2] | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Brent Geese with 55m high drill rig, 40m high vent stack, and cranes (22 Individuals[3]) | | | | | | | (Drill rig, cranes)<br><br>Permanent (Vent Stack) | | | | |
| Noise and visual feeding/roosting Brent geese from drilling at wellpad | -ve | Intermediate | Very High | Large Adverse | Disturbance | Construction | Temporary (36 months) | D | Probable | Yes | N.S. |
| Disturbance to Brent Geese through loss of approx 3.7ha grassland feeding fields (235 Individuals[4]) | -ve | Minor | Very High | Slight Adverse | Displacement | Construction & operation | Permanent | I | Certain | No | N.S. |

Key to Table 5.18
[1] See notes on magnitude in section 5.4 [2]Likelihood of impact occurrence is post-mitigation. [3]Five-year mean winter peak Brent goose count from WeBS data (2001-2006) for outer Larne lough subsite in Appendix 5.7,[4]Five-year mean winter peak Brent goose counts from WeBS data (2001-2006) for entire Larne lough site in Appendix 5.7

#### 5.4.1.2 Swan Island SPA/National Nature Reserve

Swan Island SPA is located approximately 1km southwest of the scheme caverns and 1.4km southwest of the terrestrial wellpad element of the scheme. Before discussion of the potential impacts on the SPA & Nature Reserve detailed in Table 5.19, it is important to note that all potential impacts are considered to be neutralised by the mitigation proposed in the following section 5.5.1 for designated sites. All birds other than the Terns listed in the SPA declaration (Appendix 5.5) are considered under Local Habitats and Wildlife (section 5.4.3).

Of potential impacts identified in Table 5.19, one is probable, with all other impacts of unknown probability of occurrence or unlikely. Two potential impacts are very large adverse (and of unknown probability of occurrence), and two are slight adverse (one probably and one unlikely).

The potential very large adverse impacts are pollution-linked direct bird fatalities/injury or indirect food loss disturbance due to a incidents occurring during construction or decommissioning.

The remaining two slight adverse impacts are the unlikely indirect impacts to tern colonies resulting from loss of aquatic prey due to brine emissions, and the potential slight adverse physical disturbance impacts predicted for foraging terns from physical construction disturbance.

No potential collision impacts with new vertical structures are predicted to Terns due to their small size and skilled flight. Sandwich terns were seen to easily navigate through the series of Pylons by the Moyle interconnector in high winds in late summer 2009.

All residual impacts are non-significant.

##### *5.4.1.2.1 Potential Impact of Brine emissions on Foraging Terns*

The potential impact of brine emissions on terns has been classed as slight adverse. The data in this section 5.4.1.2.1 has been taken from Chapter 9.0 Coastal Processes which presents detailed tidal, bathymetric, and brine emission modelling data

The brine outfall will discharge brine approximately 450m off-shore, with the discharge point located at 27 metres depth (chart datum). The brine, even at 10°C above ambient, will be more dense than the surrounding seawater, thus there will be a tendency for the brine plume to initially sink. However the eddying in the water column will mix the brine and seawater as the tidal currents flow across the outfall area (average tidal current speed of 0.22m/s). Any salinity increase in excess of the range normally experienced in seasonal variations is expected to be restricted to the initial mixing zone, less than 100m from the outfall. This corresponds to a distance of ca. 300-550m from the coast. Applying the Precautionary Principle (SNIFFER, 2006), this distance has been increased to 800m for the purposes of the analysis below, and is referred to as ‘the limit of significant brine influence’.

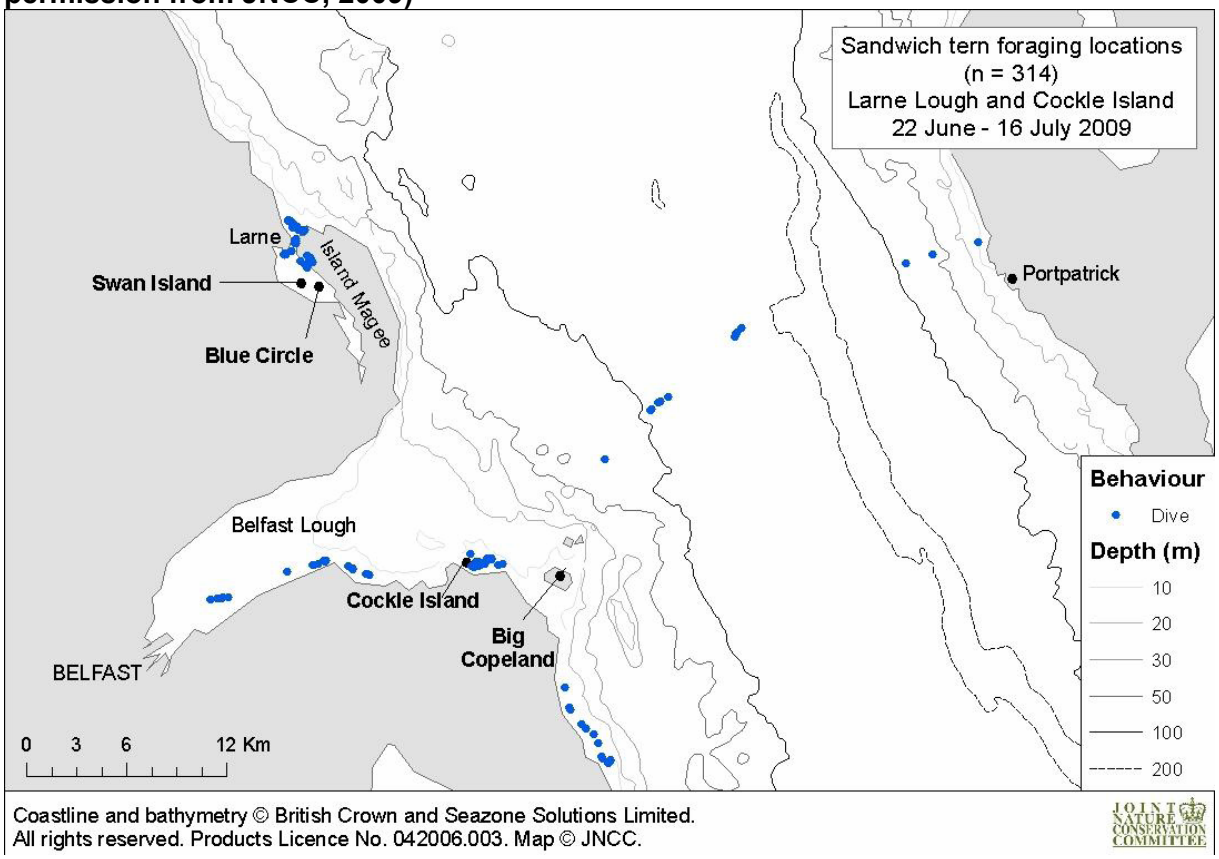
Open coast surveys (section 5.3.7.4.1) indicated that within the Open Coast survey area (limited to area in Figure 5.2), no fishing was observed by Terns. However incidental

observations during other surveys such as the Black Guillemot surveys around the power station indicated that Sandwich Terns appeared to fish frequently along the eastern shore of Larne Lough north of Ballylumford. Common and Arctic Terns were not observed fishing in the Open Coast survey area, or wider area. However the open coast surveys only recorded birds within approximately 300m of the coastline.

Data on Tern distributions at distances of greater than 300m are provided by the preliminary results of the recent JNCC study on Tern foraging distributions (Wilson et al., 2009). The JNCC data mirrors the open coast survey observations for the 300m buffer from the open coastline, in that all three Tern species appeared to avoid fishing here. The data further shows that each species in fact occupies a distinct foraging area either far off-shore, or within Larne Lough as shown in the following Charts 1-3. The distances below have been calculated by comparing foraging observations on the JNCC charts 1-3 with the proposed limit of significant brine influence of 800m.

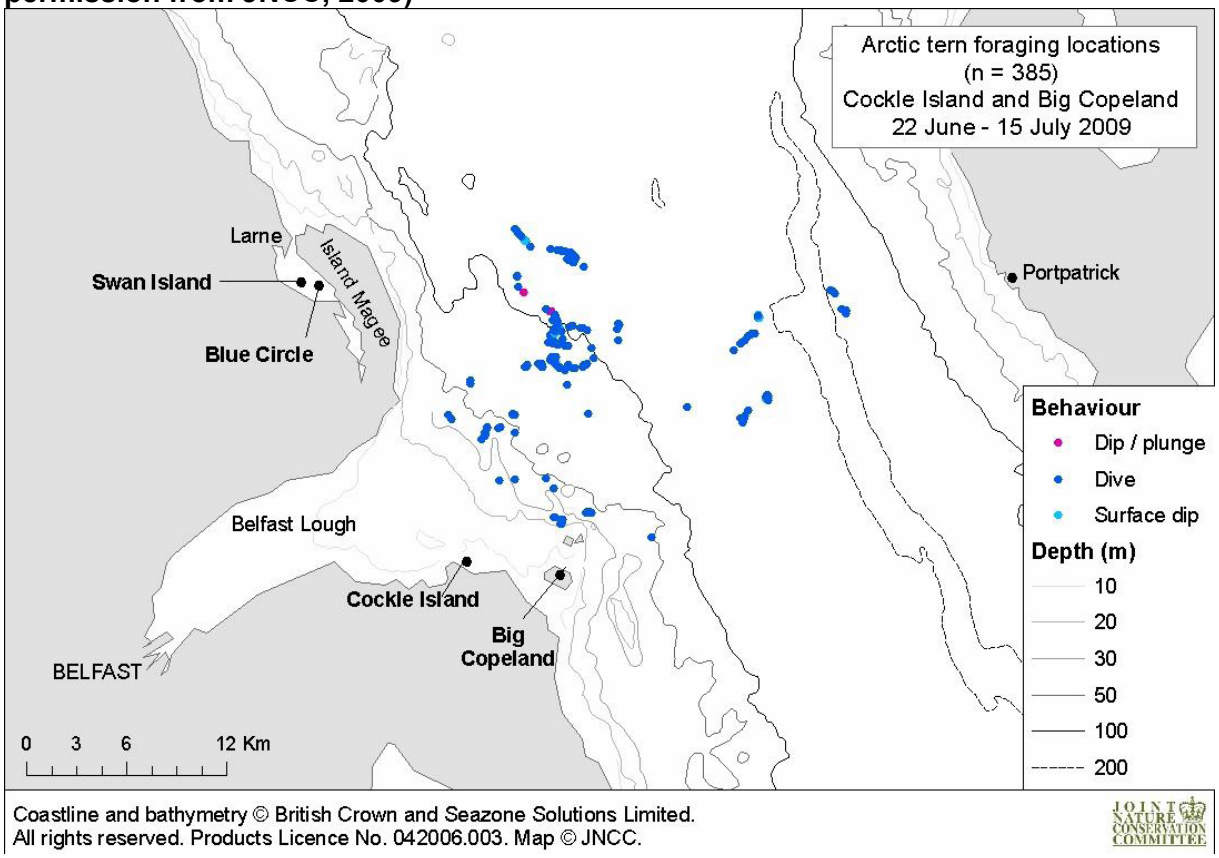
Sandwich Terns show a strong preference for fishing within Larne Lough (Chart 5.1) and were not recorded fishing east of Barrs Point by JNCC. No brine impacts are therefore predicted on Arctic Terns.

**Chart 5.1 Sandwich Tern Foraging Locations around Larne Lough (Reproduced with permission from JNCC, 2009)**




In contrast, Arctic Terns (Chart 5.2) fished only the open ocean far out to the east and south of Skernaghan Point. This species did not fish within c.8km of the limit of significant brine influence on a single occasion. No brine impacts are therefore predicted on Arctic Terns.

**Chart 5.2 Arctic Tern Foraging Locations around Larne Lough (Reproduced under permission from JNCC, 2009)**




Common Terns (Chart 5.3) fished the open ocean to the east and north of Skernaghan Point. In contrast to both Sandwich and Arctic Terns, this species did occasionally fish in the vicinity of the open coastline. However the species only fished once at Skernaghan Point (c.3km from limit of brine influence), and occasionally in the open ocean 3km off-shore to the north (also c. 3km from limit of brine influence). Further out to sea from the limit of brine influence, the Common Tern forages in a scattered northerly distribution at distances of up to 11km from the limit of significant brine influence. Common Terns generally forage in different open water locations to Arctic Terns. Applying the precautionary principle, a slight adverse impact on Common Terns is predicted.

**Chart 5.3 Common Tern Foraging Locations around Larne Lough (Reproduced under permission from JNCC, 2009)**

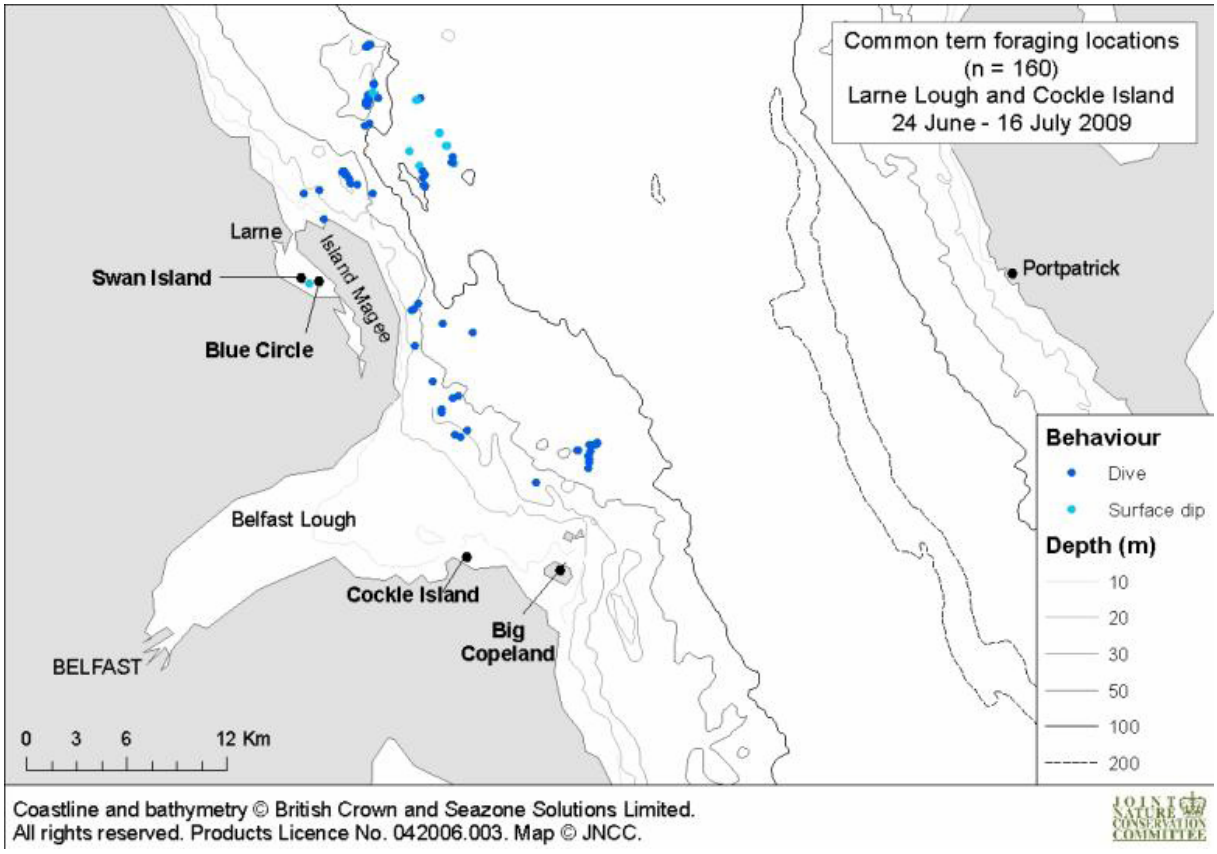


**Table 5.19 Summary Table of Potential impacts on Swan Island SPA**

| Potential Impact | Nature | Magnitude[1] | Ecological Value of Habitat/Species/Feature | Significance of Impact | Potential Impact Type | Phase of occurrence | Duration | Likelihood of Occurence[2] | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|
| Pollution of Larne Lough during construction leading to Tern disturbance from food resource depletion | -ve | Major | Very High | Very Large adverse | Indirect Fatality/Disturbance | Construction | Temporary (36 months) | Unlikely | Yes | N.S. |
| Pollution of Larne Lough during Decommissioning leading to Tern disturbance from food resource depletion | -ve | Major | Very High | Very Large adverse | Indirect Fatality/Disturbance | Decommissioning | Temporary (Unknown) | Unlikely | Yes | N.S. |
| Physical disturbance to Terns from change in prey distribution due to brine emission from open coast brine outfall | -ve | Minor | Very High | Slight Adverse | Disturbance via prey loss | Construction | Temporary (5 years) | Unlikely | Yes | N.S. |

| Potential Impact | Nature | Magnitude[1] | Ecological Value of Habitat/Species/Feature | Significance of Impact | Potential Impact Type | Phase of occurrence | Duration | Likelihood of Occurence[2] | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|
| Physical disturbance to Terns from drilling at wellpad during construction | -ve | Minor | Very High | Slight Adverse | Disturbance and/or Displacement | Construction | Temporary (18 months) | Probable | Yes | N.S. |

Key to Table 5.19

[1] See notes on magnitude in section 5.4

[2]Likelihood of impact occurrence is post-mitigation

.

#### 5.4.1.3 Larne Lough ASSI

Larne Lough ASSI (boundary coincident with Larne Lough SPA) is located along the shoreline adjacent to the boreholes, immediately west of the terrestrial wellpad and vent stack elements of the scheme. Before discussion of the impacts on the ASSI detailed in Table 5.20, it is important to note that all impacts are considered to be neutralized by the mitigation proposed in the following section 5.5.1 for designated sites.

Of potential impacts identified in Table 5.20, four are very large adverse, and one is slight adverse. All four of the very large adverse impacts are unlikely potential pollution events during construction or decommissioning. The remaining slight adverse impact is predicted due to certain physical disturbance impacts during construction.

No brine emission impacts are predicated as none of the ASSI species (Goldeneye, Greenshank, Redshank, Shelduck, Great Crested Grebe, Brent, Red-breasted Merganser) occur in open waters on the open coast.

All residual impacts are non-significant. (shown as N.S. in tables)

**Table 5.20 Summary of Impacts to Larne Lough ASSI**

| Potential Impact | Nature | Magnitude | Ecological Value of Habitat/Species /Feature | Significance of Impact | Potential Impact Type | Phase of occurrence | Duration | Direct/Indirect | Occurence[2] | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pollution of Larne Lough during construction leading to wintering bird deaths/depletion of food resources | -ve | Major | High | Very Large adverse | Indirect Bird death/Disturbance | Construction | Temporary (36 months) | D | unlikely | Yes | N.S. |
| Pollution of Larne Lough during decommissioning leading to wintering bird deaths/ depletion of food resources | -ve | Major | High | Very Large adverse | Indirect Bird death/Disturbance | Decommissioning | Temporary (Unknown) | D | unlikely | Yes | N.S. |
| Pollution of Larne Lough (construction) leading to degradation of saltmarsh, | -ve | Major | High | Very Large adverse | Habitat Loss | Construction | Temporary (36 months) | D | unlikely | Yes | N.S. |

| Potential Impact | Nature | Magnitude | Ecological Value of Habitat/Species /Feature | Significance of Impact | Potential Impact Type | Phase of occurrence | Duration | Direct/Indirect | Occurence[2] | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| intertidal and lagoon habitats | | | | | | | | | | | |
| Pollution of Larne Lough (decommissioning) leading to degradation of saltmarsh, intertidal and lagoon habitats | -ve | Major | High | Very Large adverse | Habitat Loss | Decomissioning | Temporary (Unknown) | D | unlikely | Yes | N.S. |
| Noise and visual disturbance to wintering Goldeneye, Redshank, Greenshank, Great Crested Grebe, Shelduck during construction | -ve | Minor | High | Slight Adverse | Disturbance | Construction | Temporary (36 months) | I | Certain | Yes | N.S. |

[1]See notes on magnitude in section 5.4
[2]Likelihood of impact occurrence is post-mitigation.

#### 5.4.1.4 Portmuck ASSI/Gobbins pASSI

Only two potential slight adverse impacts are predicted for the Gobbins cliffs and Portmuck ASSI (Table 5.21). Both are potential impacts to forageing seabirds. Breeding seabirds are unlikely to be significantly affected by the proposed construction activities at the IPS element of the scheme as these located at least 600m from the nearest breeding site.

The impact of brine emissions on foraging seabird populations is considered slight as these were not regularly recorded within the vicinity of the brine outfall in significant numbers. Common Guillemot (Peak count 4), and Razorbill (Peak Count 5) were the only ASSI species recorded in open water within 300m of the shore (Fulmar in flight only). A single flock of 22 Razorbill was recorded approximately 500m off-shore (directly within zone of brine emission influence) in August 2009, but this was an apparent rarity.

All residual impacts are non-significant. (shown as N.S. in tables)

## Table 5.21 Summary Table of Impacts on Gobbins Cliffs pASSI

| Potential Impact | Nature | Magnitude[1] | Ecological Value | Significance of Impact | Potential Impact Type | Phase of occurrence | Duration | Direct/Indirect | Likelihood of Occurence[2] | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Noise and visual disturbance to foraging seabirds during construction of IPS | -ve | Minor | High | Slight Adverse | Disturbance | Construction | Temporary (18 months) | D | Probable | No | N.S |
| Disturbance to foraging seabirds during construction from changes in fish abundance due to open coast brine outfall | -ve | Minor | High | Slight Adverse | Disturbance | Construction | Temporary (5 years) | I | Unlikely | No | N.S |

Key to Table 5.21
[1] See notes on magnitude in section 5.4
[2] Likelihood of impact occurrence is post-mitigation.

### 5.4.2 Non-Designated Sites

There are no non-designated sites in the immediate vicinity of the scheme. The nearest SLCNIs are located approximately 10km from south of the scheme. No significant potential impacts are predicted.

### 5.4.3 Local Habitats & Wildlife

Potential Impacts on local habitats & wildlife are summarised in Table 5.22. The largest impacts have been placed at the top of the table.

Potential Impacts to bird species already considered for designated sites above (i.e. Terns, Brent geese, Goldeneye, Great- crested Grebe, Greenshank, Redshank, Shelduck) are excluded. Before discussion of the impacts detailed in Table 5.22, it is important to note that all impacts are considered to be neutralised by the mitigation proposed in the following section 5.5.1 for designated sites.

Of potential impacts identified in Table 5.22, two are very large adverse, three are large adverse, five are moderate adverse, and the remainder are slight adverse.

The four potential very large adverse impacts are concerned with the certain disturbance to badgers along the SSP route, and the unlikely potential disturbance to roosting bats if tree removal is required for Leaching Plant construction.

The single large adverse impact is the unlikely potential pollution of Larne Lough resulting in death or injury of wintering and/or breeding waterfowl of international conservation importance.

The first potential moderate adverse impact is the unlikely potential collision of geese and waterfowl with temporary construction plant. The remaining four moderate adverse impacts relate to potential habitat loss of two Primrose populations, small areas of species-rich neutral semi-improved, and neutral flush grassland habitats, and disturbance to breeding birds during construction (due to potential bedrock blasting, if required, at the IPS). Several slight adverse impacts are predicted due to certain loss of a small number of farmland breeding bird territories, several certain physical disturbance impacts to fauna during construction and several small fragments of certain habitat loss, including hedgerows which will be removed or coppiced. All residual impacts are non-significant save for the moderate impact associated with loss of neutral semi-improved grassland.

To expand on the breeding bird habitat loss, the following nine territories will be lost (scheme element responsible in brackets).

- **1 Whitethroat territory (Vent Stack)**
- **1 Dunnock territory (GPF access roads)**
- **1 of each of Bluetit, Linnet, Meadow Pipit, Song Thrush, Robin, Wren (GPF)**
- **1 Meadow Pipit (IPS)**

Impacts of brine emissions to open water species have been considered slight. There are three Amber-listed BoCCI species that feed in the vicinity of the outfall location as recorded within the open coast survey area (300m of shore). Peak counts of 2 Great Northern Diver, 10 Shag, and 2 Cormorant indicate a small proportion of the local wintering and/or breeding populations for these species.

**Table 5.22 Summary of Potential Impacts on Local Habitats & Wildlife**

| Potential Impact | Nature | Magnitude[1] | Ecological Value | Impact Significance | Potential Impact Type | Phase of occurrence | Duration | Direct/ Indirect | Likelihood of Occurrence | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Closure of subsidiary Badger sett & temporary exclusion of outlier sett prior to digging of 1.6m deep trench for SSP pipeline | -ve | Intermediate | High | Large Adverse | Disturbance & Habitat Loss | Construction | Permanent / Temporary | D | Certain | Yes | N.S. |
| Potential disturbance or death of bats in case of semi-mature tree removal for Leaching Plant | -ve | Intermediate | Very High | Large Adverse | Direct fatality and/or disturbance | Construction | Permanent | D | Unlikely | Yes | N.S. |
| Pollution impacts to wintering/breeding water birds during construction | -ve | Major | Very High | Very Large Adverse | Direct fatality and/or disturbance | Construction | Temporary (36 months) | D | Unlikely | Yes | N.S. |
| Pollution impacts to wintering/breeding water birds during decommissioning | -ve | Major | Very High | Very Large Adverse | Direct fatality and/or disturbance | Decommissioning | Temporary (Unknown) | D | Unlikely | Yes | N.S. |

| Potential Impact | Nature | Magnitude[1] | Ecological Value | Impact Significance | Potential Impact Type | Phase of occurrence | Duration | Direct/ Indirect | Likelihood of Occurrence | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Collision impacts of Mute Swans(Peak 26[3]) , Whooper Swan (Peak 36[3]), Greylag goose Peak 27[3]), Pink-footed goose (Peak 2[3]), Snow goose Peak 2[3]), Cormorant (Peak 20[3]),Shag (Peak 42[3])with max 55m high drill rig, 40m vent stack and cranes | -ve | Intermediate | Very High | Large Adverse | Direct Fatalities | Construction & Operation | Temporary (36 months) (Drill rig, cranes)<br>Permanent (Vent Stack) | D | Unlikely | Yes | N.S. |
| Loss of two small populations of nationally protected Primrose *Primula vulgaris* | -ve | Intermediate | Medium | Moderate Adverse | Habitat Loss | Construction | Permanent | D | Certain | Yes | N.S. |
| Loss of 1.1 ha of neutral semi-improved grassland habitat for the GPF | -ve | Intermediate | Medium | Moderate Adverse | Habitat Loss | Construction | Permanent | D | Certain | Yes | S |
| Loss of 0.1ha neutral flush on sites of vent stack and GPF | -ve | Intermediate | Medium | Moderate Adverse | Habitat Loss | Construction | Permanent | D | Certain | No | N.S. |

| Potential Impact | Nature | Magnitude[1] | Ecological Value | Impact Significance | Potential Impact Type | Phase of occurrence | Duration | Direct/ Indirect | Likelihood of Occurrence | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Disturbance to breeding birds during construction of IPS (bedrock blasting) | -ve | Intermediate | Medium | Moderate | Disturbance via displacement | Construction | Temporary (36 months) | I | Certain | Yes | N.S. |
| Degradation of habitats through spread of non-native hedge species *Sympharicarpos alba* | -ve | Intermediate | Medium | Moderate | Loss of native species | Construction | Temporary | | | | |
| Loss of ca. 0.02 ha of neutral semi-improved grassland habitat for the IPS at Castle Robin Bay | -ve | Minor | Medium | Slight Adverse | Habitat Loss | Construction | Permanent | D | Certain | No | N.S. |
| Transport of brine at 60▫C resulting in heating of soil causing changes in vegetation change & invertebrate activity | -ve | Minor | Low-Medium | Slight Adverse | Disturbance/ habitat loss | Construction / | Temporary (4 years) | I | Unlikely | No | N.S. |

| Potential Impact | Nature | Magnitude[1] | Ecological Value | Impact Significance | Potential Impact Type | Phase of occurrence | Duration | Direct/ Indirect | Likelihood of Occurrence | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Physical disturbance to small mammals during construction of site including 16m deep trench for SSP | -ve | Minor | High | Slight Adverse | Disturbance | Construction | Temporary (36 months) | I | Certain | Yes | N.S. |
| Disturbance to roosting bats from nocturnal lighting of buildings and vegetation | -ve | Minor | Very High | Slight Adverse | Disturbance | Construction & Operation | Permanent | D | Unlikely | No | N.S. |
| Loss of 3.7ha improved grassland habitat and faunal forageing ground | -ve | Minor | Low | Slight Adverse | Habitat Loss | Construction | Permanent | D | Certain | No | N.S. |
| Loss of <1km species-poor and defunct hedgerow | -ve | Minor | Medium | Slight Adverse | Habitat Loss and fragmentation | Construction | Temporary | D | Certain | Yes | N.S. |
| Change in fish prey distribution of three amber-listed seabirds | -ve | Minor | Medium | Slight Adverse | Disturbance | Construction | Temporary | I | Probable | Yes | N.S |
| Loss of scrub and semi-mature Broad-leaved woodland habitat along SSP | -ve | Minor | Low | Slight Adverse | Habitat Loss | Construction | Permanent | D | Certain | Yes | N.S. |

| Potential Impact | Nature | Magnitude[1] | Ecological Value | Impact Significance | Potential Impact Type | Phase of occurrence | Duration | Direct/ Indirect | Likelihood of Occurrence | Mitigation Proposed | Significance of Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Loss/disturbance of 9 farmland breeding territories including one Amber-listed Linnet territory at site of GPF, Vent Stack and IPS. | -ve | Minor | Low-Medium | Slight Adverse | Habitat Loss and fragmentation | Construction | Permanent | D | Certain | Yes | S |
| Loss of invertebrate breeding habitat | -ve | Minor | Medium | Slight Adverse | Habitat Loss and fragmentation | Construction | Permanent | D | Certain | Yes | N.S. |
| Noise and visual disturbance to nine breeding Black Guillemot pairs on Ballylumford jetties during construction | -ve | Minor | Medium | Slight Adverse | Disturbance | Construction | Temporary (18 months) | I | Extremely unlikely | Yes | N.S. |

Key to Table 5.22
[1] See notes on magnitude in section 5.4
[2] Likelihood of impact occurrence is post-mitigation.

## 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.

There will be only two residual effects remaining after mitigation across all designated sites and local habitats**,** namely the loss of 1.1ha of neutral semi-improved grassland, and the loss of nine breeding farmland bird territories. These are treated in section 5.6 Residual effects. All other identified impacts are considered to be neutralized by the following mitigation measures.

### 5.5.1 Designated Sites

#### 5.5.1.1 Pollution Mitigation

General mitigation relating to both the operational and construction phases of the proposed scheme is listed below:

- Best practice construction guidelines and an effective Environmental Management plan (EMP) shall be drawn up and adhered to by the successful contractor. This EMP shall be submitted to the Client Representative and NIEA for approval prior to works.

- Under the terms of schedule 6 of the Drainage (Northern Ireland) Order 1973 the applicant must submit to Rivers Agency for its consent any proposal to carry out works which might affect a watercourse.

- All works should be undertaken in accordance with the Fisheries Act (Northern Ireland) 1966 as amended with particular reference to the protection of habitat, spawning areas, fry or juvenile fish, and obstruction to migratory fish.

- There shall be no discharge of suspended solids or any other deleterious matter to watercourses. During construction, silty water shall be treated using silt traps/settlement ponds and temporary interceptors and traps will be installed until such time as permanent facilities are constructed. Any surface water run-off must be treated to ensure that it is free from suspended solids, oil or any other polluting materials.

Petrol and oil interceptors will be used to prevent contaminants entering the Lough and tidal ponds.

All fuels, lubricants and hydraulic fluids will be kept in secure bunded areas away from watercourses. The bunded area will accommodate 110% of the total capacity of the containers within it. Containers will be properly secured to prevent unauthorised access and misuse.

As part of the Environmental Management Plan (EMP) to be drawn up at detailed design stage, an effective spillage procedure will be put in place with all staff properly trained in its

implementation. Spill kits will be made available. Waste oils or hydraulic fluids will be collected, stored in appropriate containers and disposed of off-site in an appropriate manner.

Fuelling and lubrication will not be conducted within 15m of the nearest watercourse.

Storage areas, machinery depots and site offices will not be located within 15m of the nearest watercourse

Foul drainage from the site offices and facilities will be properly captured, treated and removed to a suitable treatment facility by a licensed waste contractor.

Disposal of raw or uncured waste concrete will be controlled to ensure that watercourses or other sensitive areas will not be impacted.

All or any areas proposed as disposal/storage/recovery sites will be subject to ecological assessment as part of any applications for planning permission, waste permits or waste licenses.

#### 5.5.1.2 Impact-specific Mitigation

##### *5.5.1.2.1 Pollution and Disturbance Impacts during decommissioning*

Prior to undertaking planning of any decommissioning works, an ecologist will be contracted to undertake a review of bird use of the scheme area, and undertake further surveys should these be required. Pollution prevention guidelines will be strictly adhered to, and measures required to minimise construction disturbance to wintering birds will be agreed in consultation with NIEA. This may include installation of acoustic fencing to reduce noise and screening to reduce the level of perceived threat due to visible human presence.

- **Bird Collision impacts**
  Construction cranes and the drill rig will be lit at night for safety reasons. Illuminating the vent stack may reduce the risk of bird collision, however the risk of collision is considered unlikely and lighting the stack would significantly increase the visual impact of the vent stack to observers.

- **Changes in fish distribution at IPS outfall**
  Brine outfall pipe will have high pressure dispersal nozzle fitted to add turbulence to brine discharge and will enhance the mixing and rapid dispersion of the brine (further detail in Chapter 9.0 *"Coastal Processes*"). Residual impacts to local fish populations which are potential prey items to terns, will not be significant.

- **Disturbance to wintering birds during construction of IPS**
  At this stage of the preliminary design, it is not certain whether blasting will be required at the site of the IPS. Upon completion of the pre-construction ground investigation studies, if it is determined that blasting is required; a detailed methodology will be prepared and submitted with the environmental management plan for approval by the NIEA. If required and where possible, Islandmagee Storage will endeavour to undertake blasting works during the month of September, which will significantly reduce the potential adverse impact on birds. This avoids the bird breeding season, an has the lowest counts of both Brent geese and total wintering wildfowl numbers at Larne Lough (Five-year peak of 5 individuals see Appendix 5.7), and on the island of Ireland (Data from Boland & Crowe, 2007). If blasting works are required outside of the month of September, a strategy for mitigation will be agreed with the NIEA ahead of any works commencing.

### 5.5.2 5.5.2 Non-Designated Sites

None proposed (No impacts predicted)

### 5.5.3 Local Habitats

#### 5.5.3.1 Pollution prevention mitigation

See 5.5.1.1

#### 5.5.3.2 Impact-specific Mitigation

- **Loss/Temporary closure of badger sett(s)**
  Consultation with NIEA Natural Heritage has confirmed that due to the presence of a main sett within the locality of the setts to be disturbed, the subsidiary sett may be closed, and the outlier sett temporarily excluded. These actions may be undertaken under the terms of a derogation license granted by NIEA prior to commencement of construction, should the application be approved.

- **Potential disturbance of bats during Leaching Plant construction should semi-mature tree removal be required.**
  Whilst it is not proposed as part of this application to remove any semi-mature trees within woodland to the rear of the leaching plant, as a precautionary measure, the following is proposed: In the event that removal of semi-mature trees within the woodland to the rear of the proposed leaching plant is necessary, bat surveys will be undertaken prior to any works. The Wildlife Officer of NIEA will be consulted in this matter.

- **Collision impacts to swans and geese**
  Cranes and the drill rig will be lit at night for safety reasons. It is suggested that lighting at these structures should be blue or green, as these have been shown to disorientate migrating birds considerably less, leading to significantly lower collision risks especially in misty conditions (Poot et al., 2008).

- **Loss of two populations of Primrose**
  Whilst Primrose is scheduled to the Wildlife Order, this protection is provided to prevent unauthorized picking, selling or cultivating of the plant. Loss of these two populations is not significant. The species is widespread and common throughout Northern Ireland.

- **Loss of 1.1ha of neutral semi-improved grassland**
  See 5.7.1

- **Disturbance to breeding birds during construction**
  Construction and removal of any vegetation will be undertaken outside the bird breeding season in line with national legislation. The removal of vegetation associated with construction activities should be avoided from 1st February to August 31st.

- **Physical disturbance to small mammals during construction**
  Loss of woody vegetation will be minimised to help reduce the impact on faunal species from noise disturbance during both the construction and operational phases of the scheme (avoidance of impact). The physical disturbance of fauna from on-site activity will be minimised by restricting site activities to clearly designated construction areas (Management and reduction of impact)

- **Loss of <1km intact sp.-poor hedgerow**
  Hedge temporarily removed during SSP pipeline construction will be replaced by new native hedges. Soft landscaping using native species is proposed within and adjacent to the site platforms and as an informal landscaped setting for the site administration and maintenance buildings. No non-native species shall be planted at any point within the scheme except where screening planting is required (e.g. by non-native coniferous Cedar).

- **Loss of scrub and/or semi-mature broad-leaved woodland along SSP**
  Mature tree loss will be minimized. Compensatory planting will be undertaken for every tree lost. Where possible, Sycamore will be removed instead of Ash.

- **Loss of invertebrate breeding habitat**
  Planting of native species-rich nectar-rich flower borders on fringes of all built elements will provide invertebrate feeding and breeding sites to replace those lost due to habitat removal

## 5.6 RESIDUAL IMPACTS

With successful implementation of the above mitigation measures, two residual impacts remain, namely the loss of 1.1 ha of neutral semi-improved grassland for the GPF and the loss of nine farmland bird breeding territories (GPF and IPS).

## 5.7 COMPENSATORY MEASURES

### 5.7.1 Local Habitats and Wildlife

- **Loss of Nine farmland bird territories**
  18 Bird nest boxes shall be erected within newly planted and/or existing semi-mature trees on the fringes of the GPF and IPS sites to provide a positive biodiversity gain for tree-nesting birds. Nest boxes should be erected on a level section of upper bark (2m+) and positioned so there is a clear flight path unobstructed by foliage or branches. The boxes should be north or east-facing, and tilted slightly forwards to avoid rainfall.

The loss of ground-nesting birds (e.g. Meadow Pipit at the GPF cannot be mitigated against)

- **Loss of 1.1ha neutral semi-improved grassland**
  The reinstated vegetation undertaken at the vent stack and surrounding the gas plant facilities will be planted with a native species-rich grass mix reflecting the species currently present in this habitat. The mix will be jointly confirmed by a landscape architect and ecologist.

**Plate 5.1 a&b Site of Gas Plant Facilities**

Neutral semi-improved grassland embankment on site of gas plant facility (GPF). Upper photograph shows view south towards wellpad location (distant grassland to rear of central pylon). Lower plate shows view north from existing access lane towards power station

**Plate 5.2a&b Peregrine Falcon and Black Guillemots**

Peregrine falcon (lower plate) on pylon in the vicinity of main gas plant facilities and Black Gullemots observed at Ballylumford Jetty A during breeding season

**Plate 5.3 Black Guillemot Breeding Site**

Black guillemot breeding site on Ballylumford Jetty A

**Plate 5.4 Black Guillemot Breeding Site**

Black gullemots breeding site at Ballylumford Jetty B and power station wall

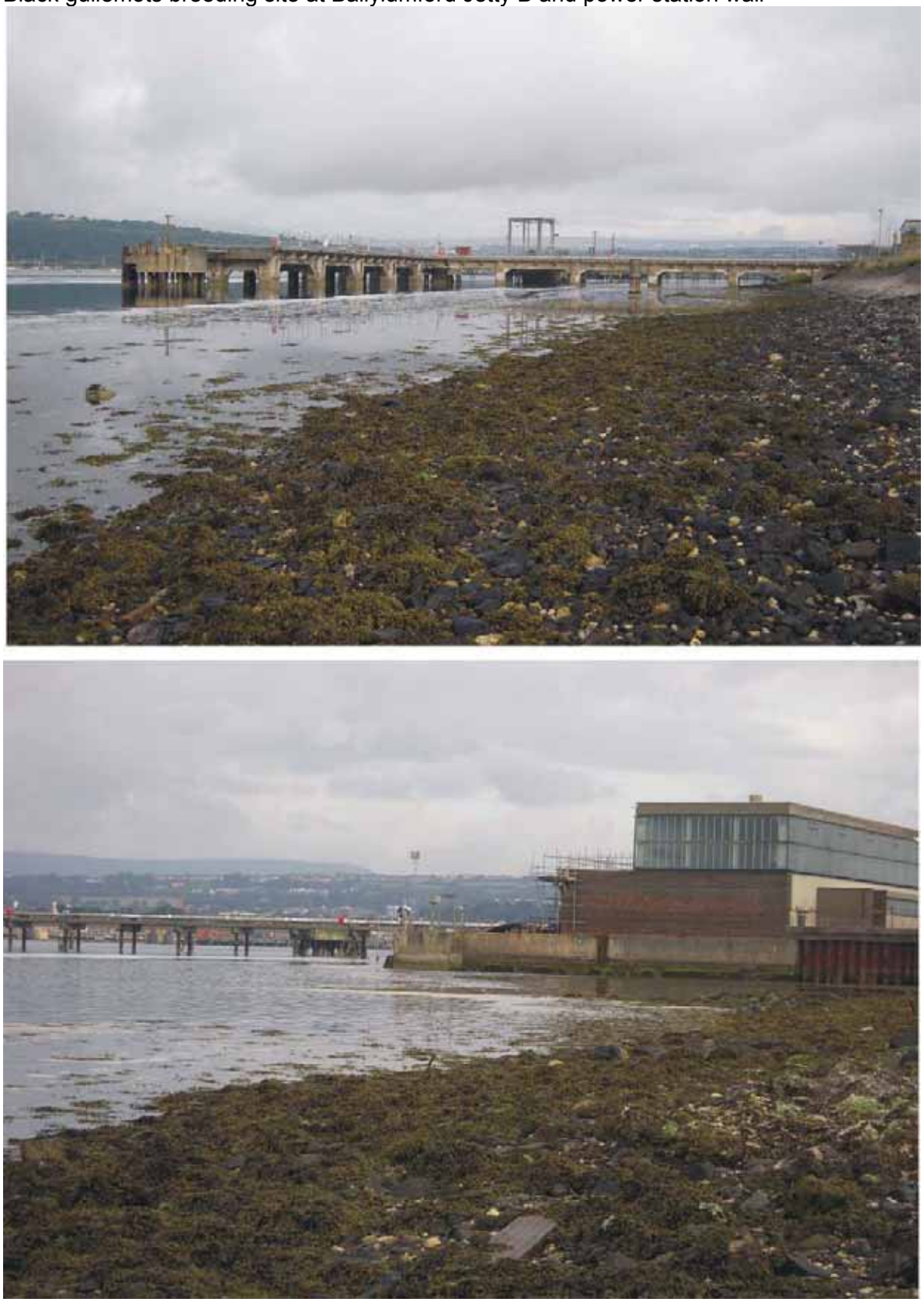


**Plate 5.5 Flora observed along pipeline route**

Hybrid swarms of Heath-Spotted Orchid *Dactylorhiza maculate* and Common-Spotted Orchid *Dactylorhiza fuschia* in species-rich neutral semi-improved grassland by Moyle Interconnector access road close to pipeline route

**Plate 5.6a&b Pipeline Route**

Upper plate shows view northeast from the Moyle Interconnector (visible to right of plate) access road along proposed sea water and brine pipeline route. Pipeline will run to the left (west) of the hedge visible in the centre of the plate. Lower plate shows view south west from Brown's Bay Road along proposed sea water and brine pipeline route. Pipelines will run to right (east) of hedge line visible on left hand side of plate.

**Plate 5.7 Vent Stack Area**

Small neutral flush at location of vent stack on south-facing slope above shoreline south of the power station, dominated by Tufted Hair Grass, Marsh Horsetail and Marsh Willowherb

**Plate 5.8a&b Neutral Flush below Gas Plant Facilities**

Tiny (0.002ha) linear neutral flush south of the power station, below proposed gas plant facility. Dominated by Articulated Rush and Glaucous sedge

**Plate 5.9 Shingle habitats (NI priority habitat)**

Shingle (NI Priority Habitat) at Castle Robin Bay on the eastern shore of Islandmagee, close to the sea water intake pumping station and on the western shore of Islandmagee, inside Larne Lough, below the wellpad site.

**Plate 5.10 Invasive Species**

Snowberry *Symphoricarpos alba* hedge (on left) near junction of Ballylumford Road and Ferris Bay Road. Non-native invasive species on The Review of Wildlife Order

**Plate 5.11 Leaching Plant Site**

Existing sheds at Brine Leaching Plant Site

**Plate 5.12 Temporary Construction Set-down Area**

Ephemeral/short perennial establishing on hardstanding at site of temporary construction set down area, adjacent to junction of Ferris Bay Road and Ballylumford Road

**Plate 5.13a&b Scrubland Area**

Extensive area of inaccessible scrub on site of former quarry between main gas plant facility and wellpad site. This area will be avoided by constructing the connecting pipelines by horizontal directional drilling. Upper plate shows view southwest from shore below vent stack area. Lower plate shows example of infrequent species-poor clearings

**Plate 5.14 Castle Robin Bay**

Castle Robin Bay, site of intake pumping station, on open coast showing improved (pale green) and semi improved (darker green) grasslands – the latter of moderately high diversity. Site used by small numbers of waders and waterfowl, but occasionally moderate gull flocks and foraging Sandwich Terns.

**Plate 5.15 Brine Pipeline Route**

Primrose *Primula vulgaris* observed along proposed pipeline route.

**Plate 5.16 Black Guillemots**

Black Guillemot pair roosting above nest at Ballylumford Jetty B (July 2009)

**Plate 5.17 Badger Sett**

One of two entrances in annex badger sett (referenced as sett #1 in EIS) on margin of scrub and farmland west of pipeline route

**Plate 5.18 Badger Sett 2**

Three of seven entrances in main Badger Sett (referenced as Sett #4 in EIS) on margin of farmland and scrub near mid-point of sea water and brine pipeline route

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