6 FLORA AND FAUNA

6.1 INTRODUCTION

1 This chapter presents an evaluation of the proposed development as set out in Chapter 6 **Volume 3B** of the Environmental Impact Statement (EIS) in relation to the potential for ecological impacts within the Cavan and Monaghan Study Area (CMSA).

2 That chapter describes the nature and extent of the proposed development, including elements of the overhead line (OHL) design and the towers. It provides a factual description, on a section by section basis, of the entire line route. The proposed line route is described in Chapter 6 **Volume 3B** of the EIS using townlands and tower numbers as a reference. The principal construction works proposed as part of the development are set out in Chapter 7**, Volume 3B** of the EIS.

3 The receiving environment of the CMSA is described and evaluated in terms of flora and fauna. The potential impacts (direct, indirect and cumulative) of the proposed development on flora, fauna and fisheries of the CMSA are evaluated and, where necessary, mitigation measures are proposed in order to avoid or reduce the severity of impacts. The potential impacts of the proposed development on European sites (sites designated as candidate Special Areas of Conservation (cSACs) or Special Protection Areas (SPAs) that form part of the Natura 2000 network) in the surrounding area have also been evaluated. This appraisal is presented separately in the form of a Natura Impact Statement (NIS) (refer to **Volume 5** of the application documentation).

4 The proposed development in the CMSA involves the construction of 134 individual steel towers, along a route totalling approximately 46km in length and the stringing of conductors and the earth wires that will be supported by the towers. For the purposes of this chapter, the proposed alignment is described in a south to north direction.

5 For description purposes, the proposed transmission line including towers and conductors is generally referred to as the ‘alignment or line’ in text here. Towers and associated conductors are the main infrastructure being developed. The ‘study area’ includes the route of the alignment but also the wider area in the vicinity as relevant to key ecological receptors discussed.

6 A large number of ecological studies, consultations and associated reports have been carried out to inform the baseline ecology of the receiving environment and recommended design since 2007. These studies have informed the ecological impact assessment and include the following:

- *Route Constraints Report (September 2007);*
- *Route Constraints Report Addendum* (September 2007);
- *North-South 400 kV Interconnector Development Preliminary Re-evaluation Report (May, 2011);*
- *North-South 400 kV Interconnector Development Final Re-evaluation Report* (April, 2013);
- *North-South 400 kV Interconnector Development Preferred Project Solution Report* (July 2013);
- Public consultation process; and
- Ecological studies (2007 – 2014).

7 These studies have informed the approach which has been taken throughout the route selection process with the aim of avoiding, where possible, potential impacts on the ecological receptors identified. The approach includes avoiding locating structures on hedgerows and treelines of high ecological value, which are the main notable ecological receptors in the CMSA.

6.1.1 Objectives

8 The objectives of the flora and fauna evaluation included:

- To carry out a desktop study in order to determine the previously recorded ecology of the area;
- To carry out a baseline flora and fauna survey of areas in close proximity to the proposed development;
- Evaluate the ecology of the CMSA based on the results of desk and field studies and identify Key Ecological Receptors (features of ecological importance that may be sensitive to impacts from the proposed development);
- To predict the potential direct and indirect impacts of the proposed development on flora and fauna of the area;
- To propose mitigation measures in the design, construction and operation of the proposed development so as to minimise potential impacts on flora and fauna; and

- To prepare this chapter of the EIS (Flora and Fauna) in accordance with the requirements of EU and Irish national legislation and inform the NIS (refer to Volume 5 of the application documentation).

6.1.2 Statutory and Guidance Documents Context

9 The appraisal has been prepared in accordance with the following legislation:

- Consolidated EIA Directive 2011/92/EU;
- *Wildlife Acts 1976-2012;*
- The Habitats Directive 92/43/EEC;
- The Birds Directive 2009/147/EC;
- The *European Communities (Birds and Natural Habitats) Regulations 2011* [S.I. No. 411 of 2011], as amended;
- The *European Communities (Environmental Impact Assessment) (Agriculture) Regulations 2011* [S.I. No. 456 of 2011], as amended;
- *European Union (Environmental Impact Assessment and Habitats) Regulations 2011* [S.I. No. 473 of 2011];
- *European Union (Environmental Impact Assessment and Habitats) Regulations 2012* [S.I. No. 246 of 2012]; and
- Flora (Protection) Order, 1999.

10 In addition, in considering the ecological impacts of the proposed development in the CMSA, regard was made to the following guidance and information documents:

- *Cavan County Development Plan 2014 - 2020*;
- Department of Arts, Heritage and the Gaeltacht (DAHG) (2011). *Ireland's National Biodiversity Plan: Actions for Biodiversity 2011 – 2016*;
- Department of Environment, Community and Local Government (DoECLG) (2013). *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*;
- DoEHLG (2009). *Appropriate Assessment of Plans and Projects in Ireland*;

- EirGrid (2012). *Ecology Guidelines for Transmission Projects*: *A Standard Approach to Ecological Impact Assessment of High Voltage Transmission Projects*;
- Environmental Protection Agency (EPA) (2002). *Guidelines on the information to be contained in Environmental Impact Statements*;
- EPA (2003). *Advice notes on current practice (in the preparation of Environmental Impact Statements)*;
- EPA (2013). *Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIS Processes: Practitioners Manual*;
- European Commission (2002). *Assessment of plans and projects significantly affecting Natura 2000 sites*;
- European Commission (2013). *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*;
- Fossitt (2000). *A Guide to Habitats in Ireland*;
- Institute of Ecology and Environmental Management (IEEM) (2006). *Guidelines for Ecological Impact Assessment in the United Kingdom*;
- *Monaghan County Development Plan 2013 - 2019;*
- National Roads Authority (NRA) (2005a). *Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes;*
- NRA (2005b). *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes;*
- NRA (NRA) (2006a). *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (Revision 1, National Roads Authority)*;*
- NRA (2006b). *Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes;*
- NRA (2006c). *Guidelines for the Treatment of Otters prior to the Construction of National Roads Schemes.* National Roads Authority, Dublin;
- NRA (2006d). *Guidelines for the Treatment of Bats during the Construction of National Roads Schemes;*

- NRA (2009a). *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes;*
- NRA (2009b). *Guidelines for Assessment of Ecological Impacts of National Road Schemes.* (Revision 2, National Roads Authority)*;*
- NRA (2010). *Guidelines on the Management of Noxious Weeds and Non-Native Plant Species on National Roads; and*
- Smith *et al.* (2011). *Best Practice Guidance for Habitat Survey and Mapping in Ireland*.

6.1.3 Cavan Monaghan Study Area (Ecology Context)

11 A consideration of the general ecological character is important in scoping and evaluating key ecological receptors. The CMSA traverses County Monaghan (approximately 37km length of alignment) and the eastern part of County Cavan (approximately 9km length of the alignment). Due consideration has been given to known ecological sites that occur in the wider CMSA (within 5km of the alignment), while more detailed assessment of ecological receptors has been undertaken within the likely zone of impact which is deemed to be within an 80m wide corridor centred on the alignment.

12 The landscape of the wider CMSA consists of a rolling drumlin landscape with relatively small intensively managed fields typically enclosed by hedgerows dominated by hawthorn and Ash. Poorly drained soils often occupy the interdrumlin hollows giving rise to frequent wetland areas in the wider CMSA. The landscape is largely dominated by agricultural farmland managed for livestock rearing and silage crop production. Field boundaries largely consist of overgrown linear hedgerows (typically Hawthorn dominated) occasionally growing in association with more mature trees (principally Ash). Occasional mature deciduous treelines occur notably around domestic farmland buildings.

13 Arable land and other land uses such as forestry are scarce. There are a number of rivers and smaller watercourses with associated bankside vegetation (often linear Alder and Ash woodland). A number of lakes are located at least 200m from the alignment of the route including Lough Egish pNHA, Tassan Lough pNHA, Bocks Lough, Lough Morne, Toome Lough, Greaghlone, Comertagh Lough, Drumgristin Lough, Coogan's Lough and Shantonagh Lough.

14 The key static ecology features requiring consideration include field boundaries (hedgerows and treelines) and watercourses. Mobile flocks of Whooper Swans specifically also require consideration. More significant ecological features such as designated conservation sites, and significant areas of semi-natural habitat (such as woodland, wetlands, unimproved grasslands) are scarce in the area and are largely avoided by careful line design which included repeated

appraisal and due consideration to ecological concerns identified during the design phase of the development.

6.1.4 Project Description

15 A detailed description of the development is presented in Chapters 6 and 7, **Volume 3B** of the EIS. The key phases of the development as relevant to the evaluation of ecological impacts will consist of the construction and operational phases.

6.1.4.1 Construction Phase

16 The following activities will be undertaken during the construction phase and therefore need to be given due consideration in the evaluation of ecological impacts:

- Site clearance and any drainage requirements at tower locations to facilitate construction;
- Temporary access routes to be used by machinery during construction;
- The use of heavy machinery and associated disturbance within the 'works area' during construction;
- The excavation of soils for the installation of tower foundations and any associated drainage requirements;
- Excavations required for guard pole structures[15];
- All works associated with modifications to existing 110kV transmission OHLs
- The use of concrete and other potentially harmful substances at each works area;
- Management, storage and disposal of excavated material during the construction;
- Locations to be used by machinery for the stringing of conductors; and
- Trimming and lopping of woody vegetation to facilitate clearance beneath the line between towers.

[15] Where a conductor is to be strung over roads, protection known as guarding will be erected prior to the commencement of stringing operations.

6.1.4.2 Operational Phase

17 The operational phase of the development will require:

- Occasional tree trimming beneath the alignment to ensure safe clearance distances around infrastructure;
- Maintenance of towers and associated equipment throughout the lifetime of the project;
- Maintenance of bird diverters as the line may pose a collision risk to vulnerable bird species; and
- Monitoring of mitigation measures (including bird diverters) to ascertain and ensure effectiveness of proposed mitigation measures, with improvements being made if and as required.

6.1.5 Constraints and Technical Difficulties

18 The main constraint during the preparation of the EIS was restricted land access to undertake baseline surveys (refer to Sections 1.5.1 and 1.5.2 of **Volume 3B** of the EIS for further details on restricted access). However, notwithstanding this difficulty, a comprehensive description of the baseline ecology of the CMSA, likely to be impacted by the proposed development, is presented in this chapter of the EIS. This evaluation is based on a combination of different survey approaches including:

- Walkover ecology surveys (see further information on methodology in **Section 6.2**) were undertaken on lands where access for survey was granted and at locations where the alignment crosses public roads. In all, 28 tower locations and associated alignment sections were subjected to walkover field surveys.
- Visual surveys of the route were undertaken from an extensive network of public roads throughout the CMSA and at all locations where the alignment crosses public roads. This allowed a large proportion of the route to be viewed and together with desktop sources (Geographical Information System (GIS) and aerial photo analysis) enabled a thorough consideration, identification and confirmation of habitat types and dominant species composition. In all, approximately 45 tower locations and a large number of intervening alignment sections were subjected to visual surveys.
- LiDAR (Light Detection and Ranging) imagery (refer to Section 1.5 of **Volume 3B** of the EIS for a detailed description of LiDAR and its capabilities) and other GIS datasets (including the subsoils dataset (Meehan 2004), Ordnance Survey Ireland (OSI) six inch mapping, OSI contours, OSI 1:5000 vector mapping) were used to assist in identifying

habitats along the proposed development where walkover or visual surveys were not possible.

- Regarding the flightline survey undertaken as part of the Winter Bird Survey, the enclosed nature of the landscape meant that long range visibility was limited over much of the study area. This influenced the type and appropriateness of survey methods used. Appropriate survey methodologies e.g. Scottish Natural Heritage (2014) were tailored to the local environment so as to ensure the collection of quality data with the aim of identifying flightlines and accurately recording Whooper Swan distribution.

19 To overcome the difficulties with limited land access, and to ensure that appropriately robust appraisals were undertaken, a precautionary approach was adopted in the design of the proposed development. In those situations where towers are required on lands that were not subject to field survey, tower locations were selected based on the presence of habitats of low ecological value (e.g. improved agricultural grassland) thereby minimising the potential for impacts of significance associated with tower construction.

20 Further details on the methodology used in defining the baseline ecology of the study area is presented in **Section 6.2**.

6.2 METHODOLOGY

21 The ecological appraisal included three main elements to inform the baseline ecology of the CMSA. These included consultation with key stakeholders, a desktop ecological evaluation, and field surveys. The approach and methodology has regard to the guidance documents listed in **Section 6.1.2**.

6.2.1 Consultation and Constraints Identification

22 As part of the overall project development and EIS preparation, a desktop review was carried out to identify features of ecological importance within the wider CMSA and surrounding region, including a review of sites designated for nature conservation.

23 Consultation with various state agencies and environmental Non-Governmental Organisations (NGO's) was undertaken to inform the EIS. As part of consultation on the *Preferred Project Solution Report (PPSR) (July 2013)* these consultees were invited to comment on the preferred line design and issues to be addressed in the environmental appraisal.

24 The project ecologist consulted with the National Parks and Wildlife Service (NPWS) through the Development Applications Unit (DAU) and directly with divisional ecologists and local staff

from both the Northern and Eastern Division of NPWS, Inland Fisheries Ireland (IFI), Cavan County Council and Monaghan County Council.

25 A summary of key meetings conducted with prescribed authorities and key NGO parties is detailed below.

6.2.1.1 National Parks and Wildlife Services (NPWS)

26 Meetings were conducted with NPWS divisional ecologists on the following dates: 21st October 2010, 26th November 2011, 13th November 2012 and 18th December 2012.

27 The outcome of these meetings was an approach to locating the vast majority of towers off hedgerows and onto agricultural land. The approach also included avoiding other semi-natural habitats such as wetlands and woodlands.

28 It was confirmed that flight diverters would be used for sections of the transmission lines identified as being of a collision risk hazard for wintering birds, in particular Whooper Swan.

29 The outcomes of these meetings resulted in response letters received from the Department of the Arts, Heritage and the Gaeltacht (DAHG) on 13th February and 10th April 2013, refer to **Appendix 6.2, Volume 3C Appendices** of the EIS. These letters indicated that they were satisfied with the approach being adopted in relation to ecological assessment for the development, and welcomed the fact that there will be less hedgerow loss due to the modified approach (avoidance of hedgerows and treelines).

6.2.1.2 Inland Fisheries Ireland (IFI)

30 A meeting was held with IFI on 1st October 2013 which focussed on water quality protection measures and significant fisheries in the CMSA. During this meeting clarification was provided to IFI regarding proposed development works and associated risks. It was confirmed that water pollution measures would be carefully considered in the EIS. No further correspondence has been received to date.

6.2.1.3 Department of Agriculture, Food and Marine (DAFM)

31 All tower locations were reviewed by the managers of the Wildlife Programme in the DAFM[16]. The DAFM has a very extensive database (data as recent as 2012) of badger sett locations

[16] http://www.agriculture.gov.ie/animalhealthwelfare/diseasecontrol/bovinetbbrucellosiseradicationschemes/wildlifepolicybadgers/.

throughout County Cavan (38.26% farmland surveyed) and Monaghan (27.52% farmland surveyed) which they have gained as part of the Bovine Tuberculosis (BTB) eradication programme led by the Eradication of Animal Diseases Board (ERAD). The DAFM advised which towers may potentially disturb badger setts. In this regard, towers potentially close to a known badger sett were, where possible, relocated as a precautionary measure in order to avoid potential impacts. It should be noted that information on badger sett locations collected under the ERAD programme is confidential and therefore locations are not detailed in this EIS.

6.2.1.4 BirdWatch Ireland

32 As part of ongoing consultation with Birdwatch Ireland, reports on Winter Bird Studies conducted in the CMSA (October 2013) were submitted for comments.

33 A submission was received from Bird Watch Ireland on 6th November 2013 relating to this report and other ongoing EirGrid projects. This submission is included in **Appendix 6.2, Volume 3C Appendices** of the EIS. A number of key considerations relevant to the project were outlined as follows:

- Ireland's obligations for protection of birds and the protection status of birds;
- Best practise guidelines to reduce the impact of power lines on birds;
- Potential impacts to sensitive bird species in particular collision and displacement impacts; and
- Required actions including required surveys to inform the assessment of potential impacts, recommendations for an Avian Protection Plan and post construction monitoring.

34 A subsequent meeting was held with BirdWatch Ireland on 11th December 2013. During this meeting BirdWatch Ireland reiterated concerns detailed in its submission, in particular, in relation to Whooper Swans and wider impacts on populations, appropriate mitigation and monitoring.

6.2.1.5 Cavan County Council

35 A meeting was held with Cavan County Council on 17th October 2013. It was outlined to Cavan County Council that the approach in the development design was to locate towers off hedgerows and avoid other sensitive habitats such as wetlands. It was also highlighted that an extensive six years of winter bird studies has been conducted to inform the assessment of impacts on Whooper Swans and other bird species. Water quality protection was outlined by

Cavan County Council as a key consideration for the construction phase of the proposed development.

6.2.1.6 Monaghan County Council

36 It was outlined to Monaghan County Council that the approach in the development design was to locate towers away from hedgerows and avoid other sensitive habitats such as wetlands. It was also highlighted that an extensive six years of winter bird studies has been conducted to inform assessment of impacts on Whooper Swans and other birds.

37 Monaghan County Council made the following observations relevant to the flora and fauna assessment:

- Requirement for detailed habitat mapping and identification of habitat complexes;
- Identify areas requiring bog matting (to minimise impacts to wetlands);
- Identify impacts to hedgerows and woodlands;
- Identify impacts to wider European designated sites (potentially linked to effects from the development e.g. Dundalk Bay cSAC);
- Identify on mapping, areas where permanent access tracks will be required;
- Outline data sources requiring consideration including historical mapping;
- Outline that EPA water quality data requires consideration;
- Highlighted the fishery at Lough Morne; and
- Highlighted that a disposal site should be identified for excess spoil removed during construction (this issue is dealt with in **Chapter 7** of this volume of the EIS).

6.2.1.7 An Bord Pleanála

38 The scoping opinion received from An Bord Pleanála (Appendix 1.3, **Volume 3B Appendices** of the EIS) identified the following issues as being relevant to this chapter of the EIS:

- Baseline data should include an ecological survey of all works sites at an appropriate time of the year. Where ex-situ impacts are possible survey work may be required outside of the development sites.
- Assess the impacts on flora, fauna and habitats with particular regard to:

- Natura 2000 sites and other (proposed) sites;
- Habitats and species listed on Annexes I, II and IV of the Habitats Directive;
- Birds listed on Annex I of the Birds Directive and important habitats for birds including nesting, feeding / wintering areas and flight corridors;
- Habitats that can be considered to be corridors or stepping stones for the purpose of Article 10 of the Habitats Directive;
- Other species protected under the Wildlife Acts, Red Data Book species; and biodiversity in general; and
- The assessment should include the indirect effects of construction activity, including construction access, as well as long term impacts in terms of fragmentation and severance.

- An assessment of potential impacts on the aquatic environment during construction and operation, including impacts on water table levels or groundwater flow which may impact on wetland sites some distance away.
- Any proposed mitigation measures should be identified in a construction management plan which must be included as part of the EIS / NIS.
- The EIS should address the issue of invasive alien plant and animal species, and methods to ensure they are not introduced or spread.
- An assessment of the extent and cumulative impact of hedgerow removal or linear woodland loss along the route. Mitigation should include suitable planting of native species and timing of works outside the nesting season.
- Identify any requirement for licenses or derogations arising.

39 Consultees who informed this response as relevant to the flora and fauna section of the CMSA included: Minister for Arts, Heritage and the Gaeltacht (Developmental Applications Unit), EPA, Monaghan County Council, Cavan County Council and Inland Fisheries Ireland. Key relevant information (relating to flora and fauna) detailed in this response, is considered in this section of the EIS.

40 No other specific feedback relating to flora and fauna has been received from other stakeholders.

6.2.2 Project Design Approach

41 Key project design approaches to avoid or minimise impacts (informed by a combination of consultation outcomes, a review of known impacts of overhead electricity lines, and best practice) recommended by the project design team included:

- Avoidance of OHL development within European sites (i.e. candidate Special Areas of Conservation (cSACs) or Special Protection Areas (SPAs)), Natural Heritage Areas (NHAs) and proposed NHAs (pNHAs), except where oversailing is unavoidable at river crossings.

- Identification of non-designated ecological sites where targeted field survey was advised. Where such surveys were not possible, mitigation by avoidance was adopted.

- Avoidance of notable semi-natural areas (non-designated) – e.g. raised bogs and other wetlands, semi-natural woodland areas identified in published ecology data sets, field survey and aerial imagery.

- Minimising the development footprint and avoidance of locating towers within woodland type habitats (of some local ecological value) e.g. mature demesne woodland, linear mature semi-natural woodland.

- Sensitive siting of tower locations with respect to hedgerows and treelines. The siting of towers along hedgerows has only been considered where field survey allowed for adequate consideration of hedgerow quality in terms of ecological value and where impacts have been quantitatively assessed.

- A minimum buffer zone of 5m to be retained between tower sites and all natural watercourses. Distances of over 20m are to be retained between tower locations and larger streams and rivers. Such buffer zones aim to minimise risks to water quality and associated sensitive aquatic receptors (e.g. salmonids and otter).

- Avoidance, where possible, of potential badger sett habitat (hedgerows / treelines and other woody habitat) and maintenance of a buffer zone (5m from outer extent of tree crown) which minimises significant risk of disturbance.

- Avoidance of known badger setts (identified during field surveys and in the DAFM dataset).

- Minimise cutting of mature trees to accommodate the OHL. Where possible impacts to mature deciduous tree lines and more extensive mature woodland is avoided or minimised.

6.2.3 Desk Study

42 As part of the overall project development and preparation of the EIS, a desktop literature review was carried out. This included a review of documented evidence regarding the effect of OHL developments on ecology as well as a review of material (published and un-published reports and datasets) to identify features of ecological importance within the wider CMSA and surrounding region, including a review of sites designated for nature conservation. This involved the following:

- Identification of all sites designated for nature conservation (cSAC, SPA, NHA, pNHA) within 30km of the proposed development and a review of their site synopses, other available information and identification of potential linkage to effects from the proposed development.

- Review of Ordnance Survey maps, aerial photography and other available GIS datasets (sub soils, contour mapping etc.) to assist in identifying habitats and features of potential ecological interest that occur within the CMSA.

- A review of detailed LiDAR imagery – which allowed accurate tree-line / hedgerow identification in addition to heights. A detailed description of LiDAR and its capabilities are summarised in Section 1.5 of **Volume 3B** of the EIS. This information facilitated a quantification of hedgerow / treeline impact.

- Review of EPA water quality data and river catchment water quality information (Water Framework Directive).

- Review rare and protected species records within the CMSA including relevant information sources for protected flora, bats, otter, birds and badger (including the National Biodiversity Data Centre records).

- A review of relevant ecological reports and literature and associated datasets (referenced throughout this text and listed in the bibliography). This included reference to ecology survey datasets (wetlands, woodlands and grasslands) compiled by NPWS and Monaghan County Council. Sources reviewed are listed in **Appendix 6.1, Volume 3C Appendices** of the EIS.

- Detailed review of published and unpublished literature on interactions of birds and powerlines in particular, and other potential impacts of OHLs on wildlife and natural habitats.

- Consultation with interested birdwatchers / landowners regarding bird species of conservation concern, in particular Whooper Swans.

- An evaluation of impacts to hedgerows and treelines was undertaken using available GIS datasets. This study entitled *Hedgerow Impact Study* (September 2011) assisted in informing the evaluation and informed the line design. This report is presented in **Appendix 6.3**, **Volume 3C Appendices** of the EIS.

- An evidence based study on actual impacts of electricity lines on hedgerows / treelines in other similar habitats / areas in Ireland. This was undertaken to inform the impact assessment and inform best mitigation practice. This study entitled *Intervening Hedgerow Impact* is presented in **Appendix 6.4, Volume 3C Appendices** of the EIS.

6.2.4 Field Studies

43 Extensive field surveys have been carried out throughout the CMSA over a seven year period (2007 - 2014). These include multidisciplinary ecology surveys (habitats, flora and fauna), winter and breeding bird surveys, and targeted bat surveys as presented in **Table 6.1**.

44 During these surveys areas of scientific and / or conservation interest, as well as the presence of protected plant and faunal species, in the vicinity of the proposed development were investigated. Relevant survey reports are included as appendices (refer to **Appendices 6.3 - 6.6**, **Volume 3C Appendices** of the EIS) and the main findings are summarised in the body of this section of the EIS. Further details of the survey methodology are presented in the following paragraphs.

Table 6.1: Survey Works and Periods Conducted

Survey Period	Suveys Conducted
November 2007 - March 2008	Monthly winter bird surveys were conducted in the wider study area (including all route corridors). A focused flightline study was conducted on the route corridor of the final alignment (Corridor A).
July - September 2008	Baseline ecology surveys (habitats, breeding birds and protected mammals and flora) at alignment road crossings.
October 2008 - April 2009	Monthly winter bird surveys were conducted in the wider study area (including all route corridors). A focused flightline study conducted on the route corridor of the final alignment (Corridor A).
April - June 2009	Baseline ecology surveys (habitats, birds and protected mammals and flora) conducted at alignment road crossings.
October 2009 - April 2010	Monthly winter bird surveys were conducted in the wider study area (including all route corridors). A focused flightline study was conducted on the route corridor of the final alignment (Corridor A).

March - July 2010	Walkover surveys were conducted on specific landholdings where consent was granted. These surveys included an evaluation of hedgerow ecological value, bird survey, habitat description including botanical identification, assessment of bat roost potential and recording of other mammal evidence (otter and badger signs). Bat activity surveys were conducted at alignment road crossings.
October 2010 - April 2011	Monthly winter bird surveys were conducted in the wider study area (all route corridors). A focused flightline study was conducted at identified relevant locations on the route corridor of the final alignment.
May - June 2011	A research study was conducted to assess actual impacts of locating towers on hedgerows in summer 2011 by examining existing electricity infrastructure. This study looked at the longer term impacts of locating towers in hedgerows and informed approaches for minimising impacts with future developments.
October 2011 - April 2012	Monthly winter bird surveys were conducted in the wider study area (all route corridors). A focused flightline study was conducted at identified relevant locations on the route corridor of the final alignment.
July 2012	A consideration of potential impacts caused by lopping of trees / hedgerows under the then indicative line was conducted in Summer 2012.
April - July 2012	Breeding Bird Surveys were conducted from the extensive road network crossed by the alignment and included noteworthy habitats up to 2km away. These surveys targeted key relevant and sensitive ground nesting species identified such as Lapwing, Snipe, and Curlew.
October 2012 - April 2013	Monthly winter bird surveys were conducted in the wider study area (all route corridors). A focused flightline study was conducted at identified relevant locations on all route corridors and surrounding areas.
Late March - July 2013	Breeding Bird Surveys were conducted from the extensive road network, crossed by the alignment and noteworthy habitats up to 2km away.
August, September, and October 2013	Bat activity surveys were conducted at alignment road crossings.
July - September 2013	Multi-disciplinary walkover surveys were conducted to specific landholdings where consent was granted. These surveys included an evaluation of hedgerow ecological value, identification of larger treelines potentially impacted (for checking accuracy of LiDAR tree height evaluation), bird survey, habitat description including

	botanical identification, consideration of bat roost potential, recording of other mammal evidence (otter and badger signs).
July - October 2013	Multi-disciplinary walkover surveys (habitats, birds and protected mammals and flora) were conducted at alignment road crossings. Specific bat surveys were conducted at alignment road crossings.
October 2013 - April 2014	Monthly winter bird surveys were conducted in the wider study area (all route corridors). A focused flightline study was conducted at identified relevant locations on the route corridor of the final alignment (Corridor A).
June, July, September 2014	Bat activity surveys were conducted at alignment road crossings.
Late March - August 2014	Breeding bird surveys were conducted from the extensive road network, crossed by the alignment and noteworthy habitats up to 2km away.
February 2015	Visit to new location of Tower 151 to determine the status of badger sett.

6.2.4.1 Habitats

45 A multidisciplinary walkover survey following the methodology outlined by the NRA (2009) was undertaken in those areas along the proposed alignment where access to survey was permitted by landowners. This included a survey of the proposed location of towers, temporary access routes, stringing areas and areas beneath the proposed conductors (intervening hedgerows and habitats). A visual survey of the proposed route was also undertaken from the extensive network of public roads throughout the CMSA and at all locations where the alignment crosses public roads. This allowed a large proportion of the route to be surveyed in the field. These visual surveys were deemed to be adequate to assess habitats of low ecological interest (following methodology outlined in Smith *et al.* 2011). These surveys aimed to record the habitats, flora and fauna present within the survey area as described in the following paragraphs.

46 Where land access was available, surveys were undertaken of all semi-natural habitats encountered along the alignment including the collection of data on dominant vegetation, qualitative assessment of plant species diversity, vegetation structure, topography, drainage, disturbance and management. The data was recorded and the habitats encountered during site visits were classified in accordance with Fossitt (2000) and where appropriate, reference is made to the EU Habitats Directive classification. Specific surveys of hedgerows and treelines were undertaken with a view to assessing their importance based on species composition, structure and management. The methodology used during the survey of hedgerows broadly

followed those proposed by Murray (2003). Visual surveys of watercourses in the vicinity of the proposed development were also undertaken. Watercourse characteristics including bankside vegetation, substrate and flow rate were recorded. An evaluation was made on the suitability of the habitat for aquatic species of conservation concern.

47 Species identification and nomenclature follows Parnell and Curtis (2012) for higher plants, Watson (1981) for bryophytes and Fitter *et al.* (1984) for grasses and sedges.

48 In addition to habitat surveys, fauna surveys were conducted to assess usage of the areas by birds and mammals (see below).

49 Following the completion of desktop analysis and field surveys, habitat maps of the entire proposed alignment were prepared according to methodology outlined in Smith *et al.* (2011). The habitat maps detail habitats and habitat complexes recorded within the alignment including a general 40m buffer zone either side of the centre line and the extent of LiDAR imagery (dated November 2013). The mapping takes account of whether the habitat determination was made by detailed field survey, visual field inspection from a distance or from remote sensing techniques as recommended by Smith *et al.* (2011).

50 Faunal surveys were conducted to evaluate usage of the areas by birds and mammals (as detailed below). Considering the characteristics of the habitats present and the nature of the proposed development, it was considered unnecessary to carry out evaluations of more specialised groups such as invertebrate species although incidental records of Lepidoptera (Butterflies and Moths) and Odonata (Dragonflies and Damselflies) were made.

6.2.4.2 Birds

51 Early scoping was informed by extensive consultation (NPWS and public consultation) and a detailed literature review (e.g. Lack (1986); Gibbons *et al*. (1993); Crowe (2005); Lynas *et al. (*2007); Colhoun and Cummins (2013); and EirGrid (2012)) identified birds and specifically Whooper Swans as a faunal group requiring consideration in the study area. Whooper Swans are listed on Annex I of the EU Birds Directive and are known to occur in significant numbers throughout the wider study area. The species is also reported as being vulnerable to potential collision as they lack agile flight EirGrid (2012).

52 Extensive multi-year and seasonal bird surveys were conducted to take into account all bird species likely to be present throughout the year within the CMSA and their activities (i.e. breeding, wintering and passage migrant bird species) focusing on identified sensitive species and in particular species of conservation significance (Lynas *et al. (*2007) and Colhoun and Cummins (2013)) and Annex I of the EU Birds Directive identified as occurring in the study area.

These species were the 'Target Species' upon which bird survey efforts focused. The main aim of these studies was to determine the distribution and abundance of species of conservation significance throughout the wider study area that are likely to be sensitive to the proposed development.

53 A full year of bird surveys (breeding and wintering) was conducted in 2009, 2012, 2013 and 2014. In addition to these full annual surveys, winter bird surveys were undertaken in 2008, 2010 and 2011. These are discussed below under breeding and wintering birds.

6.2.4.2.1 Breeding Birds

54 Annual breeding bird surveys were conducted (refer to **Table 6.1**). The appraisal was also informed by a desk study, consultation and public feedback. The final 2014 report (which includes both the CMSA and MSA) considers all survey years to date and is included in **Appendix 6.5, Volume 3C Appendices** of the EIS.

55 The breeding bird survey was carried out during the recommended period for conducting breeding bird surveys (late March to end July inclusive, with more focussed surveys in April, May and June). The methodology broadly followed BirdWatch Ireland countryside breeding bird survey methodologies and appropriate methods detailed in Gilbert *et al.* (1998). A section of road / track at all alignment road crossings was walked and all birds observed by sight and sound were recorded. In addition, fields and other habitats off the road were surveyed for bird activity using binoculars (10 x 42 magnifications) or telescope as required. Lakes, ponds, rivers and woodlands were surveyed for water fowl, waders and passerines (as relevant). Such surveys were also undertaken within lands that were accessed elsewhere along the alignment.

56 The survey was conducted early to mid-morning (between 5.30am and 12pm). Further surveys were conducted from suitable vantage points for birds of prey during the afternoon period to determine presence / absence of these species. Evening surveys were also conducted when daily bird activity increases again. Habitat that is particularly suitable to breeding birds, including scrub, cutaway bog, rivers, and lakes (e.g. Toome or Crinkill Lough) were surveyed in the general area of the proposed alignment (within 1km). Particular attention was paid to lakes and ponds where species prone to collision with OHL including Mute Swan, Great Crested Grebe, Coot, Grey Heron and Cormorant may potentially breed.

57 All bird species were recorded by call and sightings and based on the summary findings of the two repeat surveys per season, bird breeding status was categorised as:

- Probable / confirmed breeder (B);
- No breeding evidence though possibly breeding (NC); and

- Non breeder i.e. wintering, passage migrant or habitat unsuitable (NB).

58 A list of bird species was detailed for each location and signs of breeding activity were recorded in the field. Based on the findings of the early and late season surveys (over all years), a summary of target breeding bird species presented was determined. Location and comments on general abundance and habitat association are provided for all target species of conservation significance. Weather conditions during all of the site visits were deemed to be suitable for carrying out bird survey work.

59 Any nocturnal bird activity was recorded during bat surveys to determine presence of species such as Woodcock.

6.2.4.2.2 Wintering Birds – Whooper Swan

60 Whooper Swans were identified at an early stage in the project as a key target species requiring survey and evaluation to inform the overall appraisal and mitigation for the proposed development. Other less significant target species identified were wildfowl such as: Mute Swan, Cormorant and duck species.

61 Surveys were conducted based on Wetland Bird Survey (Webs) Core Counts methodology detailed in Gilbert *et al.* (1998) and Vantage Point flightline surveys were based on Scottish Natural Heritage (2013) methods as appropriate. Surveys focused on target species identified during scoping and in consultation with NPWS. However, the survey allowed for identification of other potentially relevant species that may occur based on suitable habitats present e.g. Hen Harrier Winter Roosts (CMSA relevant only).

62 As detailed in **Table 6.1**, seven years of extensive surveys were conducted within the study area, including all route corridors considered in earlier stages of the project development and the wider landscape, including up to 5km east and west of the outer corridors focussing on key sites and target species. These surveys were conducted monthly from October to April to encompass the entire period that wintering Whooper Swan are present in Ireland. Surveys were conducted every year from winter 2007 / 2008 to 2013 / 2014 inclusive. Survey effort significantly expanded from winter 2010 / 2011 to 2013 / 2014 inclusive, with regular surveys undertaken throughout each month. **Appendix 6.6, Volume 3C Appendices** of the EIS details the most recent (2013 / 2014) *Winter Bird Report* which includes a summary of all previous survey findings in particular detail on flightline survey findings for all years, survey effort (nos. times site surveyed) and summary count data analysis.

63 Wildfowl Counts: Extensive drive round surveys were conducted (at least twice per month) of known winter bird sites (sourced from BirdWatch Ireland I-Webs database) and numerous other

potential sites in the vicinity of the proposed development including areas of temporary flooding and fields host to suitable crops which can change over the course of the year(s). All sites were scanned by an observer using binoculars and telescope as appropriate, from vantage points on public roads. Potential Whooper Swan habitats close to these sites were also checked, as were areas deemed suitable for Whooper Swans that were seen whilst driving between sites. Data was collected on numbers of Whooper Swans present, other birds present, weather conditions and habitat type.

64 Flightline Surveys: The aim of the survey was to identify flightlines which may be relevant to the location of the proposed development. The flightline survey methodology was modelled around known and well utilised Whooper Swan areas in relation to known roost sites (a generally relatively secure location where Whooper Swans rest at night) as this is where flight activity would typically be highest. Vantage point locations were selected on this basis and surveys were undertaken at dawn and dusk as per standard methodology guidance.

65 Sites (lakes and identified forage areas) were checked before commencement of watches (before dusk) to determine where Whooper Swans were located, thereby enabling the observer to determine the direction and locations to which these birds moved. Dawn watches generally commenced half an hour before sunrise and continued for a further hour after. Similarly, dusk watches generally started half an hour before sunset and continued for a further hour after to detect night flying birds which is feasible as they are very vocal. Daylight surveys of Whooper Swans were also conducted during the Wildfowl count surveys (although Whooper Swans do not generally move much during daytime feeding periods).

66 Where changes in numbers of Whooper Swans were detected at key sites between dusk and dawn surveys (i.e. overnight) or between survey dates, it was possible that unrecorded flights had occurred and this has also been factored in to the assessment as possible flightlines.

67 In addition to standard terrestrial survey methods, aerial survey from light aircraft was undertaken. Two aerial surveys per year were conducted of the entire CMSA in winters 2010 / 2011, 2011 / 2012 and 2013 / 2014. Three surveys were conducted in 2012 / 2013. The survey methodology followed the NPWS approach for monitoring extensive and relatively inaccessible SPAs such as the Shannon Callows. A four seat, single engine light aircraft was used for the survey. The surveys were undertaken in conditions of good light and visibility, when flocks of Whooper Swans were detectable up to at least 10km either side of the aircraft. To minimise disturbance, the plane avoided flying below 1000 feet (approximately 300m) as much as possible. Two ornithologists experienced in the methodology were engaged in locating the Whooper Swans, counted them accurately and identified areas used by the Whooper Swans.

68 These in flight surveys allowed confirmation of total numbers of Whooper Swans and locations utilised within the CMSA, including areas that could not easily be surveyed during terrestrial surveys. This survey methodology also had the added benefit of verifying the accuracy of standard terrestrial surveys. It also indicated any sites where more survey work would have been beneficial regarding potential flightlines and allowed accurate counts of birds at specific sites and the overall survey area.

6.2.4.3 Terrestrial Mammals

69 A terrestrial mammal survey was carried out at all sites (lands where permission to survey was granted) targeting potential breeding habitat (i.e. hedgerows / treelines) in the vicinity of proposed tower locations. The key target mammals potentially occurring within habitats which may be potentially affected by the proposed development are badger, bat species and to a much lesser extent otter and deer species. Other species as detailed in **Table 6.12** are also considered in the evaluation. Potentially suitable bat roost sites and foraging habitat were also noted (see bat survey methods outlined in **Section 6.2.4.3.3**).

70 Badgers setts and otter holts tend to be located in unmanaged woody vegetation associated with hedgerows / treelines and in the case of otters, drains and streams linked to more significant foraging habitat e.g. rivers and lakes (Hayden and Harrington (2000)). Outside these areas, in managed farmland (where the towers are mostly located) the risk of disturbance to breeding sites is very low. In this regard mitigation by avoidance was adopted in those areas not subject to walkover surveys by ensuring that tower locations are removed from areas that provide suitable badger or otter habitat as described above. The presence of other protected species including Irish Hare, Pine Marten and Red Squirrel were recorded if signs were observed. Other common mammal species were also noted.

71 All signs and tracks (Bang and Dahlstrom (2004)) were evaluated as they were encountered in the field. Suitable mammal habitat and incidental records of other common faunal groups were also noted e.g. deer species, Irish Hare and rabbits.

72 Surveys methods adopted during the target species surveys, for otter and badger are outlined in the following sections.

6.2.4.3.1 Otter

73 Dedicated otter surveys were conducted at river and bridge crossings within or close to the alignment and a minimum 100m upstream and downstream (where access was possible) to confirm otter presence in the area.

74 In addition all drains and watercourses at lands accessed were checked for signs of otter presence and activity such as holts (breeding and temporary), slides and territorial marking points (spraints) with each sign recorded.

6.2.4.3.2 Badger

75 Badger activity was determined by surveys for setts, trails, latrines and feeding signs. Surveys for badger activity were undertaken at those lands that were subject to field survey (landholdings where permission was granted and alignment road crossings) paying particular attention to suitable habitat in proximity to the alignment (proposed tower locations, temporary access routes and habitat traversed by the alignment). The DAFM provided information as to whether towers and associated works areas were located in close proximity to badger setts based on their available data.

6.2.4.3.3 Bats

76 No known bat roosts or sites with significant potential for bat roosts such as old buildings, souterrains, caves, houses or other buildings will be impacted by the proposed development. Potential tree roost sites were identified along the proposed alignment. The confirmation of bat roosts in trees is very difficult, even with regular bat activity surveys at potential tree roost sites, as noted by Kelleher and Marnell (2006). The approach to the bat survey is outlined below:

- Trees which have potential as bat roosts were identified with reference to Andrews *et al.* (2013). These generally consist of trees with cavities, splits, cracks, knotholes and under loose bark. These features are consistent with mature or dying trees. Mature old trees with potential as temporary bat roosts may be impacted due to tree lopping required. An evaluation was conducted of potential tree roost sites from alignment road crossings. Where land access was facilitated, tower locations and sections where tree lopping is likely to be required were examined.

- Where treelines could not be accessed or viewed, GIS mapping of larger / mature treelines was reviewed to identify very mature treelines where precautionary mitigation is advised. This appraisal was based on detailed aerial imagery (including LiDAR). This allowed more mature treelines consistent with possible bat roost sites to be identified.

- During late Summer and Autumn 2013 and Summer 2014, dusk and night bat activity surveys were conducted at all alignment road crossings, using a bat detector in dual mode (heterodyne and frequency division). This allowed the detection of bat presence, evidence of roosts from bat emergence at dusk and song perches, habitat associations, and relative abundance. Bats were identified by their ultrasonic calls coupled with behavioural and flight observations. The bat survey was conducted from dusk to dark

and into night. The survey involved spot surveys (generally 5 to 10 minute duration) at all road crossings focussing on mature treelines. In addition, a drive round survey at and between all road crossings was conducted based on detection and car speed detailed outlined in Roche *et al.* (2012). All rivers and lakes in the vicinity of the proposed alignment were surveyed.

77 The bat surveys conducted allowed for the:

- Determination of any evidence of bat roosts (to support visual assessment);
- Confirmation of key habitats where bats congregate e.g. taller mature hedgerows;
- Identification of bat species present in the area;
- Identification of tree lines / mature deciduous woodland areas where precautionary mitigation is recommended; and
- The findings of the survey within a large sub-sample of possible bat roost habitat (treelines/ hedgerows at road crossings) provided data on the likelihood of bat roosts being present in trees across the entire route.

6.2.4.4 Fisheries and Aquatic Ecology

78 Ponds and lake habitats will be avoided by the proposed development. A number of streams will be oversailed by the proposed development. Visual surveys of these watercourses in the vicinity of the alignment were undertaken. Watercourse characteristics including bankside vegetation, substrate, and flow rate were recorded. An assessment was made on the suitability of the habitat for aquatic species of conservation concern (e.g. freshwater crayfish and salmonids). All watercourses were mapped according to Fossitt (2000).

79 Given that direct impacts are avoided to streams and rivers, it was considered that no in stream sampling was required.

80 Towers are not located in or along watercourse riparian zones. In this regard the potential for direct impacts to water courses and associated protected species is avoided.

81 For more information on water quality protection and the approach to minimise impacts to associated fisheries and aquatic ecology refer to **Chapter 8** of this volume of the EIS.

6.2.4.4.1 Other Fauna

82 The Common Frog (*Rana temporaria*), the Smooth Newt (*Triturus vulgaris*) and the Common Lizard (*Lacerta vivipara*) are all protected species under the Wildlife Act *1976* and 2000 as amended) and have a widespread distribution in Ireland. Each of these species are likely to occur within the CMSA. Pools, ponds, drainage ditches and wet grasslands provide suitable habitat for amphibians in the area. The common lizard is widespread in suitable habitats such as dry banks, heathland and bog habitats. These species and potential breeding habitat were noted if seen.

83 Other species such as Marsh Fritillary (*Euphydryas aurinia*) may potentially occur within the CMSA. Signs of this species were searched for during field surveys based on Northern Ireland Environment Agency (NIEA) (2011) methods.

84 Taking into consideration the ecology of the CMSA coupled with the characteristics of the proposed development, it was considered unnecessary to carry out field surveys of other more specialised faunal groups including fungi, invertebrates and moths.

6.2.5 Evaluation of Ecological Significance

85 The significance of any particular predicted impact is a combined function of the value of the affected feature (its ecological importance), the type of impact and the magnitude of the impact. It is necessary, therefore, to determine the value of ecological features within the CMSA in order to evaluate the significance and magnitude of possible impacts.

86 The method of evaluating ecological significance used in this study is based on a standard approach developed by the NRA (2009b) in the Ecological Assessment of National Road Schemes and has been adopted for use in electricity transmission projects (EirGrid 2012). The results of desktop and field surveys were used to evaluate the significance of identified ecological sites located in the CMSA on an importance scale ranging from international (A) - national (B) - county importance (C) - local importance, high value (D) - local importance, low value (E). Those features identified as being of high local importance or greater are then given particular mention in the ecological assessment as 'Key Ecological Receptors' when considering the potential for significant impacts and subsequent requirement for appropriate mitigation. The criteria shown in **Table 6.2** have been used in evaluating ecological value within the CMSA. In addition to the criteria listed in **Table 6.2** the evaluation of habitats and species also considers other factors such as potential ecological value, secondary supporting values where habitats may perform a secondary ecological function, and social values of an ecological feature such as educational, recreational and economic value.

87 Specific habitat and species (non sites) identified were evaluated based on protected status and in the case of specific habitats they are identified if they are potentially of high local ecological value.

88 Individual hedgerow and treeline habitat at tower locations was summarised into one of three evaluation categories (high, moderate or low) broadly based on NRA (2006a) – *Ecological Criteria for Evaluation of Hedgerows* and also with reference to Smith *et al.* (2011).

89 This evaluation for each hedgerow surveyed can be summarised briefly as follows;

- High Value – These hedgerows are relatively rare. They are generally a species rich, robust and relatively wide hedgerow dominated by native species and generally include old 'standard' trees and or associated watercourses. Woodland ground flora indicator species will typically be well represented. Protected mammal breeding sites (e.g. bats, badger, otter) are more likely to be present. These hedgerows tend to be old semi-natural linear woodland habitats and many are associated with old townland boundaries. Many will have streams associated.

- Moderate Value – These hedgerows are the typical hedgerows common in the Irish landscape variably managed to the requisite criteria (refer to NRA 2006).

- Low Value – These are generally the most managed hedgerows and relatively species poor. Many have an overgrazed field layer and will have low to moderate woody species diversity. Many of these hedgerows will be remnant hedgerows. This type of hedgerow is also relatively common.

Table 6.2: Criteria Used in Assessing the Ecological Importance of Sites

Ecological Evaluation Scheme (NRA 2009b)
International Importance: • 'European Site', including candidate Special Area of Conservation (cSAC) or Special Protection Area (SPA). • Site that fulfils the criteria for designation as a "European Site" (see Annex III of the Habitats Directive, as amended). • Features essential to maintaining the coherence of the Natura 2000 Network. • Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: - Species of bird, listed in Annex I and / or referred to in Article 4(2) of the Birds Directive; and / or - Species of animal and plants listed in Annex II and / or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).

Ecological Evaluation Scheme (NRA 2009b)

- World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
- Biosphere Reserve (UNESCO Man & The Biosphere Programme).
- Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
- Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
- Biogenetic Reserve under the Council of Europe.
- European Diploma Site under the Council of Europe.
- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).

National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.
- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Acts; and / or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level) of the following:
    - Species protected under the Wildlife Acts; and / or
    - Species listed on the relevant Red Data list.
- Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.

County Importance:

- Area of Special Amenity.
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the county development plan.
- Resident or regularly occurring populations (assessed to be important at the County level) of the following:
    - Species of bird, listed in Annex I and / or referred to in Article 4(2) of the Birds Directive;
    - Species of animal and plants listed in Annex II and / or IV of the Habitats Directive.
- Species protected under the Wildlife Acts.
- Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared.

Ecological Evaluation Scheme (NRA 2009b)

• Resident or regularly occurring populations (assessed to be important at the Local level) of the following:
  - Species of bird, listed in Annex I and / or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and / or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts.
  - Species listed on the relevant Red Data list.
• Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; and
• Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value): • Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; and • Sites or features containing non-native species that are of some importance in maintaining habitat links.

(Source: Guidelines for Assessment of Ecological Impacts of National Road Schemes (2009))

cSAC = candidate Special Area of Conservation; SPA = Special Protection Area; NHA = Natural Heritage Area
BAP = Biodiversity Action Plan (these have been published for many local authority areas)

6.2.6 Assessment of Impacts and Impact Significance

90 The evaluation of impacts is broadly based on guidance offered by the Institute of Environmental and Ecological Management (IEEM) in the published *Guidelines for Ecological Impact Assessment* (2006) with reference to national guidance provided in EirGrid (2012), NRA (2009b) and EPA (2002). Impacts are discussed and evaluated in relation to impact type (positive, neutral or negative), character and sensitivity of the affected feature, magnitude, duration, reversibility, timing and frequency.

91 Criteria to be used in describing and assessing impact type and magnitude are presented in **Tables 6.3** and **6.4**.

Table 6.3: Criteria Used in Ecological Impact Assessment

Positive or Negative: Is the impact likely to be positive or negative? International and national policy now pushes for projects to deliver positive outcomes for biodiversity.
Character: The type of habitat (e.g. natural or highly modified woodland; mature or recently established, wet or dry) is important, as is the quality of the site (e.g. undamaged active blanket bog).
Significance: State whether a site has a designation, such as a SAC or NHA, or contains a listed (Annex I) habitat. The ecological value of a site can be assigned a rating using an evaluation scheme (e.g. undesignated areas of semi-natural broadleaved woodland are normally rated as high value, locally important).
Sensitivity: Indicate changes that would significantly alter the character of an aspect of the environment (e.g. changes in hydrology of a wetland due to placing of temporary rubber matting or aluminium road panels).
Magnitude and extent: A scheme may affect only a small part of a site but the area of habitat affected in that location (in hectares) should be given in the context of the total area of such habitat available (e.g. 1ha of a woodland which measures 30ha in total)
Duration: Indicate the time for which the impact is expected to last prior to recovery or reinstatement of impacted habitats and / or species. The duration of an activity may differ from the duration of the resulting impact caused by the activity (e.g. short term construction activities may cause disturbance to birds during the breeding season, however, there may be longer –term impacts due to a failure to reproduce in the disturbed area during that season). EPA (2002) timescales used as follows: • Temporary (0-1 years) • Short term (1-7 years) • Medium term (7-15 years) • Long term (15-60 years) • Permanent (60+ years)
Reversibility: Identify whether an ecological impact is permanent (non-reversible) or temporary (reversible – with or without mitigation).
Timing and Frequency: Some changes may only cause an impact if they happened to coincide with critical life-stages or seasons (for example, the bird nesting season). This may be avoided by careful scheduling of the relevant activities.

(Source: IEEM (2006); EPA (2002))

Table 6.4: Criteria for Assessing Impact Magnitude

Impact Magnitude	Definition
No change:	No discernible change in the ecology of the affected feature.
Imperceptible Impact:	An impact capable of measurement but without noticeable consequences
Minor Impact:	A change in the ecology of the affected site which has noticeable ecological consequences outside the development boundary, but these consequences are not considered to significantly affect the distribution or abundance of species or habitats of conservation importance.
Moderate Impact:	A change in the ecology of the affected site which has noticeable ecological consequences outside the development boundary. These consequences are considered to significantly affect the distribution and / or abundance of species or habitats of conservation importance.
Substantial Impact:	A change in the ecology of the affected site which has noticeable ecological consequences outside the development boundary. These consequences are considered to significantly affect species or habitats of high conservation importance and to potentially affect the overall viability of those species or habitats in the wider area.
Major Impact:	A change in the ecology of the affected site which has noticeable ecological consequences outside the development boundary. These consequences are considered to be such that the overall viability of species or habitats of high conservation importance in the wider area is under a very high degree of threat (negative impact) or is likely to increase markedly (positive impact).

(Sources: Gittings (1998); EPA (2002))

92 A separate assessment of impacts procedure is detailed specifically for collision risks to Whooper Swans. The evaluation is more relevant to bird species. It is based on sensitivity of populations and magnitude of possible impacts, as outlined below in **Table 6.5**. The magnitude of possible impact considers the proposed development in the context of the survey findings and likely impacts from a development of this nature based on existing information and evidence of co-existence.

93 This approach follows standard assessment criteria based on Percival (2003) with additional consideration of NRA (2009). Sensitivity and magnitude (of impact) is determined based on:

- Seven years of information gathered to date on winter bird distribution, known wintering bird concentrations, significance of these concentrations and flight line surveys conducted;
- Desk study / literature review on potential impacts and mitigation approaches; and
- Evidence of actual impacts determined through ongoing studies / observations by surveyors.

Table 6.5: Criteria for Assessing Impact on Bird Species

Components	Definition
Sensitivity Factor	**VERY HIGH:** Species that form the cited interest of SPAs and other statutorily protected nature conservation areas. Cited in this case means mentioned in the citation text for the site as a species for which the site is designated. **HIGH:** Species that contribute to the integrity of an SPA but which are not cited as species for which the site is designated. Ecologically sensitive species including the following: divers, common scoter, hen harrier, golden eagle, red-necked phalarope, roseate tern and chough. Species present in nationally important numbers (>1% Irish population). **MEDIUM:** Species on Annex 1 of the EC Birds Directive Species present in regionally important numbers (>1% regional (county) population), other species on BirdWatch Ireland's red list of Birds of Conservation Concern. **LOW:** Any other species of conservation interest, including species on BirdWatch Ireland's amber list of Birds of Conservation Concern not covered above.
Magnitude of Possible Impact	**VERY HIGH:** Total loss or very major alteration to key elements / features of the baseline conditions such that the post development character / composition / attributes will be fundamentally changed and may be lost from the site altogether. Guide: < 20% of population / habitat remains. **HIGH:** Major loss or major alteration to key elements / features of the baseline (pre-development) conditions such that post development character / composition/ attributes will be fundamentally changed. Guide: 20-80% of population / habitat lost. **MEDIUM:** Loss or alteration to one or more key elements / features of the baseline conditions such that post development character / composition / attributes of baseline will be partially changed. Guide: 5-20% of population / habitat lost. **LOW:** Minor shift away from baseline conditions. Change arising from the loss / alteration will be discernible but underlying character / composition / attributes of baseline condition will be similar to predevelopment circumstances / patterns. Guide: 1-5% of population / habitat lost. **NEGLIGIBLE:** Very slight change from baseline condition. The change is barely distinguishable, approximating to the 'no change' situation. Guide: < 1% population / habitat lost.

94 The considerations of magnitude and sensitivity are brought together in order to determine the 'significance of the potential impact'. This is achieved by cross-tabulating the magnitude and sensitivity, using **Table 6.6**, to give a prediction of the significance of each potential impact on bird species.

Table 6.6: Significance Matrix: Combining Magnitude and Sensitivity to Assess Significance of Potential Impact on Bird Species

SENSITIVITY (→) / MAGNITUDE OF EFFECT (↓)	Very High	High	Medium	Low
Very High	Very High	Very High	High	Medium
High	Very High	Very High	Medium	Low
Medium	Very High	High	Low	Very low
Low	Medium	Low	Low	Very low
Negligible	Low	Very low	Very low	Very low

95 The following is a summary description of each category of significance as outlined in **Table 6.6**:

- **Very low** and **low** should not normally be of concern and there is no requirement for further mitigation;
- **Medium** represents a potentially significant impact that requires careful individual evaluation. It may be of a scale that can be resolved by revised design and / or appropriate mitigation; and
- **Very high** and **high** represent a highly significant impact on bird populations.

6.2.7 Appropriate Assessment

96 Article 6(3) of the EU Habitats Directive requires an 'Appropriate Assessment' to be carried out by a competent authority where a plan or project is likely to have a significant impact on a designated European Site (commonly referred to as a Natura 2000 site). In Ireland, European Sites include cSACs and SPAs.

97 The EU Commission's methodological guidance (2002) promotes a four stage process to undertaking Appropriate Assessment with the outcome of each successive stage determining if a further stage in the process is required. The first stage is referred to as Screening, and this is carried out to determine the potential for significant impacts from the plan or project, alone or in combination with other plans or project and European sites. The outcome determines the necessity for undertaking a more detailed (Stage 2) Appropriate Assessment and preparation of a Natura Impact Statement (NIS) where potential impacts are deemed to be of significance. It is

the responsibility of the competent authority (or consenting authority) to undertake Appropriate Assessment.

98 In the case of the proposed development (MSA and CMSA), a NIS has been prepared (refer to **Volume 5** of the application documentation) as the potential for significant impacts on eight European sites could not be ruled out at the screening stage.

99 Stage 1 Screening (for Appropriate Assessment) was carried out without reference to mitigation measures. Whereas, mitigation is a central part of the Stage 2 appropriate assessment process. In conducting a Stage 2 Appropriate Assessment, mitigation measures should be tested to ensure they are effective and capable of implementation. Hence, a series of mitigation measures have been developed to ensure that the proposed development will not adversely affect the integrity of the European sites concerned. These measures are detailed in the NIS where it is concluded that the conservation interests of the relevant European sites will not be compromised and that the development will have no adverse impact on the integrity of the relevant sites.

6.3 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

100 The potential impacts on flora and fauna in the CMSA occur during both the construction and operational phases. Details of the potential impacts are included in **Section 6.5**. Overall, the construction programme is anticipated to last approximately three years. The proposed development entails the construction of towers as individual sites separated on average by a distance of approximately 340m. In general the construction phases can be broken down into the following: site preparation including laying of temporary rubber matting or aluminium road panels, removal of fences and erection of temporary fencing where required, establishment and operation of the construction materials storage yard, all works associated with modifications to existing 110kV transmission OHLs, installation of tower foundations, erection of towers, guard poles, tree lopping, stringing of conductors, commissioning of the line and reinstatement of land.

101 The following activities and ecological features in particular warrant specific attention in the consideration of potential impacts:

- Construction Phase:
  - Permanent and temporary habitat loss during site clearance / construction;
  - Disturbance to fauna; and
  - Pollution runoff risks to surface and groundwater quality (aquatic receptors).
- Operational Phase:

- Presence of OHL (conductors and earth wire) may present a collision risk to sensitive bird species; and
- Ongoing maintenance activities.

6.4 EXISTING ENVIRONMENT

102 This section describes the existing ecological environment within the CMSA.

6.4.1 Designated Conservation Areas

103 The location of all designated sites within 30km of the alignment is illustrated in Figure 6.1, **Volume 3C Appendices** of the EIS. The extensive buffer zone of 30km is used to ensure adequate consideration is given to all sites potentially linked to the development. Sites detailed include cSACs, SPAs for birds, NHAs, pNHA and Areas of Special Scientific Interest (ASSIs) (areas recognised as being of national conservation importance in Northern Ireland) and (non-designated but proposed) Natural Heritage Areas (pNHAs) located throughout the wider landscape.

104 Further details of those designated sites within 5km of the alignment are presented in **Table 6.7**. Considering the scale and characteristics of the proposed development, it is considered highly unlikely that sites further than 5km would be impacted. However, due consideration is given to two sites outside of this 5km radius where there is potential for the following impacts:

- Designated sites known to support important populations of wintering birds; and
- Designated aquatic sites located downstream of the alignment.

105 Where it is deemed that the conservation interests of such sites could potentially be impacted, they are also included within **Table 6.7**, which lists designated sites in order of increasing distance from the alignment.

106 The alignment is not within or directly adjacent to any designated areas in the CMSA. The closest designated site is Tassan Lough proposed Natural Heritage Area (pNHA) located approximately 250m south of the alignment. The conservation interest of most designated sites in the surroundings area includes lakes and associated wetland habitats, and would therefore be sensitive to activities in the local catchments. The nearest European site (cSAC or SPA) to the alignment is Killyconny Bog cSAC located approximately 11km to the south-east. A detailed assessment of potential impacts of the proposed development on European sites (cSACs and SPAs) is presented in the NIS (refer to **Volume 5** of the application documentation).

Table 6.7: Designated Sites for Nature Conservation within 5km of the Alignment within the CMSA (Sites further than 5km are included where a potential pathway for impacts is identified)

Site Code	Site	Designation	Site Description	Approximate Distance to the Alignment
001666	Tassan Lough	pNHA	The site comprises a small lake which is noted for its bedrock geology which comprises Silurian outcrops which support rare plant species. The lake is fringed with Common Reed (*Phragmites australis)*. Elsewhere rock outcrops occur with grassland and *Sphagnum* moss communities thrive. Surveyed by Foss and Crushell (2007). Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	250m (south of Tower 115)
001608	Monalty Lough	pNHA	This is a small mesotrophic lake surrounded by tall dense reedbed vegetation with scattered Willow scrub. The site comprises a lake fringed by reeds (Phragmites australis) and wet woodland dominated by Willow species (Salix spp). Low lying wet grassland occurs adjacent to the lakeshore and is dominated by Creeping bent (Agrostis stolonifera) with rushes and wetland herb species. The site is suffering from nutrient enrichment due to the intensive farming practices (silage production and slurry spreading) on this farmland. In addition cattle have access to the reedbeds around the lake which is grazed in parts. Surveyed by Foss, Crushell and Wilson (2011). Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	470m (north-east of Construction Compound)
000561	Lough Naglack	pNHA	This site comprises a large mesotrophic lake surrounded by mature mixed deciduous woodland with an associated species rich woodland flora. Reed beds and swamp occur on the lakeshore with reeds (Phragmites australis) and Willow woodland behind. Surveyed by Foss and Crushell (2012). Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts	480m (north-west of Construction Compound)

Site Code	Site	Designation	Site Description	Approximate Distance to the Alignment
			on the conservation interest of the site and therefore the site is not considered further.	
ASSI182	Drumcarn Fen ASSI (Drumgallan Bog pNHA)	ASSI / pNHA	The site comprises a large cutover bog area with secondary fen habitat. Other habitats include wet grassland, heath and scrub. The site is renowned for its diversity of dragonfly species (14 species of dragonfly have been recorded on site). Surveyed by Foss and Crushell (2007). Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	600m (north-east of Tower 109)
001605	Lough Egish	pNHA	Lough Egish comprises a medium to large sized open water lake. One of the few examples of intact raised bog occurs adjoins the north western part of the lough which was surveyed by Foss and Crushell (2011).	600m (east of Tower 163)
001558	Breakey Lough	pNHA	This site is located approximately 7km south-west of Kingscourt. The site comprises two small loughs which are separated by freshwater marsh, wet woodland, cutover bog and wet grassland. Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	1.3km (south of Tower 236)
001268	Cordoo Lough	pNHA	Cordoo Lough comprises a mesotrophic lake surrounded by a broad fringe of Common Reed (*Phragmites australis)* merging into a meadow community. The reed swamp grades into cutover bog towards the southern boundary of the site. Shining pondweed (*Potamogeton lucens*) occurs at the site and is indicative of calcium rich water. A stream occurs at the south western end of the site. Surveyed by Foss and Crushell (2012). There is no potential for the proposed development to affect the conservation interest of the site and therefore this site is not considered further.	1.3km (west of Tower 132)
001671	Spring and Corcrin Loughs	pNHA	This site consists of two calcareous loughs. Both loughs have similar botanical structures with a ring of White Water Lily (Nymphaea alba) inside a	1.3km (north of Construction Compound)

Site Code	Site	Designation	Site Description	Approximate Distance to the Alignment
			fringe of Common Reed (Phragmites australis). Between the two loughs is an acidic grassland community, through which a drain runs, connecting the loughs. Around the lake shores there is wet grassland, freshwater marsh and scrub. Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	
ASSI183	Crossbane Lough	ASSI	A large and diverse site comprising a variety of plant communities. There is a gradual transition from the open water of the lough through a range of fen communities, to heath. Fen vegetation occurs in small stands among rocky outcrops and shallow basins. The site supports a diverse invertebrate assemblage. Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	1.4km (east of Tower 105)
000560	Lough Fea Demesne	pNHA	Lough Fea Demesne consists of an extensive area of mixed deciduous woodland. Of note to the immediate south of this site is the presence of two turloughs (non designated Annex 1 listed priority habitat). The turloughs were surveyed by Foss and Crushell (2011). Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	2.2km (west of Construction Compound)
ASSI179	Straghans Lough	ASSI	A large and diverse site with various wetland habitats. Designated as an ASSI for wetland habitats and rich and diverse invertebrate communities. Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	2.9km (east of Tower 103)

Site Code	Site	Designation	Site Description	Approximate Distance to the Alignment
002077	Nafarty Fen	pNHA	This small wetland site is dominated by swamp and wet woodland communities. Former springs and fen are now degraded due to a water abstraction scheme, infilling and industrial development adjacent to the site. The site was surveyed by Foss and Crushell (2007). Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	3.2km (north west of Construction Compound)
001595	Lough Bawn House Loughs	pNHA	This site is connected via a stream to Black Lough. A small wooded island occurs on the lough. The lough is fringed by Common Reed with Alder and Willow trees in the surroundings. The remainder of the site comprises mixed woodland and deciduous woodland. Surveyed by Foss and Crushell (2008). Lough Bawn is a locally important site for waterbirds.	3.9km (west of Tower 176)
001607	Lough Smiley	pNHA	This site exhibits a good diversity of habitats dispersed over a large area. The lough comprises floating marsh which is fringed by Willow (*Salix*) reed swamp with Common Reedmace (*Typha latifolia*), Reeds (*Phragmites australis*) and Water Horsetail (*Equisetum fluviatile*) dominate the surrounding area. Small areas of raised bog occur throughout the site. Surveyed by Foss and Crushell (2007). This site is of value to waterbirds.	5km (east of Tower 139)
004091	Strabannan Braganstown SPA	SPA	Grassland site, this SPA is of importance for Greylag Goose of which 35% of the national population occurs within the site. Whooper Swan, Greenland White-fronted goose and Golden Plover have also been recorded feeding at the site during winter.	24km (east of Tower 230)
000455 / 004020	Dundalk Bay cSAC / SPA	cSAC / SPA	The cSAC includes coastal (salt meadows) and marine intertidal and sub-tidal (estuaries) habitats. The SPA is of importance due to the occurrence of large numbers of waterbirds during winter and migration periods.	28km (east of Tower 200)
004049	Lough Oughter and associated loughs	SPA	The SPA is designated for protection for water bird species including Whooper Swan, Great Crested Grebe and Wigeon.	32km (west of Tower 86)

6.4.2 Non-Designated Sites of Conservation Interest

107 A number of non-designated ecological sites of varying ecological value that occur in proximity to the alignment were identified during the desktop studies. Only those sites within 1km of the alignment were considered due to their non-designated status (of lower importance than designated sites listed above) and the essentially non-destructive nature of works associated with the proposed OHL. However, non-designated bird sites that occur within 5km of the alignment are also included. These sites together with a brief description and evaluation are listed in **Table 6.8.**

108 In summary, no towers are proposed to be located within any non-designated sites of ecological value and most non-designated sites have been fully avoided through careful selection of the final line route. The alignment does oversail five non-designated sites of known ecological importance (refer to **Table 6.8**).

Table 6.8: Non-Designated Sites of Ecological Value in Proximity of the Alignment within the CMSA

Site Name	Description	Evaluation	Location (with reference to alignment)
Corlea Bog	Area of cutover bog with regenerating fen communities. Surveyed by Foss and Crushell (2008).	National Importance	Proposed alignment oversails this wetland site between Towers 206 – 207 at Scalkill and Corlea (ED Drumcarrow) townland boundary.
Greaghlone Bog	Cutover bog site with good diversity comprises wet Willow-Alder-Ash woodland and transition mire (surveyed by Foss and Crushell 2012). Considering the scale and characteristics of the proposed development together with the interest features of the site, it is concluded that there is little potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	County importance	60m west of the alignment at Tower 204 in Greaghlone North.
Raferagh South	Wetland site comprises dystrophic lake, transition mire, reed and large sedge swamp and marsh (surveyed by Foss and Crushell 2011). Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	County importance	Wetland site occurs approximately 60m north of alignment (Tower 198) at Raferagh.

Site Name	Description	Evaluation	Location (with reference to alignment)
Corvally Lake	This site has a fairly extensive fen area to the south and a considerable area of floating vegetation. (Monaghan Wetland Map 2010). Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	County importance	This wetland site occurs approximately 60m west of alignment between Towers 193 – 194 at Corvally.
Bocks Lough	Wetland site comprises a lake, wet woodland and bog woodland. The woodland fringing the lake shore is dominated by Birch (*Betula pubescens*) with frequent grey Willow (*Salix cinerea*) in the canopy. (Monaghan Wetland Map 2010; NSNW (Perrin *et al*. 2008)). Considering the scale and characteristics of the proposed development together with the interest features of the site it is concluded that there is no potential for adverse impacts on the conservation interest of the site and therefore the site is not considered further.	County importance	Bocks Lough occurs approximately 100m east of the alignment between Towers 175 – 176 at Tullyglass.
Tullyglass Woodland	Comprises Oak-Birch-Holly woodland (NSNW (Perrin *et al*. 2008)).	Local importance (Higher Value)	Alignment oversails the site between Towers 171 – 172 at Tullyglass.
Lough Nahinch (Cashel Bog)	Wetland complex comprising two lakes with intervening transition mire habitat. Some bog communities persist in parts of the site together with scrub and Birch woodland (surveyed by Foss and Crushell 2008).	National importance	Alignment oversails the southern part of the site between Towers 117 – 118 at Cashel and Tassan townland boundary.
Clarderry Bog	Extensive area of cutover bog. Western side comprises good quality fen habitat regenerating in cut out area (surveyed by Foss and Crushell 2012).	County importance	Alignment oversails the south eastern boundary of this wetland between Towers 127 - 128 at Clarderry.
Tassan Grassland	Excellent example of neutral to acid grassland with abundant orchids (*Dactylorhiza fuchsii* and *Platanthera chlorantha*) (surveyed by Foss and Crushell (2011).	National importance	The alignment oversails part of this site between Towers 117-118.
Dromore wetlands	Wintering Bird sites and network of lakes along the Dromore River Valley immediately west of Ballybay.	National importance	The alignment avoids bisecting this wetland network hence minimising bird collision risks. The closest concentration of wintering birds is located 3.8km to the west of the nearest tower (beside Ballybay).
Shantonagh	Wintering Bird sites and network of	County	The alignment avoids bisecting this

Site Name	Description	Evaluation	Location (with reference to alignment)
Area wetlands lakes	lakes.	importance	wetland network hence minimising bird collision risks. The closest lake, Shantonagh, is located 1.2km to the west of the nearest tower.
Lough Morne and lakes to the west	Wintering Bird sites and network of lakes.	County importance	The alignment avoids bisecting this wetland network hence minimising bird collision risks. The closest lake, Morne, is located 210m from the alignment and approximately 250m from to the west of the nearest tower (number 167).

109 All non-designated sites of high conservation value located in close proximity of the alignment have been avoided through careful selection of the final route.

6.4.3 Rare and Protected Flora

110 The alignment is located within the Ordnance Survey National Grid 10km squares H70, H71, H72, H82 and N79. A plant species list for these 10km squares was generated from the CD-ROM version of the *New Atlas of British and Irish Flora* (Preston *et al*. 2002). This list was then compared to the list of species protected under the Flora (*Protection*) Order, (1999), the Wildlife (NI) Order, (1985), and those which are included in the *Irish Red Data Book* (Curtis and McGough, 1988). **Table 6.9** presents the rare or protected species with records occurring in these grid squares. The habitat requirements of these species is also presented and the likelihood of any impacts. No protected flora species were recorded during the course of field surveys.

Table 6.9: Rare and Protected Plant Species Previously Recorded in the Study Area

Common name	Latin name	Status	Category	Habitat Requirements	10km Square	Likelihood of Impact
Bee Orchid	*Ophrys apifera*	NI	Red Data Book: Threatened	Open scrub; grassland (lime rich soils); dry banks and sand dunes.	H82	Towers avoid potential suitable habitat within the study area.
Bog Rosemary	*Andromeda polifolia*	NI	Red Data Book : Threatened	Lowland raised bogs; upland peats.	N79; H72	Towers avoid potential suitable habitat within the study area.
Cowslip	*Primula veris*	NI	Red Data Book: Threatened	Widespread species local in old meadows and pastures, on railway cuttings and embankments, coastal cliffs and road verges.	H70; H72	It is likely that the species occurs within the study area.

Common name	Latin name	Status	Category	Habitat Requirements	10km Square	Likelihood of Impact
Fir Clubmoss	*Huperzia selago*	Protected ROI	EU Habitats Directive; Annex V	Mountain cliffs and wet heath mostly above 300m but sometimes on lowland bogs.	H71; N79	Towers avoid potential suitable habitat (wet heath) within the study area.
Round leaved Crane's Bill	*Geranium rotundifolium m*	Protected ROI	Red Data Book; Vulnerable	Banks; walls; roadsides & stoney ground.	H70	Unlikely – towers avoid this habitat
Stag's Horn Clubmoss	*Lycopodium clavatum*	Protected ROI	EU Habitats Directive; Annex V	Wet heath; grassy mountain slopes.	N79	Towers avoid potential suitable habitat within the study area.
Water Violet	*Hottonia palustris*	Protected ROI & NI	Red Data Book; Rare	Marshes; ditches; shallow ponds.	N79	Towers avoid potential suitable habitat within the study area.

(Source: Preston *et al*. 2002)

6.4.4 Habitats

6.4.4.1 General Ecological Character of the Route

111 In this section, the overall ecological character of the landscape along the alignment in the CMSA is described. The description of the alignment is broken down into a number of sections from south to north. Local townlands and tower numbers are used as reference points. More detailed ecological information on the habitats encountered along the alignment is presented in **Section 6.4.2.2**, while sites of particular ecological interest are described in **Table 6.14**. Habitat Maps of an 80m corridor centred on the alignment are presented in Figures 6.2.1 – Figure 6.2.19, **Volume 3C Figures** of the EIS.

6.4.4.1.1 Clonturkan to Dingin: Towers 236 to 224

112 Tower 236 is located in the townland of Clonturkan. The habitat in this townland is improved agricultural grassland with boundary hedgerows. The alignment runs in a general northward direction between Clonturkan and the townland of Cordoagh (ED Enniskeen). The landscape is undulating and the ecological character is generally agricultural grassland with some areas recently ploughed and re-seeded. The dominant habitats along this part of the alignment include improved grassland on well drained areas with occasional wet grassland indicated by rushes. There are fragments of other habitats including hedgerows and treelines along field boundaries. Pockets of marsh occur at inter-drumlin hollows between Towers 231 and 235 in the townlands of Carrowreagh and Corraneary (ED Enniskeen). The alignment crosses two

streams identified as tributaries of the River Dee along this section. The alignment turns in a north-east direction towards the townland of Corrycholman, passing north of Muff Lough, a eutrophic lake bordered by reed-swamp and wet woodland. There is some planting with broadleaves on the north shore. The alignment avoids the lake running across elevated drumlins. The alignment crosses three un-named streams that flow into Ervey Lough to the East. The towers avoid natural watercourses along this section. At Dingin, the line turns north again, continuing through agricultural grassland to the townland of Corglass (ED Lisagoan).

6.4.4.1.2 Dingin to Scalkill to Doagh: Towers 224 to 203

113 At Dingin, the alignment crosses an un-named tributary of the River Drumsallagh. The line crosses a second stream (Drumsallagh Stream) at Collops which is bordered by a mature Ash treeline. From Collops to Lisagoan the alignment again traverses agricultural fields with patches of wet grassland bordered with hedgerows and a watercourse that feeds into the River Lagan downstream. The line turns in a north-west direction at Drumiller. In the townland of Lisagoan the line crosses a fragment of conifer woodland, with the supporting structures remaining outside of the woodland area. The alignment crosses a tributary of Magheracloone stream along the southern boundary of this woodland. North of the woodland area, the line crosses another stream along a road in Lisagoan (see **Table 6.14**) which is bordered by a large mature treeline comprising Ash, Hazel and Willow. Between Lisagoan and Scalkill the habitats are dominated by improved agricultural grassland and hedgerows. The line crosses a roadside stream at Skalkill (between Towers 210 and 211) which is a tributary of the Greaghlone. The line avoids a fragment of wetland just to the south at Scalkill, dominated by tall herbs. It also remains removed (and downstream) from the wetland complex of Greaghlone Lough. At the townland borders of Scakill and Corlea (ED Drumcarrow), the alignment oversails Corlea Bog (between Towers 206 and 207) (see **Table 6.14**), a cutover bog with secondary fen habitat identified in the Fen Survey of Monaghan (Foss and Crushell, 2007). Either side of the Corlea wetland site the area is dominated by improved agricultural grassland. Towers 206 and 207 are located within elevated areas of improved pasture removed from the wetland area. The line continues north to Doagh, avoiding a similar cutover bog area in the townland of Greaghlone.

6.4.4.1.3 Doagh to Ardragh to Sreenty: Towers 203 to 186

114 From Doagh the alignment continues to the north-west and crosses a wet Willow-Birch woodland complex (see Cornalaragh Marsh, **Table 6.14**) at Cornalaragh (between Towers 202 and 201). The woodland complex is a diverse site with Willow, Birch, Broom, Ash and areas of open water with Common Reedmace and patches of heathland. To the east of the line is Comertagh Lough (see Comertagh and Raferagh Loughs, **Table 6.14**). This is another site of local ecological value comprising wetland and woodland habitats that is avoided by the alignment.

115 At the crossroads between Cornalaragh and Raferagh South, there is a fragment of wet woodland dominated by Willow, at the crossing of a stream. The alignment avoids crossing this woodland and from this point continues in a northerly direction and continues through agricultural grasslands. The line passes east of a small lake at Corvally which is bordered with reed swamp and wet woodland habitat. The line continues in a northward direction and skirts a small section of conifer woodland planted on cutover bog at the crossroads between Corvally and Ardragh. The line passes through the eastern section which is considered to be of low ecological value. From this point the habitats are dominated by agricultural grassland and small patches of scrub near the townland borders at Ardragh and Sreenty. The alignment turns north-east at Tower 188 towards the townland of Sreenty. A wetland comprising marsh deemed to be of local importance (higher value) occurs at the road crossing between the townlands of Ardragh and Sreenty (Towers 187 to 188) (see Ardragh Wetland, **Table 6.14**).

6.4.4.1.4 Sreenty to Cornasassonagh to Drumillard: Towers 186 to 169

116 To the north of Ward's Cross the line turns in an easterly direction, through the townland of Ummerafree and north-east again to Cornasassonagh. Again, the habitats are dominated by agricultural grassland with patches of gorse scrub and wet grassland at Corrinenty and Cornasassonagh. From that point, the line turns in a north-west direction (Tower 176), 0.2km east of Bocks Lough, a small lake surrounded by wetland deemed to be of county importance (see Bocks Lough and Woodland, **Table 6.8**). The alignment is routed to the east of this wetland crossing agricultural grassland and a small fragment of wet woodland (between Towers 175 and 176). The line continues through the agricultural fields occurring on raised drumlins, through the townlands of Tullyglass and Tooa. At Tullyglass, the alignment crosses a small eutrophic pond (Towers 172 to 173) and an area of broadleaved woodland (Towers 171 to 172) along an un-named stream. The woodland and surrounding hedgerows and treelines in this area are considered to be of local importance, higher value (see Tullyglass Pond and Tulyglass Woodland, **Table 6.14**). The woodland occurs in depression between elevated drumlins on which the towers are sited. Between Tooa and Drumillard the landscape is dominated by improved agricultural fields.

6.4.4.1.5 Drumillard to Cooltrimeglish to Greagh: Towers 169 to 154

117 From Drumillard the alignment turns in a north-east direction passing across elevated agricultural grasslands, avoiding Lough Morne (210m) and Boraghy Lough (300m) which occur to the west. The alignment turns north-east at Aghmakerr (Tower 166) and oversails an area of low lying marsh at the crossroads between the townlands of Aghmakerr and Boraghy (Towers 165 to 166). The line crosses a natural watercourse that discharges from Boraghy Lough (south of Tower 163) and flows eastwards towards Lough Egish pNHA, located approximately 600m to the east. The line turns north-west in the townland of Cooltrimeglish, again crossing agricultural grassland and a low lying cutover bog area (see Tullynahinnera Bog, **Table 6.14**)

comprising a mosaic of wetland habitats including scrub and wet grassland (Towers 158 to 159). Drainage ditches occur throughout the wetland indicating degraded conditions. At Greagh the alignment oversails another low lying wetland comprising marsh and transition mire habitat (see Greagh Marsh, **Table 6.14**) (Towers 156 to 157). These secondary wetland habitats are likely to have become established within an area of cutover bog. The wetland is considered to be of local importance, higher value. At Greagh the line route turns in a northerly direction, again the grassland habitats are largely intensively managed for agriculture.

6.4.4.1.6 Greagh to Terrygreeghan to Drumroosk: Towers 154 to 130

118 Through the townlands of Greagh, Drumhowan, Drumgillew Lower, Clogher and Crinkill the alignment occurs on raised drumlins that are intensively managed as agricultural grassland with mostly hawthorn and Ash hedgerows forming field boundaries. The alignment crosses a stream in Drumhowan. Tower 152 is located approximately 20m from this stream and associated hedgerow. The alignment crosses a small clear felled woodland (Towers 150 to 151) at the townland boundaries of Drumhowen and Drumguillew Lower, a badger sett has been recorded from this area (see Drumhowan, **Table 6.14**). From Drumgiullew Lower, the alignment turns north-west continuing through agricultural lands approximately 500m to the south-east of Crinkill Lough. The alignment avoids small sections of scrub fragmentary wetland habitats of marsh and Willow woodland between Towers 144 to 146 (see Clogher Marsh, **Table 6.14**). The alignment oversails a small low lying wetland (see Terrygreeghan Marsh, **Table 6.14**) along the townland boundaries of Cornamucklagh South and Terrygreeghan (Towers 142 to 143). Habitats that occur in this area includes marsh and transition mire. Towers are located on elevated agricultural lands removed from the wetland site.

119 At Tower 142 the alignment turns in a northerly direction and continues across agricultural grassland through the townlands of Terrygreeghan and Rausker. The alignment traverses an unnamed stream at the townland boundaries of Terrygreeghan, Rausker and Cornanure (Monaghan By). The alignment crosses a section of wetland (see Cornanure Marsh, **Table 6.14)** between Towers 138 and 139. This wetland appears relatively undisturbed with no indication of recent drainage. Towers are located within improved grassland outside of the wetland area. A small fragmented wetland area (see Caraghramer Marsh, **Table 6.14**) is also oversailed by the alignment between Towers 135 and 136. This area appears fragmented and relatively disturbed comprising a mix of wet grassland and scrub habitat. The alignment continues through improved grassland and fragments of scrub and hedgerows along field boundaries through the townlands of Caraghramer and Drumroosk, passing to the east of a small wetland at Tower 134 (see Dromroosk Marsh, **Table 6.14**). The alignment is routed to avoid a number of small lakes and associated wetland habitats (Coogan's Lough, Drumgristin Lough and Ghost Lough) located to the east.

6.4.4.1.7 Drumroosk to Cashel to Annaglogh: Towers 130 to 112

120 At Drumroosk, the line turns in a north-east direction (Tower 132) and crosses extensive improved agricultural grassland with small pockets of scrub throughout the townlands of Drumroosk and Derryhallagh (Monaghan By). At Clarderry, just north of Dunfelimy, the line oversails the eastern margin of Clarderry Bog (see Clarderry Bog, **Table 6.14**), a relatively large wetland complex occurring in an area of cutover bog with a good diversity of regenerating wetland and woodland habitats. The site was reported to be of county importance by Foss and Crushell (2012). That part of the wetland oversailed by the alignment comprises Willow scrub. From Cornamucklagh North, the alignment turns eastward avoiding areas of wet grassland and marsh to the south of Tower 126. The alignment crosses a river in the townlands of Cornamucklagh North and Clarderry and continues over elevated ground with improved pasture and into the townland of Annagh. The line avoids crossing an area of cutover bog at Annagh and oversails scrub at the southern edge (between Towers 117 to 118) of a large wetland complex at Cashel (see Lough Nahinch, **Table 6.14**) deemed to be of national importance (Foss and Crushell 2008). A complex of four fields of unimproved grassland (see Tassan Grassland, **Table 6.14**) with good species diversity adjoins the eastern part of Lough Nahinch wetland between Towers 117 and 118. Towers in this are all located in improved pasture of low ecological value. The alignment avoids Tassan Lough pNHA, located approximately 250m to the south at Tassan. The alignment continues across improved agricultural grasslands between Towers 116 and 112 at Annaglogh, Larnakelly and Tassan. A number of confirmed active badger setts are avoided in this area.

6.4.4.1.8 Annaglogh to Lemgare: Towers 112 to 103

121 An area of semi-improved calcareous grassland and gorse scrub occur in the area of Annaglogh and Lisdrumgormly between Towers 110 and 112, where Tower 111 is situated in an area of semi-improved grassland. The alignment oversails further areas of scrub and outcropping rock at Lemgare between Towers 107 and 108. The line avoids the Drumgallan Bog area (Duncarn Fen) which is located approximately 1km to the east of the line route at this location. Between Lemgare and where the line crosses the border, the area is dominated by improved pasture with associated managed hedgerows.

6.4.4.2 Habitat Descriptions

122 This section describes habitats identified within an 80m corridor centred on the proposed line route. It also considers habitats traversed by temporary access routes, many of which extend beyond 80m. This section should be read in conjunction with Figures 6.2.1 - 6.2.19, **Volume 3C Figures** of the EIS.

123 A complete list of flora species recorded during surveys undertaken along the alignment is presented in **Appendix 6.8, Volume 3C Appendices** of the EIS.

124 In addition, **Appendix 6.7, Volume 3C Appendices** of the EIS (Flora & Fauna Plates) illustrates the habitats recorded within the wider CMSA. Agricultural activity is the dominant land use within the vicinity of the proposed development and hence habitats are significantly influenced by this activity. The habitats detailed below are those habitats identified along the alignment.

125 The following habitat types recorded within the corridor of the alignment (within 80m centred on the alignment) (Fossitt 2000) are described below and their distribution in relation to the alignment illustrated on the Habitat Maps presented in Figures 6.2.1 – 6.2.19, **Volume 3C Figures** of the EIS.

- Freshwater:
  - Eutrophic lakes (FL5)
  - Other artificial lakes and ponds (FL8)
  - Reed and large sedge swamp (FS1)
  - Depositing / lowland rivers (FW2)
  - Drainage ditch (FW4)
- Grassland:
  - Improved agricultural grassland (GA1)
  - Dry calcareous and neutral grassland (GS1)
  - Dry meadow and grassy verge (GS2)
  - Wet grassland (GS4)
  - Freshwater Marsh (GM1)
- Peatland:
  - Cutover Bog (PB4)
  - Transition mire (PF3)
- Woodland & scrub:
  - Oak-Birch-Holly woodland (WN1)
  - Wet Willow-Alder-Ash woodland (WN6)
  - Scrub (WS1)
  - Conifer Plantation (WD4)
  - Hedgerows (WL1)
  - Treelines (WL2)
- Cultivated & built land:
  - Arable crops (BC1)
  - Stonewalls and other stonework (BL1)
  - Buildings and artificial surfaces (BL3)

126 The dominant habitats along the alignment include improved agricultural grassland (GA1), hedgerows (WL1), and treelines (WL2). At roadsides, grassy verges (GS2) are often present. Drainage ditches (FW4) are commonly associated with linear woodland and hedgerows throughout the CMSA.

127 Less frequently occurring habitats include species poor modified wet grasslands, marsh / cutover bog, conifer plantation and natural watercourses.

6.4.4.2.1 Eutrophic Lakes (FL5)

128 Eutrophic lakes are rare throughout the alignment. Characteristically, the habitat is nutrient rich with an abundance of algae. The habitat is surrounded by a margin of wet grassland dominated by Soft Rush (*Juncus effusus*) together with Bottle Sedge (*Carex rostrata*). Improved agricultural grassland occurs in the wider surroundings. Aquatic plant species recorded include *Potamogeton natans*. The alignment crosses a small example of this habitat at Tullyglass.

129 This habitat may serve as a wetland refuge for local wildlife particularly invertebrate groups such as dragonflies and damselflies. The habitat that occurs within the CMSA does not correspond with the Annex I protected habitat 'natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation (3150)'.

6.4.4.2.2 Other Artificial Lakes and Ponds (FL8)

130 Artificial lakes and ponds are rare throughout the alignment in the CMSA being recorded at only one location at Lennan. Characteristically, the habitat comprises bodies of standing water usually arising as a result of human modifications to the landscape. The nutrient status of these artificial waters is variable. The pond margins contain disturbed areas of excavated material with ruderal plants including Thistle spp. (*Cirsium* spp.), Broadleaved Dock (*Rumex obtusifolius*) and False Oat-grass (*Arrhenatherum elatius*). The habitat present within the CMSA is small in extent with no marginal wetland vegetation.

6.4.4.2.3 Reed and Large Sedge Swamp (FS1)

131 This wetland habitat has largely been avoided by the alignment throughout the CMSA although is present within wetlands that occur in the wider study area. Characteristically, this habitat is dominated by reeds including Common Reed (*Phragmites australis*), Common Reedmace (*Typha latifolia*) and to a lesser extent Reed Canary-grass (*Phalaris arundinacea*) and surrounds open pools comprising aquatic plants. Other plant species include Bogbean (*Menyanthes trifoliata*), Meadowsweet (*Filipendula ulmaria*) and Wild Angelica (*Angelica sylvestris*). Reed and large sedge swamp (FS1) occurs together with Dystrophic Lakes (FL1) to the north of the alignment at Raferagh fen in the townland of Raferagh.

132 This habitat often forms part of a more extensive wetland systems. The habitat is avoided by the proposed alignment.

6.4.4.2.4 Depositing Lowland Rivers (FW2)

133 The watercourses are variable in width and largely free of vegetation, with Water Cress (*Apium nodiflorum*), Brooklime (*Veronica beccabunga*), Duckweed (*Lemna minor*) and Floating Reed

Grass (*Glyceria fluitans*) in parts. In some instances there are good examples of riparian woodland along stream edges, dominated by Alder (*Alnus glutinosa*) and Willow (*Salix* spp.) but this is fragmentary in occurrence.

134 Riparian vegetation is variable and includes improved grassland, isolated trees and areas of linear riparian woodland. Marsh and other habitats were also noted along the alignment. Some watercourses provide suitable habitat for a number of protected aquatic species (Atlantic Salmon, Lamprey and Freshwater Crayfish as listed on Annex II of EU Habitats Directive) and also provide potentially suitable habitat for Otter (Annex II and IV of EU Habitats Directive).

135 Natural watercourses with good water quality provide suitable habitat conditions for salmonids and other protected aquatic species. Parts of the watercourses crossed by the alignment may correspond with the Annex I habitat '*Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation'*. However, a clear definition of this habitat (and its sub-types) has not yet been developed for Ireland and its distribution remains unclear (NPWS, 2013). There are approximately 27 watercourses oversailed by the alignment, most of which are small streams being less than 2m in width (refer to **Appendix 6.7, Volume 3C Appendices** of the EIS Plate 9 and Plate 11, of the EIS.). The main watercourses which the alignment oversails include those listed in **Table 6.10**.

Table 6.10: Larger Rivers and Streams Crossed by the Proposed Alignment and Distance of Closest Towers

River Name	Nearest Tower	Distance to River (m) (approximately)
Unnamed tributary of the River Dee	Tower 235	85m
Lough Morne Stream	Tower 167	167m
Watercourse (Cooltrimegish) at Boraghy Lake	Tower 163	40m
Watercourse (Lisquigney)	Tower 139	85m
River Fane	Tower 126	170m
Unnamed tributary of Clontibret stream	Tower 103	65m

6.4.4.2.5 Drainage ditches (FW4)

136 This habitat is widespread and common throughout the alignment. Drainage ditches associated with field boundaries particularly along hedgerows and treelines throughout the CMSA occur most frequently along field boundaries particularly adjacent to hedgerows and treelines. Drainage ditches were also recorded traversing a number of wetland habitats and conifer plantations. Aquatic plants such as Fools Watercress (*Apium nodiflorum*), Duckweed (*Lemna minor*) and Brooklime (*Veronica beccabunga*) were also noted.

6.4.4.2.6 Improved Agricultural Grassland (GA1)

137 The dominant habitat (over 80% of all habitat mapped) that occurs throughout the alignment is improved agricultural grassland (see Plate 7, **Appendix 6.7, Volume 3C Appendices** of the EIS). The habitat is a common feature of the undulating hills that form the wider landscape of the CMSA being intensively managed for cattle grazing and silage crop production. The main plant species that occur within this habitat comprise Perennial Rye-grass (*Lolium perenne*). Other grass species include Sweet Vernal-grass (*Anthoxanthum odoratum*), Crested Dog's-tail (*Cynosurus cristatus*), Yorkshire-fog (*Holcus lanatus*) and Cock's Foot (*Dactylis glomerata*). Broadleaved herbs that are found in this habitat type include White Clover (*Trifolium repens*), Meadow Buttercup (*Ranunculus acris*), Creeping Buttercup (*Ranunculus repens*) and occasional dock (*Rumex* spp).

138 Where drainage is poor, particularly in inter-drumlin, this grassland type grades into rush (*Juncus* spp.) pasture or wet grassland (GS4). Drainage ditches and hedgerows are common features around field boundaries. This common and widespread habitat is of low ecological value. The species recorded within the habitat are common throughout the wider countryside. The habitat is generally of low interest to wildlife species although, in suitable situations, Whooper Swans may use the habitat as foraging grounds during winter months.

6.4.4.2.7 Dry Calcareous and Neutral Grassland (GS1)

139 Dry calcareous and neutral grassland is uncommon and likely to be confined to the northern part of the CMSA. This habitat type typically occurs on free draining soils where grassland is semi-improved and not managed intensively for agriculture.

140 Plant species that occur include Yorkshire Fog (*Holcus lanatus*), Crested Dog's-tail (*Cynosurus cristatus*), Meadow Grasses (*Poa* spp.), Cock's-foot (*Dactylis glomerata*), White Clover (*Trifolium* repens), Red Clover (*Trifolium pratense*) and Ragwort (*Senecio jacobaea*) and Common Spotted Orchids (*Dactylorhiza fuchsii*). Examples of this habitat occur at Annaglogh and Lisdrumgormly. A good example of the habitat which is avoided by the alignment occurs at Tassan.

141 The habitat is uncommon and restricted in its distribution across the CMSA. Better examples of the habitat can correspond to the Annex I habitat 'Orchid Rich Grassland' where the diversity of orchids is high. The example of the habitat recorded within the CMSA does not correspond to the Annex I habitat.

6.4.4.2.8 Dry Meadows and Grassy Verges (GS2)

142 Dry meadows and grassy verges are most common at road crossings and along the margins of field boundaries throughout the alignment. The habitat comprises tall coarse tussock grasses such as Cock's-foot (*Dactylis glomerata*) and False Oat-grass (*Arrhenatherum elatius*). The habitat occasionally forms mosaics with scrub where management of agricultural lands has been abandoned. The habitat is widespread throughout the CMSA.

6.4.4.2.9 Wet Grassland (GS4)

143 Wet grassland is frequent throughout the CMSA and occurs where there is impeded drainage. The habitat that occurs within the CMSA is generally dominated by Soft Rush (*Juncus effusus*) and Jointed Rush (*Juncus articulatus*). The habitat comprises soft rush tussocks that range from 0.5m to 1.0m in height. Grasses recorded include Yorkshire Fog (*Holcus lanatus*), Sweet Vernal Grass (*Anthoxanthum odoratum*) and Creeping Bent (*Agrostis stolonifera*). The grass species are generally low-growing and dominate the inter-tussock spaces. Herbs recorded include: Creeping Buttercup (*Ranunculus repens*), Meadowsweet (*Filipendula ulmaria*), Sorrel (*Rumex acetosa*), Daisy (*Bellis perennis*), Marsh Thistle (*Cirsium palustre*), with occasional stands of Yellow Flag-iris (*Iris pseudacorus*). A number of bryophytes are present, including *Rhytidiadelphus squarrosus* and *Eurhynchium praelongum*. These are species commonly found in wet grassland habitat. This habitat is patchy in occurrence and may grade into patches of poor fen (PF1) or marsh (GM1) typically in poor draining areas. Examples of where this habitat occurs along the alignment include Collops, Canusassonagh, Tullyglass, Greagh, Drumroosk and Annagh.

144 The habitat provides a refuge for wetland flora. It is relatively common in the wider countryside and generally species poor. The examples of the habitat recorded within the study area do not correspond with the more species rich Annex I habitat 'Molinia meadows (6410)'.

6.4.4.2.10 Marsh (GM1)

145 Freshwater marsh occurs occasionally throughout the alignment. The habitat occurs at inter-drumlin hollows and in natural depressions where drainage is impeded by underlying substrates. The habitat is commonly associated with drainage ditches. The quality of marsh varies within the CMSA from substrates with a high water table to areas drying out as indicated by the presence of drainage ditches and encroachment of scrub species. Most abundant species include: Meadowsweet (*Filipendula ulmaria*), Wild Angelica (*Angelica sylvestris*) and Soft Rush (*Juncus effusus*). Other species that were recorded include Yellow Iris (*Iris pseudacorus*), Water Horsetail (*Equisetum fluviatile*), Soft Rush (*Juncus effusus*), Creeping Buttercup (*Rannunculus repens*), Common Reedmace (*Typha latifolia*), False Oat-grass (*Arrhenatherum elatius*) and Reed Canary-grass (*Phalaris arundinacea*). Ground conditions are

characterised by waterlogged mineral soil. Marsh habitat provides a refuge to a diversity of wetland species. Examples of this habitat occur at Raferagh, Ardragh, Sreenty, Corrinenty, Aghmakerr, Crinkill, Terrygreeghan, Cornamucklagh North and Lemgare.

6.4.4.2.11 Cutover Bog (PB4)

146 There are a number of areas of isolated fragmentary habitats comprising cutover bog. These areas were once raised bog habitats that occupied inter-drumlin hollows, however they have been drained extensively and cutaway for peat in historic times. The regeneration of these areas after turf-cutting ceases can lead to a mosaic of habitats of local value that are collectively described as cutover bog. There may be fragments of dry and wet heath (dominated by Ling Heather (*Calluna vulgaris*); open water with bog mosses (*Sphagnum cuspidatum*) and Bog Cotton (*Eriophorum angustifolium*); poor fen and in some instances examples of rich fen or transition mire (see Plate 12, **Appendix 6.7, Volume 3C Appendices** of the EIS). Throughout cutover bog areas there are also stands of Birch or Willow scrub. Good examples of the habitat occur at Corlea (ED Drumcarrow), Brackly, Derryhallagh, Annagh and Cashel (Lough Nahinch) although the alignment has avoided the requirement to locate towers in these areas.

6.4.4.2.12 Transition Mire and Quaking Bog (PF3)

147 Transition mire occurs occasionally throughout the CMSA. Characteristically, the habitat is a wet peat forming system intermediate between poor and rich fen. Transition mires are usually found in the wettest part of a bog or fen comprising a floating raft of vegetation dominated by a rich moss layer supporting a variety of sedge species. The habitat supports a number of sedges including Common Cotton-grass (*Eriophorum angustifolium*)*, Carex diandra, and Carex rostrata* together with broadleaved herbs such as Bogbean (*Menyanthes trifoliata*), Marsh Cinquefoil (*Potentilla palustris*) and Lesser Spearwort (*Ranunculus flammula*). The habitat may also support scattered stands of Grey Willow (*Salix cinerea*). Examples of this habitat occur at Scalkill and Terrygreeghan. The alignment has avoided the requirement to locate towers in these areas.

148 The habitat is considered to be an important wetland refuge for flora and fauna and corresponds to the EU Annex I habitat 'Transition mires and quaking bogs'. The design of the proposed development has been successful in avoiding this habitat.

6.4.4.2.13 Oak – Birch - Holly Woodland (WN1)

149 Mixed broadleaved woodland is uncommon along the proposed route alignment. A single stand of mature Birch dominated woodland occurs along the alignment at Tullyglass Woodland (see **Table 6.14**). The area in proximity of the alignment is dominated by Birch (*Betula pubescens*) with a field layer of Bramble (*Rubus fruticosus* agg.) and various grass species. The following

description is from Perrin *et al.* (2008): 'Cattle grazing occurs through out the site and there are many areas with poached soil. Invasive shrubs are problematic with *Rhododendron ponticum* and *Prunus laurocerasus* dominating substantial areas. Most of the site is on sloping ground and is freely draining although there are some wetter areas along the streams. Elsewhere within the site are a mixture of Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*), Birch (*Betula pubescens*), Beech (*Fagus sylvatica*), Sycamore (*Acer pseudoplatanus*) and Holly (*Ilex aquifolium*) with a field layer dominated by Bramble (*Rubus fruticosus* agg.), Germander Speedwell (*Veronica chamaedrys)*, Bluebell (*Hyacinthoides non-scripta*), Primrose (*Primula vulgaris*) and Creeping Buttercup (*Ranunculus repens*)'.

150 Good examples of this woodland type may provide valuable habitat for terrestrial mammals, bats and common woodland birds.

6.4.4.2.14 Wet Willow – Alder - Ash Woodland (WN6)

151 Wet Willow-Alder-Ash woodland occurs occasionally within the CMSA. The habitat occurs in areas that are predominantly wet or flushed for most of the year. The tree layer is characterised by mature trees including Grey Willow (*Salix cinerea*), White Willow (*Salix alba*), Alder (*Alnus glutinosa*), Ash (*Fraxinus excelsior*) and occasional Birch (*Betula pubescens*). Drainage ditches are associated with this habitat in the CMSA. Ground conditions are typically characterised by a waterlogged peat substrate with bramble growing in the understorey. Examples of this habitat occur at Corraneary (ED Enniskeen), Ummerafree, Tullyglass, Crinkill and Raferagh.

152 The habitat is widespread in areas associated with wet ground conditions, particularly around the perimeter of lakes and cutover bog areas. Good examples of the habitat may correspond to the Annex I habitat 'Alluvial woodland', however, no such stands have been identified within the corridor of the alignment.

6.4.4.2.15 Scrub (WS1)

153 Scrub occurs frequently along the alignment. The habitat varies somewhat depending on a number of factors including drainage. Gorse (*Ulex europaeus*) typically dominates in drier areas associated with rock outcrops or at the edge of well drained peatlands. Willow (*Salix* spp.) scrub occurs most commonly in wetter sites such as poorly drained cutover bog sites and adjacent lakes or watercourses. Other species that commonly dominate the habitat include Hawthorn (*Crataegus monogyna*), Birch (*Betula* spp.) and Bramble (*Rubus fruticosus* agg.). The habitat was usually found growing in association with areas or rock outcrop or on areas of cutover bog. Examples of where this habitat occurs along the alignment include Cordoagh (ED Enniskeen), Greagh, Ardragh, Clarderry, Cashel, Corrinenty, Annaglogh and Lemgare (see Plate 10, **Appendix 6.7, Volume 3C Appendices** of the EIS).

154 The habitat is common and widespread throughout the CMSA. Scrub may provide valuable cover to terrestrial mammals (badger) and nest sites to common farmland bird species.

6.4.4.2.16 Conifer Plantation (WD4)

155 Conifer forestry occasionally occurs throughout the CMSA. Characteristically, tree stands comprise non-native conifer species planted in distinct rows and are managed for commercial timber production. Semi-mature stands were most common throughout the CMSA although mature and immature plantations are also present. Species diversity is low, often comprising monoculture stands of Sitka Spruce (*Picea sitchensis*) often planted in areas of cutover bog and marsh.

156 Conifer plantations in the CMSA are fringed with Bramble (*Rubus fruticosus* agg) thicket. Artificial Drainage Ditches (FW4) are present within and surrounding the perimeter of this habitat. Examples of where this habitat occurs along the alignment include Leiter, Lisagoan and Corvally.

6.4.4.2.17 Hedgerows (WL1)

157 Hedgerows form the main field and road boundaries throughout agricultural lands within the CMSA. Targeted surveys were carried out on those hedgerows and treelines that occur along the alignment where access was possible or good visual interpretation from a distance could be made. Other hedgerows were assessed using LiDAR imagery which allows a good interpretation of the structure of hedgerows and their likely value as wildlife habitat. The majority of the hedgerows that occur along the alignment are largely managed and intact. Drainage ditches often occur alongside hedgerows. Species that occur most commonly throughout the hedgerows include Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Elder (*Sambucus nigra*), Common Gorse (*Ulex europaeus*), Willow (*Salix* spp.) and Ash (*Fraxinus excelsior*) and typically attain heights of 2-5m (see Plate 8, **Appendix 6.7, Volume 3C Appendices** of the EIS). Larger more mature trees are also common with Ash being the most abundant although the following species were also recorded: Oak (*Quercus* spp.), Rowan (*Sorbus aucuparia*), Horse chestnut (*Aesculus hippocastanum*) and Sycamore (*Acer pseudoplatanus*). Where trees are mature they attain heights of up to 15m but generally their occurrence is scattered and patchy.

158 The understory typically includes species such as bramble (*Rubus fruticosus* agg.), Ivy (*Hedera helix*), Common Nettle (*Urtica dioica*), Cowslip (*Primula veris*), Ground Ivy (*Glechoma hederacea*), and Vetch species (*Vicia* spp.). The more robust examples have a higher diversity of woodland flora with a dense ground layer and often comprise Herb Robert (*Geranium robertianum*), Wood Sorrel (*Oxalis acetosella*), Lesser Celandine (*Ranunculus ficaria*) and Primrose (*Primula vulgaris*). A number of ferns may also be present including Male fern

(*Dryopteris filix-mas*), Hard Fern (*Blechnum spicant*), Hart's-tongue Fern (*Asplenium scolopendrium*) and other Fern species (*Dryopteris* spp.).

159 Non native shrubs including Fuchsia (*Fuchsia magellanica*) and Snowberry (*Symphoricarpos albus*) were also recorded amongst hedgerows. Good examples of hedgerow habitat were recorded at Corraneary (ED Enniskeen), Tullyglass, Annagh and Cornamucklagh North. For the purposes of this evaluation, hedgerows have been classified into two distinct types depending on their height and structure to enable a quantitative evaluation of potential impacts associated with the proposed development. Each hedgerow along the alignment has been classified into one of the following two types:

- Type A: Managed / low hedgerows typically dominated by hawthorn. These are generally less than 6m high and no significant tree trimming will be required.
- Type B: Overgrown / unmanaged hedgerows typically with immature or semi-mature trees (most commonly Ash). There may be isolated mature standard trees. These are generally less than 12m high and will typically require some lopping and / or trimming to facilitate adequate clearance beneath conductors.

160 In all, the alignment passes over 390 Type A hedgerows and 92 Type B hedgerows. Hedgerows occur within the proposed footprint of six towers throughout the length of the alignment. Hedgerows serve as important corridors for wildlife linking areas of semi-natural habitat within an agricultural landscape. Good examples of hedgerow habitat form well developed intact structures serving to provide suitable habitat for terrestrial mammals, bats and birds.

6.4.4.2.18 Treelines (WL2)

161 This habitat typically comprises lines of mature native and non-native trees which may include Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*), Birch (*Betula* spp.), Oak (*Quercus* spp.), Alder (*Alnus glutinosa*), Grey Willow (*Salix cinerea*), White Willow (*Salix alba*) and Rowan (*Sorbus aucuparia*). Mature trees along the alignment typically attain heights of up to 15-25m high. The majority of treelines comprise native species usually growing in association with hedgerows comprising hawthorn and bramble. Good examples of where this habitat occurs include Clonturkan, Collops, Corglass (ED Lisagoan) (refer to Plate 9, **Appendix 6.7, Volume 3C Appendices** of the EIS), Lisagoan, Drumhowan and Tullyglass.

162 The alignment traverses a total of 56 treelines, while treelines occur within the footprint of towers at two locations along the entire alignment. Treelines may provide valuable roost and foraging areas for bats. A number of badger setts were recorded along Ash treelines particularly at Cordoagh (ED Enniskeen), Drumhowan and Latnakelly. Treelines also function

as ecological corridors linking areas of semi-natural habitat within the intensively managed agricultural landscape.

6.4.4.2.19 Arable Crops (BC1)

163 This habitat is uncommon throughout the CMSA and is of low ecological value.

6.4.4.2.20 Stone Walls and Other Stone Work (BL1)

164 This habitat is associated with hedgerows in parts of the CMSA. This habitat will be retained and is considered under WL1 habitat in potential impacts.

6.4.4.2.21 Buildings and artificial surfaces (BL3)

165 The alignment crosses a number of tracks and roads along its length. The proposed route alignment avoids built structures and no demolition of buildings is necessary to facilitate the proposed development. Old and derelict buildings may provide important valuable roost sites for bats.

6.4.5 Fauna

6.4.5.1 Birds

166 The main findings of the bird surveys are summarised in this section under breeding and wintering birds. The focus is on bird species identified as being at potential risk from impacts associated with the development (Target species). Sensitivity to potential effects of the OHL development is based on the extensive desktop study conducted, consultation with relevant stakeholders and field studies. Sensitivity factors include one or more of the following – known collision risk (with transmission lines), risk of disturbance (during site clearance works), displacement (permanent outcome of development) and species distribution within the study area. EirGrid Guidelines (2012) detail vulnerability of bird species in Ireland to collision with electricity transmission lines and this has also informed the evaluation. This evaluation is detailed as appropriate for individual species detailed below.

167 Target species were identified as species sensitive to this type of development. They are species listed on Annex I of the EU Birds Directive (79/409/EEC)[17] and birds listed as being of high (Red listed) and medium (Amber listed) conservation concern (as identified by Colhoun

[17] The species listed in Annex I of the EU Birds Directive are those in danger of extinction, rare, vulnerable to specific changes in their habitat requiring particular attention for reasons of the specific nature of their habitat.

and Cummins (2013)). Also considered are common species which have been identified as relatively sensitive to potential collision impacts from this type of development (EirGrid, 2012).

6.4.5.1.1 Breeding Birds

168 A detailed survey of breeding birds in the CMSA has been undertaken to inform the ecological impact evaluation. This survey report is presented in **Appendix 6.5, Volume 3C Appendices** of the EIS. Key species of conservation significance identified are summarised below into potentially sensitive and relatively non sensitive, to potential impacts from the proposed development.

169 The species accounts presented below relate to those species of conservation concern that are considered to be sensitive to the OHL development as per rationale described in **Section 6.4.5.1**

6.4.5.1.1.1 Sensitive Species of Conservation Significance

170 **Lapwing** (Red Listed), a wader species of high conservation concern was probably breeding at one location only (Raferagh), which is located 200m away from the alignment in 2009 and 2010. No breeding pairs were noted in 2012, 2013, or 2014. The species is considered currently to be very scarce as a breeding species in the wider CMSA. This species is considered a moderately collision prone species.

171 **Curlew** (Red Listed), a species of high conservation concern, is a very rare breeding species in parts of the wider CMSA study area. No breeding pairs were recorded in 2012, 2013 or 2014. Habitat in the study area is considered generally unsuitable. A pair was noted in 2011 in the townland of Lemgare (c.a. 500m from the alignment) in less improved pasture which has since been reclaimed.

172 **Coot** (Amber Listed), is considered a highly collision prone species. In CMSA this species is a scarce breeding species in the CMSA in larger lakes. A pair was noted in 2012, 2013 and 2014 at Toom or Crinkill Lough in the townland of Crinkill, located approximately 500m east of Tower 146.

173 **Cormorant** (Amber Listed) frequents the larger rivers and lakes. Cormorants are regularly recorded at Lough Egish (located approximately 500m east of alignment at Tower 163) and other lakes throughout the CMSA though mainly non breeding individuals. This is considered a highly collision prone species. It is also a relatively mobile species which makes regular flights between foraging areas (lakes and rivers).

174 **Great Crested Grebe** (Amber Listed) is a widespread breeding species on medium to larger sized lakes within 2km of the proposed alignment within the CMSA. Most lakes have one breeding pair though more than this occurs in larger lakes (see below). In 2013 and 2014 at least one breeding pair of this species within 2km of the alignment were recorded at:

- Bocks Lough (located approximately 250m from the alignment);
- Lough Toome or Crinkill (located approximately 500m from the alignment);
- Lough Morne (located approximately 210m from the alignment);
- Lough Comertagh (located approximately 750m from the alignment);
- Lough Egish - 3+ pairs (located approximately 600m from the alignment);
- Lough Shantonagh - 2+ pairs (located approximately 1km from the alignment); and
- Lough Greaghlone (located approximately 1.25km from the alignment).

175 This species is considered a highly collision prone species. However this species is also considered to be at low risk from the proposed development as the line route is removed from breeding areas with the nearest confirmed breeding lakes being located approximately 250m from the alignment (see above). It is also a relatively sedentary species which does not follow regular flight paths.

176 **Little Grebe** (Amber Listed) is relatively scarce on smaller ponds and lakes in CMSA. In 2013 it was recorded breeding at two lakes within 1km of the alignment - Muff Lough and Corawaddy Lough. This species is considered a high collision prone species. However this species is considered to be at very low risk from the proposed development as it is relatively sedentary and occurs at very low numbers well removed from the development.

177 **Mute Swan** (Amber Listed). This species is a widespread breeding species on waterbodies from small ponds to large lakes throughout the CMSA. In CMSA this species breeds on a number of small lakes located between approximately 250m and 3km from the alignment. In particular locally significant numbers congregate on Lough Egish in winter and a minimum of three pairs usually breed at this site annually. In 2013 and 2014 breeding pairs of this species were also confirmed at lakes including Lough Morne, Lough Shantonagh, Toome or Crinkill Lough, Muff Lough (located approximately 250m from the alignment) and Lurgacham Lough (located approximately 1.1km from the alignment). Mill Lough (located approximately 700m from alignment) and Bellatrain Lough (located approximately 3km from the alignment) were probable breeding sites.

178 Mute Swan is considered a high collision prone species. In the CMSA they are considered to be at low risk from the proposed development as they are relatively sedentary and do not make regular flightlines at least during the breeding season. Flight diverters are proposed between Lough Egish and Lough Morne as precautionary mitigation for this species as flightlines occur in this area.

179 **Snipe** (Amber Listed). In the wider CMSA much suitable breeding habitat for Snipe occurs. No breeding pairs were recorded in 2014. This species was only recorded at Drumcarn ASSI and Milltown Lough during 2013 which are located away from the alignment. In the past Snipe has been recorded breeding at Raferagh Lough and at Cashel Bog also. It likely breeds at low densities in cutover bog and wetland habitats throughout CMSA. This species is considered a moderately collision prone species. Suitable habitat is largely avoided and this species is not considered sensitive to the proposed development.

180 **Teal** (Amber Listed). None were recorded in 2014. In 2013 this species was recorded once as possibly breeding on Lough Nahinch though none were noted in previous surveys. This species is considered a highly collision prone species. This species is not considered sensitive to the proposed development as it is a low flying species (typically below the height of proposed conductors) and the only possible breeding site (Lough Nahinch) is removed from the development.

181 **Tufted Duck** (Red Listed), is a highly collision prone species. In CMSA Tufted Duck (flock of 10) were recorded in early (11th) April 2014 on Lough Morne, located approximately 210m west of the alignment. No Tufted Duck were recorded here in later surveys and no evidence of breeding was determined on lakes in the vicinity of the development during all years of survey.

182 **Water Rail** (Amber Listed). This species is widespread in wetlands and overgrown drumlin hollows throughout the CMSA. This species is considered a moderately collision prone species. This cryptic species is not considered sensitive to the proposed development as it is a sedentary low flying species.

183 **Woodcock** (Red Listed) were not recorded as a breeding species within the CMSA. This species is a cryptic species active at night which likely breeds in scrub, overgrown wetland edges and forestry. This species is considered a moderately collision prone species. This skulking sedentary species is not considered sensitive to the development.

184 Common species which are moderately or highly vulnerable to collision are summarised below. Most of these species listed are associated with water bodies which will not be impacted by the proposed development, the exception being Pheasant which is bred for recreational hunting:

- Duck species and Moorhen;
- Grey Heron; and
- Pheasant.

6.4.5.1.1.2 Non Sensitive Species of Conservation Significance

185 **Barn Owl** (Red Listed) is a nocturnal bird of prey species which potentially breeds in the CMSA. This species typically breeds in old uninhabited buildings and outhouses though they may possibly use hollows in large old trees (Notice Nature, 2013). This species is very rare in the study area (Balmer et al., 2013). None were recorded during surveys in the CMSA and impacts to typical nesting areas are avoided. No significant potential nest sites (old trees with large cavities) were determined at any roadside crossings or lands accessed. The likely absence of breeding sites in proximity to the alignment coupled with the relatively rare occurrence of the species throughout the CMSA suggests that collision risk would be negligible.

186 **Kingfisher** (Annex I EU Birds Directive and Amber Listed) is associated with river, riparian habitats and lakes in the overall CMSA though none were recorded during surveys. This is not a collision prone species but is sensitive to disturbance of breeding habitat where the alignment crosses potential breeding areas (rivers and associated riparian areas).

187 The following passerine species of high conservation concern were recorded, all of which are considered to have low susceptibility to collision with powerlines (EirGrid, 2012); Meadow Pipit and Grey Wagtail. Meadow Pipit was recorded throughout suitable habitat along the alignment (semi-improved pasture and cutover bog). Grey Wagtail was recorded along watercourses and associated riparian habitat.

188 The following passerine species of moderate conservation concern were recorded, all of which are considered to have low susceptibility to collision with powerlines (EirGrid, 2012); House Sparrow, Kestrel, Skylark, Linnet, Sand Martin, Starling, Swallow, House Martin and Swift. Some woody vegetation nesting species may be susceptible to disturbance during woody vegetation clearance prior to construction.

6.4.5.1.2 Wintering Birds

189 Detailed multi-annual surveys have been conducted of wintering birds in particular Whooper Swans to inform the ecological impact assessment. The most recent survey report (2013 / 2014) includes a consideration of all previous surveys and is presented in **Appendix 6.6, Volume 3C Appendices** of the EIS.

190 The key findings of this study, in relation to sites and inter year usage by Whooper Swan is detailed in Figure 6.3.1, **Volume 3C Figures** of the EIS. Identified and probable flightlines based on surveys conducted are detailed in Figure 6.3.2, **Volume 3C Figures** of the EIS.

191 A summary of the key findings of the annual winter survey from 2007 / 2008 to 2013 / 2014are detailed below.

6.4.5.1.2.1 Whooper Swans (Annex 1 EU Birds Directive)

192 Whooper Swans were highlighted in the An Bord Pleanála (the Board) scoping opinion and also during consultation with BWI and NPWS, as extensively using the CMSA, in numbers that can exceed nationally significant levels (greater than 150 birds (Boland et al., 2010). This species is considered highly susceptible to collision with powerlines. In this regard it was identified as a key target species for consideration regarding potential effects of the proposed development. Given that collision risk was identified as an issue for this key target species; a more species specific method of impact assessment was utilised (see **Tables 6.5** and **6.6**). This approach differs from the procedure implemented for all other identified potential impacts on ecological receptors including other identified impacts to Whooper Swans (e.g. displacement and disturbance).

193 Over a period of seven years, surveys for Whooper Swan and other wintering birds were undertaken monthly during the period of October to April. 56 No. sites have been identified in the CMSA as being utilised by Whooper Swan during the study (desk and field survey) and historically. Three of these sites are historical records only i.e. despite being regularly surveyed during the current study, no Whooper Swans were recorded. These sites include Lough Major, Lough Sillan, and Bawn Lakes. It should be noted that the wider study area has been subject to continual winter surveys (2010 – 2014 inclusive) as highlighted in Figure 6.3.1, **Volume 3C Figures** of the EIS.

194 During the course of surveys, no individual site within the wider CMSA study area exceeded nationally significant levels. The most regularly utilised and important site close to the alignment is Lough Namachree with maximum counts of 65 swans (approximately 0.5% national population). Other sites of county importance identified during the study include Lough Creeve and fields at Ballintra. Key wintering Whooper Swans and other wintering bird sites have been avoided by the proposed development, refer to **Table 6.11**. No Whooper Swans have been noted during surveys to date on Lough Major which has held nationally significant numbers in the past (Source: NPWS).

195 A summary of the most important individual Whooper Swan sites identified based on average values for the survey period are summarised in **Figure 6.1**.

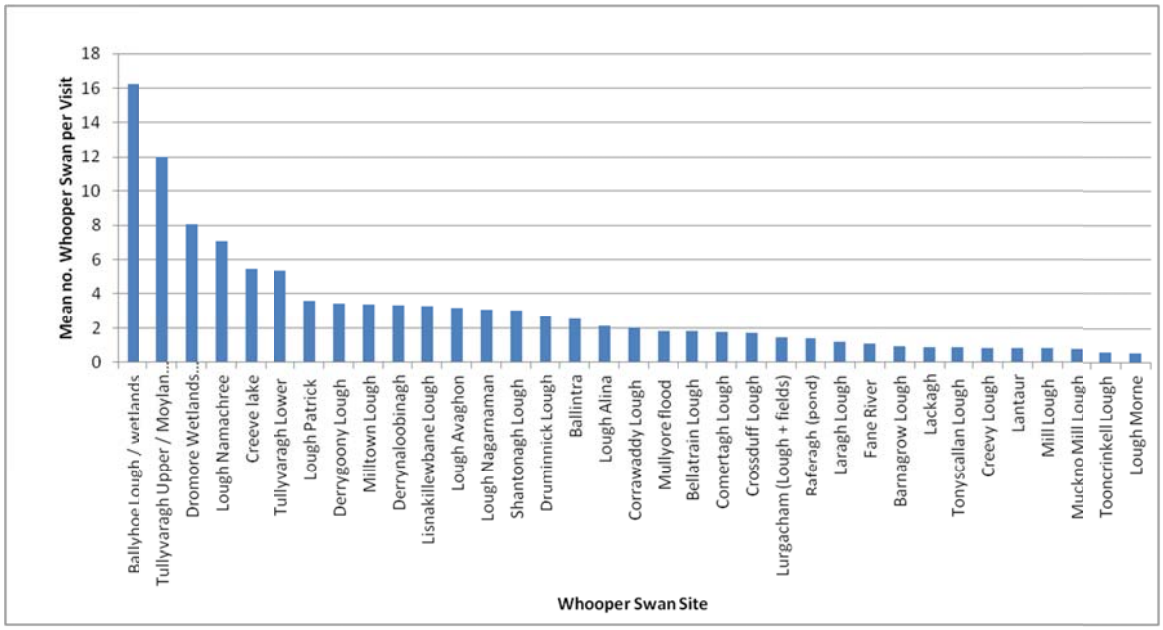

Figure 6.1: Key sites are ranked based on highest to lowest average bird counts during surveys.

196 The most important sites in the study area including Ballyhoe Lough /Wetlands (>10km), Tullyvaragh Upper/ Moylan (>10km) and Dromore wetlands (>3.8km) are well removed from the proposed development. The alignment is located to the east of 3 important linear wetland areas where Whooper Swan concentrate including the Dromore River Valley, a cluster of lakes west of Lough Morne, and Knappagh River (and associated lakes).

197 The key findings of the study, as presented in **Appendix 6.6, Volume 3C Appendices** of the EIS, include:

- At Ballintra a regular flightline was confirmed in the first four winters of the study (between 2007 and 2011) and again in 2014. Ballintra consists of a feeding area which swans fly to during the day. They roost at two small lakes (Loughs Tonyscallan and Toome (or Crinkill)) which are located approximately 1.5 and 2km east and east south-east of Ballintra respectively. This flightline crosses the proposed alignment as shown in Figure 6.3.2, **Volume 3C Figures** of the EIS. In winters 2011 - 2013 inclusive no Whooper Swan activity was recorded in this area.

- Based on observed number changes, an irregular flight line exists across the alignment in the Comertagh, Corvally, Greaghlone, Mill Lough, and Raferagh Pond area as Whooper Swan move throughout the winter between this cluster of lake sites.

- Similarly, based on observed number changes, an irregular flight line exists across the alignment between Lough Egish and Lough Morne and lakes to the west.

- In 2013 / 2014 three new sites were determined relatively close to the alignment including Corvally (650m) and Greaghlone Loughs (1.25km) – see above. A small number (3) of Whooper Swans were additionally recorded at Corawaddy Lough (750m).

198 The following sites close to the proposed development (within 2km) were regularly surveyed and no Whooper Swan activity was noted in the vicinity of the proposed development. The key observations are summarised as follows:

- Lough Nahinch and environs. The entire northern section of the alignment including several small lakes such as Tassan, White and Nahinch were regularly surveyed. This area is not important for Whooper Swan and numbers which occur are very sporadic and low. No flightlines were observed.

- Cremartin Lough. The area east of Cremartin Lough (Lackagh) was visited in the early years of survey. No flightline was observed relative to the proposed development. Flightlines observed were at least 2km east of here.

- Bocks Lough: Whooper Swans disperse between Loughs Namachree, Shantonagh, Bellatrain and Lisnakillewbane throughout the winter period. Flightlines (observed and likely unobserved) in this area do not regularly cross the preferred line route, as sites utilised all occur to the west of the development.

- The area south of Lough Greaghlone to the MSA northern boundary does not hold significant concentrations of Whooper Swan. Despite regular drive round and aerial surveys no significant concentrations of Whooper Swans were observed.

- No records of Whooper Swan were determined for other numerous lakes (Loughs) and ponds despite regular survey. These include the following lough's within 2km of the preferred line route, (from north to south); Tassan, White, Black, Cornamucklagh, Letterbane, Ghost, Drumgristin, Coogans, Cordoo, Corfin, Boraghy, unnamed ponds Corvalley townland and Muff.

6.4.5.1.2.2 Other Wintering Bird Species

199 Flocks of Golden Plover and Lapwing (maximum count 260 Golden Plover and 140 Lapwing) are regular during specific periods (late spring and early autumn) around Lough Egish. These are birds on migration and do not stay for extended periods throughout the winter but use this area for foraging and resting before migrating further. No flightline was observed of these species crossing the alignment.

200 Mute Swan uses most lake sites in the CMSA. A key area identified where there may be potential impacts is between Lough Egish and Lough Morne as non-breeding individual numbers can build up on these lakes in some years, and unrecorded flightlines occur between these lakes which are bisected by the alignment.

201 Relatively large numbers of cormorant, winter at times on Lough Egish (maximum count of 40 in 2009).

202 Most other lakes, besides those highlighted for Whooper Swans, are typically utilised by low densities of Mute Swan and Great Crested Grebe and are unlikely to be measurably affected by the proposed development.

203 As part of the assessment, SPAs in the wider area were considered, refer to the NIS in **Volume 5** of the application documentation.

204 Strabannan-Braganstown SPA (Site Code 004091) is the closest SPA at 21km from the proposed development. This site has been designated for wintering Greylag Goose (*Anser anser*) though Whooper Swans also use this site. Greylag Geese are very irregular wintering birds in the CMSA to date with only one individual noted (in 2014). In this regard it is concluded that the conservation interest of the SPA will not be affected.

205 Lough Oughter and Associated Loughs SPA (Site Code: 004049) is located approximately 32km from the proposed development and has been designated for species common to the study area including Great Crested Grebe and Whooper Swans. There is the possibility that individual Whooper Swans may move occasionally between these areas given their mobile nature though numbers are likely to be extremely low. No evidence of possible linkage e.g. bird tags was identified during bird surveys. Great Crested Grebe breeding populations at this European site are suitably removed from the proposed development by a very extensive buffer zone and this species is relatively sedentary minimising collision risks.

206 It is considered that no significant impacts will arise to qualifying interest bird species in SPA sites including the closest i.e. Strabannan Braganstown SPA, Dundalk SPA and Lough Oughter and associated loughs SPA.

6.4.5.1.2.3 Summary Birds Evaluation

207 A summary evaluation of the key bird species determined and key areas are detailed in **Table 6.11**. For sites with flightlines refer to Figure 6.3.2, **Volume 3C Figures** of the EIS.

Table 6.11: A Summary and Evaluation of Key Bird Areas and Species within the CMSA

Key Bird Species to consider	Key Areas and Evaluation	Description of Location / Flightlines
Whooper Swan	Ballintra area, Lough Tonyscallon and Toome or Crinkill Lough. County Importance.	Sites detailed are avoided (located > 600m from the alignment). Ballintra (core feeding area and other fields) are located between 300 and 600m from the alignment). Whooper Swan flightline confirmed as relevant to the development.
Whooper Swan	Loughs Comertagh, Corvally, Greaghlone, Raferagh and Mill Lough. County Importance.	Loughs detailed are avoided. No flights observed to date despite extensive multi-year survey which confirmed flights are highly irregular. However changes in numbers indicate occasional movement between these lakes and hence a Whooper Swan flightline is confirmed as relevant to the development.
Great Crested Grebe	Various – Bocks Lough and Lough Morne are closest breeding sites. Local Importance (Higher value).	Loughs detailed are avoided.
Mute Swan, Cormorant, Great Crested Grebe, Tufted Duck, Whooper Swan	Lough Egish and Lough Morne. County Importance.	Loughs detailed are avoided. Mute Swan flightline confirmed as relevant to project. Very irregular Whooper Swan flightline occur at least in some years.
Common collision prone species: Grey Heron, Common duck species	Throughout study area concentrated at rivers and hedgerow crossings. Local Importance (Lower value).	Some features traversed by the alignment may support small populations of these species.

6.4.5.2 Mammals

208 Mammal surveys were undertaken in areas where potentially suitable habitat (hedgerows, scrub and treelines) occurred at proposed tower locations.

209 Based on a review of the National Biodiversity Data Centre (NBDC) and field survey findings, the following protected mammals utilise the CMSA and require consideration regarding potential impacts; badger (*Meles meles*), otter *(Lutra lutra),* Irish Hare (*Lepus timidus hiberinicus)* and bat species. Those mammal species of conservation interest previously recorded (NBDC 2013) within the 10km grid squares of the alignment are listed in **Table 6.12**.

Table 6.12: Protected Mammals Occurring in the CMSA and Legal Status

Common Name	Latin Name	Protected Status
Irish Hare	*Lepus timidus subsp. hibernicus*	Habitats Directive Annex V; Wildlife (Amendment) Act 2000
European Otter	*Lutra lutra*	Annex II of EU Habitats Directive Annex IV of Habitats Directive Wildlife (Amendment) Act 2000
Eurasian Badger	*Meles meles*	Wildlife (Amendment) Act 2000
Pine Marten	*Martes martes*	Annex V of Habitats Directive Wildlife (Amendment) Act 2000
Red Squirrel	*Sciurus vulgaris*	Wildlife (Amendment) Act 2000
Myotis Bat species	*Myotis*	Annex IV of Habitats Directive Wildlife (Amendment) Act 2000
Daubenton's Bat	*Myotis daubentonii*	Annex IV of Habitats Directive Wildlife (Amendment) Act 2000
Natterer's Bat	*Myotis nattereri*	Annex IV of Habitats Directive Wildlife (Amendment) Act 2000
Leislers Bat	*Nyctalus leisleri*	Annex IV of Habitats Directive Wildlife (Amendment) Act 2000
Pipistrelle Bat species	*Pipistrellus*	Annex IV of Habitats Directive Wildlife (Amendment) Act 2000
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	Annex IV of Habitats Directive Wildlife (Amendment) Act 2000
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Annex IV of Habitats Directive Wildlife (Amendment) Act 2000
Brown Long-eared Bat	*Plecotus auritus*	Annex IV of Habitats Directive Wildlife (Amendment) Act 2000

(Source: National Biodiversity Data Centre (NBDC) 2013)

210 The findings of surveys for these species listed are summarised below.

6.4.5.2.1 Bats

211 All Irish bat species and their breeding and resting places are afforded protection under the *Wildlife Act 1976* (as amended 2000) and the *Habitats Directive 1992* (Annex IV). Of those species detected during activity surveys, Leisler's Bat is the only species considered 'near threatened' in the published *Red List* of terrestrial mammals, the remaining species are considered 'least concerned' (Marnell *et al.* 2009).

212 No potential significant roost sites for bat species; (such as old ruined buildings, bridges, and uninhabited buildings) were recorded within proposed work areas although they are likely to be relatively common in the wider study area. Potential suitable tree roost sites are very scarce in the study area. In addition all known bat roosts (provided by NPWS and Biodiversity Ireland) are avoided.

213 The CMSA contains a large network of hedgerow, with scattered trees and woodland habitats which provide abundant foraging habitat and commuting routes for bat species throughout the area. River corridors, lakes, ponds and wetlands also provide foraging potential.

214 Bat activity surveys confirmed abundant bat foraging activity along mature hedgerows, rivers and linear woodland throughout the alignment. Bat species recorded included foraging and commuting Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Leisler (*Nyctalus leisleri*), Brown Long-eared (*Plecotus auritus*), Natterer's (*Myotis* nattereri) and Daubenton's (Myotis daubentonii).

215 In summary, bats have been recorded foraging amongst suitable habitat (hedgerows, woodlands and river corridors) throughout the study area. No bat roosts have been recorded, and all those potentially nationally important roosts (such as old buildings and bridges) are avoided. Mature trees that could potentially provide roost sites occur along treelines and wooded areas that have been identified within the alignment as shown in habitats maps presented in Figures 6.2.1 - 6.2.19, **Volume 3C Figures** of the EIS.

6.4.5.2.2 Otter

216 No breeding sites or signs of otter were determined during field surveys. Otters are likely to be widespread, though scarce, in the CMSA with distribution focussed around larger lakes such as Lough Egish (located approximately 500m from the alignment) and along some of the more significant watercourses. A national survey undertaken in 2004 / 2005 did not cover any of the 10km squares that occur within the CMSA study area (Bailey and Rochford 2006). During this national survey, the authors found that, in Ireland, otters are mostly associated with watercourses that exceed 2m channel width. Similar findings were reported from a survey in Northern Ireland (Preston 2004). Most watercourses within the CMSA are first or second order

streams and therefore very few exceed 2m in width. In all, nine watercourses have been identified that may provide suitable habitat for otter and all of these are removed (> 20m) from proposed tower locations and works areas. Therefore there is an absence of suitable otter habitat (watercourses and associated semi-natural habitat) in proximity to tower locations throughout the alignment (see Habitat Maps in Figures 6.2.1 - 6.2.19, **Volume 3C Figures** of the EIS).

217 Given the likely time delay between planning and construction of the proposed development, it is proposed to undertake a pre-construction survey amongst suitable habitat within the corridor of the alignment, in order to confirm the conclusions set out in this EIS.

218 Otter are afforded protection in Ireland under the *Wildlife Act (Amendment) 2000* and the EU Habitats Directive (Annex II and Annex IV). Otter are also listed as 'near threatened' in the published *Red List* of terrestrial mammals (Marnell *et al*. 2009).

219 In summary, although not recorded during the current study, it is likely that otter occur along the main watercourses within the study area. The current study confirmed that there is an absence of suitable otter habitat in proximity to tower locations.

6.4.5.2.3 Badger

220 Field surveys confirmed the presence of badger at a number of locations along the alignment. Badger signs (including hair) were noted along hedgerows and tree lines at Cordoagh (ED Enniskeen), Drumhowan, Tassan, Latnakelly and Lemgare. In all, six setts were identified during field surveys, one of which was an active main sett. Five of these sett locations are located no closer than 50m from the nearest tower location. A single sett, is located approximately 25m from a proposed tower location (Tower 151). A summary of badger activity recorded during field surveys is presented in **Table 6.13**. The exact locations of badger setts are described but not mapped in order to prevent disturbance of this protected species, or damage to their setts.

221 Data received from the Department of Agriculture, Food and Marine (DAFM) also indicates a relatively high number of breeding sites in the general study area, particularly towards the northern part of the alignment. It has been confirmed that all of these sites are removed from tower locations.

222 Badgers occur throughout most of the Irish countryside being well suited to woodland and farmland mosaics (Hayden and Harrington 2000). The most frequent location of badger setts is within or close to hedgerows and treelines, as these provide cover and safety from disturbance from agricultural and other activities. Setts are also frequently located in areas of deciduous

woodland and scrub and do not typically occur in wet soils (Hayden and Harrington 2000) as are frequent in the low lying areas of the study area.

223 Tower locations have been predominantly located in areas of improved pasture, and their locations have been selected to avoid habitats that are typically associated with badger setts.

Table 6.13: Badger Activity Recorded during Field Surveys within the CMSA

Location	Signs of Badger Activity Recorded
Line oversail between Towers 227 and 228 at Cordoagh (ED Enniskeen)	Single sett entrance recorded along an Ash treeline with fresh earthen spoil (active). Black and white hairs confirm the presence of badger at this location. Other evidence of digging (including latrines) was recorded along hedgerows and scrub in the surroundings.
Oversail between Towers 150 and 151 at Drumhowan (North, approximately 25m from Tower 151)	Four badger sett entrances were recorded in an area of clear felled broadleaved woodland. Three of the sett entrances appear to be inactive based on recolonising vegetation recorded at sett entrances. One sett entrance was likely to be active at the time of survey (February 2015) with fresh earthen spoil. There was no bedding material around the sett entrance. The nearest sett entrance (in-active during Febreuary 2015) is located approximately 25m north of Tower 151. The three other entrances are all located further to the north. Based on level of use recorded during the survey, it is concluded that the sett is likely to be a subsidiary sett.
Oversail between Towers 142 and 143 at Terrygreeghan	Five active badger sett entrances with fresh spoil have been recorded south of a public road. This is likely to be a subsidiary sett.
South (approximately 60m) of Tower 115 at Tassan	Outlier sett with single entrance recorded along an intact hawthorn hedgerow with fresh earthen spoil. Prints were observed at sett entrance. Sett is considered to be active.
Oversail between Tower 113 and 114 at Latnakelly	Main sett with 26 badger entrances recorded at Latnakelly. Eighteen of the sett entrances were found to be active while eight of the entrances were found to be inactive. Large fresh earthen spoil, badger prints and badger hairs were confirmed at sett entrances. Sett is considered to be active.
Oversail between Towers 105 and 106 at Lemgare	Single sett entrance with large heaps of earthen spoil recorded along intact hawthorn hedgerow. An abundance of leaf litter, recolonising vegetation and bramble occurs at this entrance. Considered to be an inactive outlier sett.

224 Given the likely timescale between planning and construction of the project, it is proposed to undertake a pre-construction survey amongst potentially suitable habitat in proximity to tower locations to identify and record any active badger setts, in order to confirm the conclusions reached in this EIS.

225 In summary, badgers have been confirmed as occurring within suitable habitat within the study area. Where possible, tower locations have been selected with the aim of avoiding potentially suitable badger habitat by locating them away from hedgerows and other wooded habitat. Badgers and their setts are strictly protected under the *Wildlife (amendment) Act 2000*.

6.4.5.2.4 Other Protected Mammals

226 Other protected mammals noted included Irish Hare (*Lepus timidus hibernicus*). This species was noted on several occasions amongst grassland and field boundary areas along the alignment. Irish Hare are relatively common in a wide range of habitats including semi-improved grassland, improved grassland, upland habitats and bogs.

227 The Irish Hare is a quarry species (may be hunted under licence) and has limited protection under domestic legislation. It is listed as a species of 'least concern' in the published *Red List* of terrestrial mammals (Marnell *et al*. 2009). It is also listed under Annex V of the Habitats Directive as a species which may be exploited but not to the extent that it's favourable conservation status is compromised (Hayden and Harrington 2000).

228 No other protected mammal species were noted. Other protected species which may occur include Red Squirrel (*Sciurus vulgaris*). The Red Squirrel occupies a variety of woodland types across much of Ireland. It has now become largely absent in the CMSA as Grey Squirrel are now common. Grey Squirrel tends to displace Red Squirrel in farmland (lowland habitats).

6.4.5.2.5 Other Mammals

229 Other common mammal species present include: Grey Squirrel (*Sciurus carolinensis*), Rabbit (*Oryctolagus cuniculus*), Fox (*Vulpes vulpes*), Irish Stoat (*Mustela erminea*), Wood Mouse (*Apodemus sylvatica*), Pygmy Shrew (*Sorex minutus*), Hedgehog (*Erinaceus europaeus*) and Brown Rat (*Rattus norvegicus*). All of the aforementioned mammals may use the study area for hunting and / or foraging (Hayden and Harrington 2000).

6.4.5.3 Fisheries and Aquatic Species

230 The CMSA is located within parts of the North Western and the Eastern River Basin Districts.

231 The main catchments include the River Dee, River Glyde, River Annalee (Erne Catchment), River Fane and the Clontibret River (for further details, refer to **Chapter 8** of this volume of the EIS). The main watercourses and drainage ditches that occur along the alignment are shown in the Habitat Maps presented in Figures 6.2.1 - 6.2.19, **Volume 3C Figures** of the EIS. There are no major rivers crossed by the alignment (3rd order river or above based on EPA rivers dataset).

232 The watercourses within the CMSA are significant fishery areas holding Salmon and Trout stocks while the majority of the tributaries contain salmonid spawning and nursery habitats. The water quality in watercourses and lakes within the CMSA as reported by the EPA is reviewed in detail in **Chapter 8** of this volume of the EIS. In summary, most rivers along the alignment are

suffering from water quality problems, principally eutrophication from suspected agriculture sources and Waste Water Treatment Plants (WWTP). Those rivers that retain good water quality (Q value of 4 - 5) such as the River Glyde and River Dee would be expected to support salmonid populations.

233 Other protected aquatic species which may occur in rivers crossed by the alignment include White-clawed Crayfish (*Austropotamobius pallipes*) (Reynolds *et al.* 2010) and Lamprey species in particular *Lampetra fluviatilis* (NPWS 2013) both of which are listed on Annex II of the EU Habitats Directive.

234 Freshwater Pearl Mussel (*Margaritifera margaritifera*) has been previously recorded (pre-1970 live populations) from the Annalee Catchment, however they have not been confirmed from the catchment in recent years (NPWS Map of Margaritifera Sensitive Areas, 2013). More recent records are confirmed from the Larah Catchment, which is a sub-catchment of the Annalee which is hydrologically disconnected from the alignment (NPWS Map of Margaritifera Sensitive Areas, 2013).

235 The lakes that occur throughout the wider CMSA contain stocks of coarse fish and are extensively used as recreational angling sites. The design of the proposed development has taken account of all known watercourses and waterbodies within the CMSA. All towers are removed from known watercourses and associated riparian habitats.

236 In summary, the rivers and streams that occur within the CMSA are of high importance due to the presence of sensitive aquatic species including salmonids. These species would be sensitive to any deterioration in water quality. While towers are removed from natural watercourses, there would be linkages via field drains that may occur in proximity to tower locations.

6.4.5.4 Other Fauna

237 Frogs were recorded in wet habitat and are likely to be associated with any wetland areas in proximity to the alignment. Smooth Newt is also likely to occur in ponds and other wetland habitats in proximity to the proposed development. These areas are largely avoided.

238 There are a number of important sites for aquatic invertebrates that have been identified in recent years following surveys of suitable wetland habitats (Woodrow Sustainable Solutions 2008; 2009), some of which have been included in **Table 6.8**. These areas are sufficiently removed from the proposed development to avoid any potential impacts.

239 Marsh Fritillary has been recorded from Drumcarn Fen (the part of Drumgallan Bog that occurs in Northern Ireland). This site is also sufficiently removed to avoid any potential impacts (see **Table 6.7**).

240 The avoidance of features such as wetlands, species rich grassland, and to a large degree wooded habitats should ensure that other less common invertebrate species that may be associated with these habitats will not be impacted by the proposed development.

6.4.6 Invasive Alien Species

241 The spread of alien species (both flora and fauna) is recognised as a major threat to biodiversity in Ireland (Stokes *et al.* 2006). The only terrestrial invasive alien plant species recorded was Japanese Knotweed (*Fallopia japonica*). The species was regularly recorded growing in dense stands along the public road network and at the edge of lakes in the wider study area. The species was not recorded during field surveys conducted along the alignment (walkover or visual surveys).

242 Aquatic and riparian habitats crossed by the alignment have the greatest potential to support invasive species and facilitate their dispersal. Works associated with the construction of towers avoid these areas.

6.4.7 Key Ecological Receptors

243 Following a review of the receiving environment (as presented above), it is possible to determine key ecological receptors requiring consideration regarding potential impacts and mitigation. These include specific sites that have been evaluated as being of high local importance or greater (according to site evaluation scheme outlined in NRA 2009b) and other ecological features deemed to be of conservation concern (such as particular habitats types, bird species or mammal species) that could potentially be impacted by the proposed development. Details of the key ecological receptors within the study area are presented in **Table 6.14**. Cowslip is noted in **Section 6.4.3** as a widespread species within the study area. It is not protected within Ireland and it is not considered a key ecological receptor.

Table 6.14: Summary Evaluation of Key Ecological Receptors and Locations within the CMSA

Site / Feature	Evaluation	Brief Description of Ecological Receptor	Relevant Location
Designated Conservation Areas			
Lough Egish pNHA	National	No potential for impacts to habitats as site avoided by alignment. The site was very irregularly used by Whooper Swans during the winter bird studies. Mute Swan and Cormorant potentially fly between lakes in this area.	600m east of Towers 161-163
Non-designated Ecological Sites (listed as they occur along alignment from South to North)			
Cordoagh Scrub	Local Importance (Higher Value)	Area of scrub and Ash treelines. Confirmed active outlier badger sett (single sett entrance) at this location.	Line oversails site between Towers 227 and 228. Badger sett occurs 60m north of alignment at this location.
Corglass Stream	Local Importance (Higher Value)	The site comprises a mature Ash treeline with occasional Hazel along a stream. Potential habitat for badger.	Line oversails site between Towers 221 and 222 at boundary between Collops and Corglass (ED Lisagoan) townlands.
Lisagoan Stream	Local Importance (Higher Value)	Mature treeline comprises mixed native tree stands including Ash, Hazel and Willow along a stream. Potential habitat for badger.	Line oversails site between Towers 213 and 214 at Lisagoan.
Corlea Bog	National	Cutover bog with secondary fen communities.	Line oversails wetland site between Towers 206 and 207.
Cornalaragh Marsh	Unknown (unsurveyed)	Interdrumlin marsh area with tree cover (wet Willow-Alder-Ash woodland).	Line oversails wetland site between Towers 201 and 202 at Doagh and Cornalaragh townland boundary.
Comertagh and Raferagh Loughs	County	Whooper Swans recorded regularly at these lakes. Whooper Swans irregularly fly between small lakes in this area.	In proximity to alignment between Towers 197 and 200.
*Ardragh Wetland	Local Importance (Higher Value)	Mosaic of wetland habitats comprising mostly marsh. Considering characteristics of proposed works together with the sensitivity of this site, it is concluded that potential impacts are not foreseen and therefore the site is not considered further in this assessment.	The line oversails this wetland site between Towers 187 and 188 at Sreenty and Ardragh.
Tullyglass Pond	Local Importance (Higher Value)	The site comprises a small eutrophic pond surrounded by wet and improved grassland. The site may be of value to water birds. Considering characteristics of proposed works together with the sensitivity of this site, it is concluded that potential impacts are not	The line oversails this small wetland pond between Towers 172 and 173 at Tullyglass.

Site / Feature	Evaluation	Brief Description of Ecological Receptor	Relevant Location
		foreseen and therefore the site is not considered further in this assessment.	
*Tullyglass Woodland	Local Importance (Higher Value)	Woodland comprises mixed woodland dominated by Birch (National Survey of Native Woodlands (NSNW Site Code: 860). (Perrin *et al.* 2008). Considering characteristics of proposed works together with the sensitivity of this site, it is concluded that potential impacts are not foreseen and therefore the site is not considered further in this assessment.	Line oversails the site between Towers 171 and 172 at Tullyglass.
Tullynahinnera Bog	Unknown (unsurveyed)	Wetland site comprises area of cutover bog and wet grassland (Monaghan Wetland Map, 2010).	The line oversails some minor habitats of the main wetland site between Towers 158 and 159 at Brackly.
Greagh Marsh	Local Importance (Higher Value)	Wetland site comprises marsh and possible transition mire. Potential wetland value.	The line oversails this small wetland pond between Towers 156 and 157 at Greagh.
Drumhowan	Local Importance (Higher Value)	Site comprises clear felled woodland surrounded by mature Ash treelines. Badger sett confirmed at this location.	Tower 151 is located just south (approximately 25m from) of this disturbed site.
Clogher Marsh	Local Importance (Higher Value)	Wetland site comprises marsh and wet Willow-Alder-Ash woodland.	The line oversails the site between Towers 144 and 146.
Ballintra	County	Whooper Swan foraging sites. Swans were recorded flying across the alignment between this area and both Tonyscallan Lake and Crinkill Lough to the East.	Located 500m west of Tower 143
Terrygreeghan Marsh	Local Importance (Higher Value)	Marsh with abundance of wetland vegetation including Meadowsweet (*Filipendula ulmaria*), Water Horsetail (*Equisetum fluviatile*), Common Reedmace (*Typha latifolia*), Yellow Flag-iris (*Iris Pseudacorus*) and Reed Canary Grass (*Phalarus arundinacea*). To north of marsh is an active badger sett associated with area of scrub and linear woodland.	The line oversails the site between Towers 142 and 143.
Cornanure Marsh	Local Importance (Higher Value)	Site comprises an area of marsh / fen. Potential presence of Annex I habitats (EU Habitats Directive).	The line oversails the site between Towers 138 and 139 at Cornanure (Monaghan By). Tower 138 occurs approximately 15m to the north of this site.
Caraghramer Marsh	Local Importance (Higher Value)	Site comprises separate areas comprising marsh and broadleaved woodland. Confirmed habitat for badger. Potential presence of	The line oversails the site between Towers 135 and 136 at Caraghramer and Cornanure (Monaghan

Site / Feature	Evaluation	Brief Description of Ecological Receptor	Relevant Location
		Annex I habitats (EU Habitats Directive).	By).
*Drumroosk Marsh	Unknown (unsurveyed)	Wetland site likely to comprise comprises marsh / fen. Potential presence of Annex I habitats (EU Habitats Directive). Considering characteristics of proposed works together with the sensitivity of this site, it is concluded that potential impacts are not foreseen and therefore the site is not considered further in this assessment.	The site occurs (approximately 40m) west of the preferred alignment at Tower 134 Drumroosk.
Clarderry Bog	County importance	Extensive area of cutover bog. Western side comprises good quality fen habitat regenerating in cut over bog area (surveyed by Foss and Crushell 2012).	Line oversails the south-eastern boundary of this wetland site between Towers 127 and 128 at Clarderry.
*Lough Nahinch (includes Cashel Bog)	National Importance	This large site contains a complex of habitats including three lakes, extensive area of poor fen, regenerating bog, scrub, wet woodland and mixed broadleaf woodland. (surveyed by Foss and Crushell 2008). It has been confirmed that there is no requirement for trimming of vegetation within the site. Considering the characteristics of proposed works together with the sensitivity of this site, it is concluded that potential impacts are not foreseen and therefore the site is not considered further in this assessment.	Line oversails the very southern margin of this wetland site between Towers 117 and 118.
Tassan Grassland	National Importance	Excellent example of neutral to acid grassland with abundant orchids (surveyed by Foss and Crushell 2011).	Line oversails this grassland site between Towers 117 and 118.
Farmland at Latnakelly	Local Importance (Higher Value)	Ash treeline with active main badger sett.	Line oversails this site. Tower 113 has been sited to avoid the area.
Annaglogh grassland and scrub	Local Importance (Higher Value)	Calcareous and neutral grassland in association with extensive area of scrub to the north.	Tower 111 is located within this site. The line oversails the remaining part of the site from 110 and 111.
*Lemgare Rocks	Local Importance (Higher Value)	Site comprises an area of scrub in association with rock outcrop. Potential habitat for badger. Considering characteristics of proposed works together with the sensitivity of this site, it is concluded that potential impacts are not foreseen and therefore the site is not considered further in this assessment.	Line oversails the site between Towers 107 and 108 at Lemgare.

Site / Feature	Evaluation	Brief Description of Ecological Receptor	Relevant Location
Habitats			
Hedgerows / Treelines	Cumulatively the network of these habitats is of high value to wildlife by providing ecological corridors (Article 10 Habitats Directive).	Three types of hedgerow / treeline have been identified as occurring along the alignment ranging from low managed hedgerows to continuous mature treelines as described in **Section 6.4.2**.	Mostly avoided by tower locations being sited in low managed hedgerows. Alignment oversails hedgerows and treelines throughout the length of the alignment.
Watercourses	Local Importance (Higher Value)	Watercourses that occur within the study area are mostly small and comprise channels that have been modified in the past with narrow fringing habitats. Important habitat for aquatic species of conservation concern (Salmonids; Lamprey and White-clawed Crayfish). Provide a suitable habitat for otter, a species listed on Annex I of EU Habitats Directive.	Towers are located in areas removed from watercourses. The alignment oversails a number of rivers and streams.
Protected Species			
Whooper Swan	Annex I EU Birds Directive	Whooper Swans are dispersed throughout the wider study area during the winter season. Key wintering sites for Whooper Swans and other wintering birds have been avoided by the proposed development (see **Section 6.4.5** for further details).	Ballintra area; Lough Tonyscallon and Toome (or Crinkill) Lough; Loughs Comertagh, Corvally, Greaghlone, Raferagh, and Mill Lough.
Badger	*Wildlife (amendment) Act 2000*	Breeding sites (setts) usually occur along base of hedgerows / treelines or amongst scrub or woodland habitat.	A number of setts have been recorded amongst hedgerow habitat in proximity to the alignment. Likely to occur amongst suitable habitat. Towers have been positioned away from suitable breeding habitat.
Otter	Annex II of Habitats Directive Annex IV of Habitats Directive	Likely to occur along major watercourses within the wider study area although no records during field surveys.	Areas mapped as FW2 and adjoining semi-natural habitats as shown on Habitat Maps (Figures 6.2.1 - 6.2.19**, Volume 3C Figures** of the EIS).
Bats	*Wildlife (amendment) Act 2000* Annex IV of Habitats Directive	Forage throughout the study area. Likely that mature trees may provide (temporary) roost sites. Such trees are rare and typically associated with linear woodland (WL2) areas identified during surveys.	Various – refer to WL2 habitat highlighted in Habitat Maps.

*Note: The above table lists all ecological sites that occur beneath the alignment regardless of whether impacts are foreseen (together with other sites in surroundings that could be potentially impacted). Those sites where impacts are not foreseen are not considered further in the assessment.

6.5 POTENTIAL IMPACTS

244 The identification and description of impacts presented below takes account of the characteristics of the receiving environment as described throughout **Section 6.4** with particular reference to the Key Ecological Receptors identified in **Section 6.4.7**. Impacts are presented in relation to each phase of the project (construction and operation), refer to **Section 6.7**.

245 The impacts described in this section are those ecological impacts predicted due to the proposed development prior to the consideration of any appropriate mitigation measures, refer to **Section 6.6**. Residual impacts describe potential impacts following implementation of mitigation measures.

6.5.1 Do Nothing Scenario

246 In the case of no development occurring, there would continue to be changes in biodiversity or ecological value as a result of on-going land management within the CMSA. It is most likely that most of the area would continue to be managed intensively for agriculture. Possible changes in management could include further land drainage, scrub clearance and afforestation, the majority of which would have a localised negative impact on ecological value / biodiversity of the area, however, it is not expected that these changes in land use would be influenced by whether the proposed development proceeds or not.

247 The potential ecological impacts of the proposed development are detailed in **Section 6.5.2** (construction phase impacts) and **Section 6.5.3** (operational phase impacts). Residual impacts are described under **Section 6.7** post mitigation being implemented.

6.5.2 Construction Impacts

248 Based on the nature of the proposed development and the baseline ecological data collected on the CMSA, the following activities and ecological features warrant specific attention in the consideration of ecological impact:

- Permanent habitat loss to hedgerows, treelines and grasslands associated with construction activity including woody vegetation clearance, site access, tower foundation excavation, tower construction and line stringing within the defined works area for each tower location;
- Permanent / temporary habitat loss / disturbance associated with stockpiling of material on vegetation outside the works area (if required);

- Temporary habitat loss / disturbance associated with the laying of temporary access track locations and trimming of vegetation to widen existing access gaps in the hedgerows, if necessary;
- Temporary habitat disturbance associated with guarding locations (at road and other OHL crossings) and areas used for machinery required during stringing of conductors.
- Temporary habitat loss / disturbance associated with the operation of the construction material storage yard;
- Temporary noise and physical presence disturbance impacts from machinery and staff at work area locations to fauna (birds and mammals);
- Pollution runoff risks to surface water quality through drains and other watercourses close to the works area, potentially linked to more ecologically important streams, rivers and lakes;
- Pollution runoff risks to ground water quality in the vicinity of works area potentially linked to ground fed wetlands and other surface water features;
- Tree lopping of more mature treelines under the proposed alignment for conductor clearance and or installation of towers;
- Tree and hedgerow trimming under the proposed alignment for conductor clearance;
- Tree lopping and clearance in managed plantation woodland areas crossed by the alignment for construction and ongoing maintenance of the wayleave; and
- Tree lopping of mature deciduous woodland.

249 Potential ecological receptors of impacts include:

- Habitats that occur within the footprint of the proposed development;
- Watercourses surrounding and downstream of the alignment;
- Bird and mammal activity; and
- Identified Key Ecological Receptors (see **Table 6.14**).

6.5.2.1 Direct Impacts (Habitats)

250 Direct impacts upon habitats of highest ecological value have been minimised by constraint identification and avoidance and subsequently careful consideration to tower locations, stringing

locations and temporary access routes. While other factors influence the siting of structures, ecological constraints have been addressed to the extent that the layout avoids the most important and sensitive habitats in the wider study area. In addition, due to the nature of the proposed development it is possible to span certain habitats of conservation interest and therefore avoid direct impacts. In the following paragraphs habitat loss and disturbance is assessed in relation to tower locations, along the alignment beneath conductors, and at stringing areas (where machinery used during stringing process will be stationed).

6.5.2.1.1 Habitat Loss and Disturbance – Tower Locations

251 Direct short term habitat loss will occur in those areas where towers are to be constructed. Stockpiling of material has the potential to cause additional short term habitat loss should it be placed in a manner that would smother vegetation.

252 In following the precautionary principle, all towers have been carefully positioned to ensure that there will be no direct impacts on habitats of high ecological value. Only a single tower is located within a site identified as a Key Ecological Receptor in **Section 6.4.5** (Annaglogh grassland and scrub, see **Tables 6.18** and **6.19** for assessment of impacts on this site). Due to the nature of the proposed development, with careful design it has been possible to span or oversail the remaining identified ecological sites. Furthermore, habitats of ecological value outside of these sites have largely been avoided.

253 It can be seen from **Table 6.15** that the vast majority of towers are to be constructed within habitats of low ecological value, with over 90% of all towers located within improved agricultural grassland. In all, direct habitat loss associated and disturbance with the construction of tower footings is estimated at 12.8ha, most of which (11.4ha) is improved agricultural grassland, which is a modified habitat of low ecological importance.

254 There are five towers located on boundary hedgerows and one on a treeline causing direct habitat loss of 150m and 30m respectively. All of these sites have been assessed during walkover field surveys as being of low or moderate intrinsic value. This impact is therefore deemed to be an imperceptible localised negative impact.

255 Three towers are proposed to be located on drainage ditches. All three locations were assessed during field work. Two of the three ditches (Towers 216 and 235) at the time of survey had no water present and there was an absence of wetland species. Surface water was present within the third drainage ditch (at Tower 232), suggesting that it functions throughout the year, although an absence of vegetation suggests recent maintenance works. It was concluded that these features are of low intrinsic value but may, following periods of rainfall provide a potential pathway for pollutants to impact on more sensitive receptors downstream.

The drainage ditches are likely to be diverted and subsequently culverted during the construction phase of the project.

256 Some additional temporary habitat disturbance will occur in the works area immediately surrounding each structure location (accounted for in **Table 6.15**) due to machinery movements and temporary stockpiling of excavated material. It has been possible to design these works areas so as to avoid sensitive habitats to the surroundings as they can be offset to areas of least ecological sensitivity.

257 Considering the value of the habitats affected it is concluded that habitat loss and disturbance will cause a direct short term minor negative impact. In the case of hedgerows and treelines the impact will be permanent in nature as in most cases it is unlikely to grow back to the same vigour as the surrounding hedgerows and will be continually managed (trimmed) throughout the operational phase.

Table 6.15: Impact of Locating Towers in Each Habitat Type within the CMSA

Habitat	Number of Towers[1]	% of all Towers	Maximum Area / length habitat impacted (worst case)[2]	Assessment of impact
Improved agricultural grassland (GA1)	126	94	11.4ha	Imperceptible
Wet grassland (GS4)	6	4.5	0.5ha	Imperceptible
Hedgerows (WL1)	5	3.7	150m	Minor
Scrub (WS1)	5	3.8	0.5ha	Imperceptible
Recolonising bare ground (ED3)	3	2.2	0.3ha	Imperceptible
Drainage ditches (FW4)	3	2.2	90m	Imperceptible
Treelines (WL2)	1	0.8	30m	Minor
Dry calcareous and neutral grassland (GS1)	1	0.8	0.1ha	Imperceptible
Dry meadows and grassy verges (GS2)	1	0.8	0.1ha	Imperceptible

1. A single structure can impact on more than a single habitat. However, for the purposes of this ecological assessment in the case of a tower impacting on more than a single habitat, it is assumed that all habitats are equally impacted therefore the area of calculated habitat loss / disturbance is likely to be overestimated.
2. Assuming an area of 900m^2 impacted at each structure location and, where relevant 30m of linear habitat impacted.

6.5.2.1.2 Habitat Loss and Disturbance – Under Conductors

258 The habitats identified as being potentially impacted are mature hedgerow with trees, mature treelines and mature woodland. The requirement for a minimum 74m corridor (tree removal) within woodland areas is also considered.

Hedgerows and Treelines

259 There will also be a requirement for some trimming (and possibly lopping) of woody vegetation at hedgerows and treelines that occur between towers to provide adequate clearance beneath the OHL. This measure is only foreseen where hedgerows exceed 6m in height and therefore will be confined to Type B hedgerows (as defined in **Section 6.4**) and treelines that have been identified as occurring along the alignment. In summary, it is foreseen that 92 hedgerows (Type B) and 56 treelines will be impacted by tree trimming operations (see **Table 6.16**).

260 This is considered a worst case scenario as it is most probable that a proportion of these hedgerows and treelines will not require trimming. The degree of trimming required depends on a number of factors including topography and the potential sag of the conductors at the hedgerow location. Within the study area, most towers are located on somewhat elevated grounds throughout the drumlin landscape and therefore it is probable that adequate clearance will prevail where hedgerows and treelines occur at lower elevations, even when their height exceeds six metres.

261 Following trimming or lopping of individual trees, the structure of the hedgerows and treelines will largely be retained as the base and the shrub layer will not be affected and therefore the value of the habitat as a wildlife corridor will largely be maintained. The impact associated with tree trimming of hedgerows and treelines is deemed to be a permanent moderate negative impact. The impact will be localised in that it will only impact a very short section of each feature affected.

Table 6.16: Number of Linear Woodland Habitat Features Oversailed by the Alignment and Assessment of Impact

Habitat[1 and 2]	Number of linear woody habitat features over sailed by alignment[3]	Impact	Assessment of Impact
Hedgerows (WL1) - Type A	390	No impact foreseen.	None
Hedgerows (WL1) - Type B	92	Tree trimming required.	Moderate
Treelines (WL2)	56	Tree trimming / lopping of higher limbs.	Moderate

1. Hedgerows Type A - hedgerows that do not include mature trees and therefore should not require tree lopping or significant trimming as vegetation is typically below the heights where woody vegetation cutting is required.

2. Hedgerows Type B – Overgrown hedgerows that typically include at least 1 mature tree and therefore will likely require tree lopping or bow cutting and / or hedgerow trimming.

3. Estimate is based on interpretation of LiDAR imagery coupled with field observations.

Woodland Areas

262 Long term habitat loss is foreseen in some wooded areas that the alignment oversails. There are a total of seven woodland stands (including both commercial and semi-natural woodland) that occur beneath the alignment as presented in **Table 6.17** (and illustrated in the Habitat Maps presented in Figures 6.2.1 - 6.2.19**, Volume 3C Figures** of the EIS). In those areas where there is inadequate clearance beneath conductors (6m of clearance is required) it may be necessary to fell a 74m wide corridor (in a worst case scenario). Following a detailed analysis of vegetation at each of the seven locations (taking account of many variables including tower heights, ground topography and elevation, likely sag of conductors etc.), it has been shown that adequate clearance occurs at five of these sites thereby indicating that, at these sites, no felling or lopping of trees will be required.

263 Based on the vegetation analysis undertaken, some vegetation management will be required at the two woodland areas (mature conifer plantation at Lisagoan; and wet Willow-Alder-Ash woodland at Tullyglass). Assuming that felling will be required at both of these sites to produce a 74m non-wooded corridor, then the area of woodland affected would be 0.4ha of conifer plantation at Lisagoan and 0.2ha of Willow-Alder-Ash woodland at Tullyglass. Considering that both these areas have been evaluated as being of Local Importance (Lower Value), the impact associated with this is deemed to be a probable direct long term minor negative impact and localised in nature.

Table 6.17: Areas of Woodland Crossed by the Proposed Alignment

Location	Woodland Type	Evaluation	Extent of woodland loss[1]	Assessment of impact
Lisagoan (Tower 214-215)	Conifer Plantation (WD4)	Local Importance (Lower Value)	0.4ha	Minor
Cornalaragh (Tower 201-202)	Wet Willow-Alder-Ash woodland (WN6)	Unknown (unsurveyed)	N/A	None
Corvally (Tower 192-193)	Conifer Plantation (WD4)	Local Importance (Lower Value)	N/A	None
Ummerafree (Tower 181-182)	Wet Willow-Alder-Ash woodland (WN6)	Local Importance (Lower Value)	N/A	None
Tullyglass (Tower 175-176)	Wet Willow-Alder-Ash woodland (WN6)	Local Importance (Lower Value)	0.2ha	Minor
Tullyglass (Tower 171-172)	Oak-Birch-Holly woodland (WN1)	Local Importance (Higher Value)	N/A	None
Crinkill (Tower 144-145)	Wet Willow-Alder-Ash woodland (WN6)	Local Importance (Lower Value)	N/A	None

Note: [1]Calculation of habitat loss is based on the requirement to fell a corridor width of 74m.

6.5.2.1.3 Habitat Loss and Disturbance – Temporary Access Routes

264 In selecting appropriate temporary access routes, wet areas and areas comprising semi-natural habitat have largely been avoided.

265 Some clearance of woody vegetation to facilitate site access may be required to widen existing access points. However, in choosing suitable temporary access routes, potential adverse ecological impacts have been largely avoided by using existing farm tracks and gaps in hedgerows wherever possible. Access routes typically follow these existing tracks used by agricultural machinery or across lands that are actively managed for agriculture. All access points were assessed by an ecologist and no significant potential impacts were identified. Given that farm scale type machinery regularly utilise existing hedgerow gaps and farm entrances only minimal vegetation clearance is likely to be required to facilitate construction vehicles and equipment. No temporary access routes cross habitats of high ecological value such as wetlands or semi-natural woodland areas. Any clearance of vegetation required to facilitate access will be reinstated following the completion of construction.

266 Potential localised impacts associated with temporary access routes are determined to be short term imperceptible negative.

6.5.2.1.4 Habitat Loss and Disturbance – Stringing Areas and Guarding Locations

267 Stringing areas have been identified in the vicinity of angle tower locations for locating machinery required for the process of stringing conductor cables. These are all located in habitats of low ecological interest and avoid those sites identified as Key Ecological Receptors (see **Table 6.14** and Habitat Maps presented in Figures 6.2.1 - 6.2.19, **Volume 3C Figures** of the EIS). These areas will be reinstated post works and standard pollution controls (as detailed below) will be implemented.

268 Some minor temporary habitat disturbance may occur at those sites where guard poles are to be temporarily erected during the stringing of conductors. A number of these sites are located within areas identified as key ecological receptors (see **Table 6.14** and Habitat Maps presented in Figures 6.2.1 - 6.2.19, **Volume 3C Figures** of the EIS). These areas will be reinstated post works and standard pollution controls (as detailed below) will be implemented.

6.5.2.1.5 Habitat Loss and Disturbance – Structure alterations Lisdrum – Louth 110 kV and Louth – Rathrussan 110 kV Lines

269 The Lisdrum – Louth 110 kV Line is an existing transmission line. Existing poleset 55 is located in improved grassland of low ecological value. The alignment crosses 1 managed hedgerow between existing poleset 55 and proposed new poleset 55A. No impacts are likely to this hedgerow. The proposed poleset 55A is located in improved grassland of low ecological value.

270 It is proposed to replace poleset IMP 56 and to install additional new polesets at IMP 55A and 56A along the Lisdrum – Louth 110 kV Line. This is required to accommodate the proposed development. These poles are all located in improved grassland of low ecological value. Replacement poles for IMP 56 will be located immediately adjacent to the current pole location. No additional hedgerow loss or trimming is required for these works. These areas will be reinstated post works and standard pollution controls as detailed below will be implemented. The impact is considered a temporary imperceptible negative impact based on the low ecological value of the site.

271 The alignment crosses 1 managed hedgerow between poleset 56 and the proposed new poleset at 56A. No impacts are likely to this hedgerow. Existing poleset 57 is located in improved grassland of low ecological value. New polesets IMP 55A and 56A and replacement poleset 56 will not impact any habitats of ecological value.

272 It is proposed to replace poleset IMP 100 with a new wood poleset in an excavation immediately adjacent to the butt of the old wood poles along the Louth – Rathrussan 110 kV transmission OHL so as to accommodate the proposed development. Existing poleset IMP100 is located in gorse scrub that occurs adjacent to a hedgerow. This habitat is likely to be of low ecological value. The risk of disturbance to mammal breeding sites is likely to be low as this is an existing development. Appropriate mitigation is detailed in this chapter to consider possible breeding sites of birds and mammals. Ecological impacts and risks of disturbance to fauna can be further minimised by accessing and replacing the poleset from the south. No additional hedgerow loss or trimming is required for proposed works. Work areas will be reinstated post works and standard pollution controls as detailed below will be implemented. The impact is considered likely to be a temporary imperceptible negative impact based on the low ecological value of the site, the presence of the existing development, and the very limited scale of impacts.

273 INT 101 is located in improved grassland of low ecological value. Two managed hedgerows, scrub and an indeterminate wetland are crossed between existing poleset 100 and INT101. This area will be avoided and no impacts are likely.

6.5.2.1.5 Habitat Loss and Disturbance – Construction Material Storage Yard

274 The principal habitat that occurs (Figure 6.2.19, **Volume 3C Figures** of the EIS) at the proposed construction material storage yard comprises improved agricultural grassland (GA1) being managed for grazing. The grassland is of little ecological interest with low species diversity and of limited value to wildlife. Low managed hedgerows and post and rail fencing occur around much of the perimeter of the site with semi-natural hedgerow occurring along the southern boundary. No sensitive aquatic ecological receptors occur in proximity to the site. The operation of the site as a storage yard will cause the temporary loss of this grassland habitat throughout the site (estimated at approximately 0.25ha) for the duration of the construction phase. Some minor hedgerow removal will also occur along the southern boundary of the site to provide adequate vehicular access. The site will be reinstated as grassland following the construction phase of the project. The impact is considered a temporary imperceptible negative impact based on the low ecological value of the site.

6.5.2.2 Secondary (Indirect) Impacts to Habitat

6.5.2.2.1 Hydrological Impacts to Wetlands

275 The construction phase may require temporary drainage (3 - 6 days) to facilitate construction. This may cause a secondary (indirect) impact on adjacent habitats by causing drying out of the surface. The possibility of this impacting on wetlands sites in proximity to tower locations has been considered.

276 In all cases, towers are located on elevated lands a sufficient distance from sensitive wetland. The excavations associated with tower foundations are limited to the each tower footing and will not exceed 3.5m depth and are short term in duration. De-watering would not be expected to cause any material change to the water table in the surroundings for any significant period of time. Based on the low permeability soil and rock types present throughout the CMSA, only minimal dewatering is foreseen. Groundwater pumped out will be allowed to percolate back into the ground adjacent to the temporary excavations. It is therefore concluded that no impacts of significance are foreseen.

6.5.2.2.2 Water Quality (Aquatic Receptors)

277 Water quality perturbations associated with construction activity have potential to impact upon ecologically sensitive watercourses downstream of the proposed development.

278 No requirement for in-stream works during the proposed development is foreseen and therefore the risk of impacts on water quality is considered to be relatively low.

279 Potential impacts on freshwater habitats arising from the construction phase include, in the absence of mitigation, deterioration of water quality due to sediment release during the excavation of tower foundations or potential contamination of water from concrete and / or fuels during construction. Such potential impacts in the absence of mitigation could cause direct and indirect impact on aquatic ecology as follows:

- Sedimentation – temporary smothering of gravel beds with consequent loss of fish and spawning habitat.
- Sediment deposition can also provide a base for growth of filamentous algae on gravel beds, leading to a build up of sediment and loss of suitable habitat for crayfish and spawning habitat for lamprey and salmonids.
- Sedimentation impacts in the absence of mitigation include smothering fish eggs and causing mortalities in fish of all ages, reducing abundance of food and impeding movement of fish.
- Sedimentation impacts in the absence of mitigation also include smothering of food prey for juvenile salmonids i.e. macro invertebrates.
- Localised construction phase reduction of surface and groundwater quality in wetlands removed from, but linked to the proposed development.
- Accidental leakage / spillage of oil and fuels from construction vehicles can have indirect impacts on fish, fish food and fish habitats and other aquatic species.

- Accidental leakage / spillage of concrete, chemicals and / or fuels during the construction phase of the proposed development into the surrounding watercourses, could potentially impact on the habitat of sensitive aquatic receptors downstream. The duration of works at each tower location is approximately 2.5 weeks, with the majority of this time due to concrete setting.

- There is no requirement for in-stream works which has significantly reduced both direct and indirect impacts to the aquatic systems and their flora and fauna.

280 The sources of such impacts have been identified at tower locations where works are proposed in proximity to watercourses and surface and ground water dependant habitats. These locations are illustrated on the Habitat Maps presented in Figures 6.2.1 - 6.2.19, **Volume 3C Figures** of the EIS. All tower locations are located away from sensitive natural watercourses and permanent drainage features and therefore the risk of pollution of surrounding watercourses is low. Best practice construction techniques which will be adhered to during the construction phase of the project will also minimise the potential for these impacts to occur.

281 It is concluded that in the absence of mitigation, possible deterioration of the water quality of surrounding surface water during the construction phase could result in temporary, moderate, negative impacts to aquatic receptors.

282 Felling of conifer plantations required to facilitate the proposed development also has the potential to impact the water quality of downstream watercourses due to the possible release of sediments and nutrients. Considering the very limited extent of forestry felling required (total of 0.4ha at a single location at Lisagoan as shown in **Table 6.17**, and an absence of sensitive watercourses in this area, no impacts of significance are foreseen as a result of this activity.

283 Further details on the potential impacts on water quality are addressed in **Chapter 8** of this volume of the EIS.

6.5.2.2.3 Direct and Indirect Impacts on Fauna (Mammals and Birds)

284 Potential exists for direct disturbance of resident birds and mammals due to noise and activity associated with construction works and traffic. Disturbance effects would be expected to be higher during the breeding season than during the non-breeding season. However in most cases mammals and birds within the CMSA are thought to be sufficiently mobile so as to temporarily relocate from works areas, and construction traffic will be relatively light so as not to cause major disturbance. Furthermore, most construction related activity will be undertaken at tower locations. These locations have been selected on the basis that they avoid suitable mammal habitat (hedgerows, treelines and woodlands).

285 Those hedgerows that will be impacted directly by the construction of towers have been confirmed to be of low value to mammal species. It is concluded that the level of disturbance will be relatively low and it is foreseen that disturbance during construction will at most cause a temporary short term minor negative impact.

286 The removal and trimming of hedgerows and other habitats as detailed above may cause the loss of potential foraging and breeding sites for common bird species. Based on the extent of predicted habitat loss, and the phased nature of the works, this impact is deemed to be a probable minor negative impact.

287 Whooper Swan foraging sites identified during the winter bird surveys are sufficiently removed (>150m) from the alignment such that disturbance impacts are unlikely. Also, considering the short duration of construction at each tower location, any disturbance effects at a particular foraging site would be short term and it would be expected that the Whooper Swans would move temporarily to alternative sites in the surrounding areas. It is concluded that this unlikely negative impact would be imperceptible.

288 The potential for disturbance impacts to badgers and their setts has been minimised by the placement of towers (and sections of temporary access routes) away from known setts and potentially suitable habitat (hedgerows and wooded areas). It remains possible however that disturbance effects could occur at badger setts in proximity to works areas. Badger sett tunnel systems can extend approximately 20m from sett entrances (NRA 2006). Typical site works (using heavy machinery) that occur within 50m of an active badger sett could cause disturbance impacts if works are undertaken during the breeding season (December to June inclusive) (NRA 2006b).

289 There is a confirmed badger sett located, at its nearest point, approximately 25m from Tower 151. This sett is located adjacent to a farm track within an area of improved grassland. The area was formerly broadleaved woodland but has recently (between 2010 and 2013) been felled and reclaimed as pasture. Four sett entrances were identified, of which only one appeared to be actively used by badger in July 2013 and again in February 2015. The nearest sett entrance (inactive in February 2015) is located ca 25m north of Tower 151, the remaining three sett entrances are located further north, away from the tower. An absence of bedding material suggests that the site is a non-breeding subsidiary sett. In the absence of mitigation, works associated with the construction of Tower 151 could potentially impact on the sett and the use of the sett by the local badger population. Based on the sett being located approximately 25m from tower, at its nearest point, direct disturbance to the sett chambers during construction works is highly unlikely. This impact is therefore deemed to be a possible temporary moderate negative impact.

290 There are no other confirmed badger setts entrances within 50m of any works area and therefore this impact is not foreseen. However, it is possible that unidentified badger setts occur in proximity (within 50m) to works areas and therefore this potential impact can be described as a possible temporary moderate negative impact.

291 The potential for disturbance impacts on otter and their breeding sites has been minimised by the placement of towers (and section of temporary access routes) away from potentially suitable habitat (significant watercourses and associated semi-natural habitat). Larger watercourses (over two metres width) that are favoured by otter are rare throughout the study area and no evidence of otter occurring in close proximity to the alignment has been recorded during field surveys. It is concluded that the potential disturbance can be classed as an extremely unlikely temporary moderate negative impact.

292 Bat species may roost in large mature trees that provide suitable crevices and hollows. Surveys have confirmed that such large mature trees are rare throughout the zone of potential impact. Felling or trimming of such trees that function as transient bat roosts will cause displacement or death if not felled using appropriate techniques ('soft' felling). It is concluded therefore that there is potential that temporary tree roosts will be lost during the construction phase. This unlikely temporary impact would be classed as moderate negative.

6.5.2.3 Construction Impacts on Key Ecological Receptors

293 A summary of potential impacts associated with the construction phase is presented in Table 6.18. The magnitude of predicted impacts range from temporary imperceptible to permanent moderate in significance.

Table 6.18: Summary of Potential Construction Phase Impacts, prior to mitigation, on Identified Key Ecological Receptors within the CMSA

Site / Feature	Evaluation	Potential Impact Source	Assessment of Potential Impact
Designated Conservation Areas			
Lough Egish pNHA (Towers 161-163)	National	Construction related noise and activity may cause temporary disturbance to foraging Whooper Swans.	Temporary Imperceptible
Non-designated Ecological Sites (listed as they occur along alignment from South to North)			
Cordoagh Scrub (Towers 227-228)	Local Importance (Higher Value)	Construction related noise and activity may cause disturbance to badgers resident in the area (known sett occurs approximately 60m of tower location) if construction is undertaken in breeding season. Minor temporary habitat disturbance associated with erection of guard poles.	Temporary Minor

Site / Feature	Evaluation	Potential Impact Source	Assessment of Potential Impact
Corglass Stream (Towers 221-222)	Local Importance (Higher Value)	Lopping of some higher limbs of mature Ash trees is likely to be required. Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible
Lisagoan Stream (Towers 213-214)	Local Importance (Higher Value)	Lopping of some higher limbs of mature Ash trees is likely to be required. Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible
Corlea Bog (Towers 206-207)	National	Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible
Cornalaragh Marsh (Towers 201-202)	Unknown (unsurveyed)	Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible
Comertagh and Raferagh Loughs (Towers 197-200)	County	Construction related noise and activity may cause disturbance to foraging Whooper Swans.	Temporary Imperceptible
Tullynahinnera Bog (Towers 158-159)	Unknown (unsurveyed)	Possible deterioration in water quality due to surface water run-off (sediment / accidental spillages). Drainage ditch and wetland approximately 20m west of Tower 158.	Imperceptible
Greagh Marsh (Towers 156-157)	Local Importance (Higher Value)	Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible
Drumhawan (Towers 150-151)	Local Importance (Higher Value)	Disturbance to resident badger population associated with construction activity. Known sett occurs beneath line (approximately 25m from tower location). Trimming and lopping of mature treelines between tower locations.	Temporary Moderate Long term Imperceptible
Clogher Marsh (Towers 144-146)	Local Importance (Higher Value)	Trimming and lopping of mature trees between tower locations.	Imperceptible
Ballintra (500m west of Tower 143)	Local Importance (Higher Value)	Construction related noise and activity may cause temporary disturbance to foraging Whooper Swans.	Temporary Imperceptible
Terrygreeghan Marsh (Towers 142-143)	Local Importance (Higher Value)	Disturbance on resident badger population associated with construction activity. Known sett occurs at treelines beneath line. Minor temporary habitat disturbance associated with erection of guard poles. Trimming and lopping of mature Ash between tower locations.	Temporary Moderate Imperceptible
Cornanure Marsh (Towers 138-139)	Local Importance (Higher Value)	Lopping of some higher limbs of mature Ash trees is likely to be required along northern boundary of site.	Imperceptible

Site / Feature	Evaluation	Potential Impact Source	Assessment of Potential Impact
Caraghramer Marsh (Towers 135 – 136)	Local Importance (Higher Value)	Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible
Clarderry Bog (Towers 127-128)	County importance	Lopping of some higher limbs of mature Ash trees is likely to be required along southern boundary of site.	Imperceptible
Tassan Grassland (Towers 117-118)	National Importance	Lopping of some higher limbs of mature trees will be required along eastern boundary of site. Potential damage to grassland surface if heavy machinery used to access trimming / lopping site.	Imperceptible
Farmland at Latnakelly (Towers 113-114)	Local Importance (Higher Value)	Disturbance on resident badger population associated with construction activity. Known sett located 115m from tower at hedgerow beneath alignment. Trimming and lopping of mature Ash between tower locations.	Temporary Moderate Imperceptible
Annaglogh grassland and scrub (Towers 110-111)	Local Importance (Higher Value)	Short term habitat loss and disturbance affecting approximately 0.1ha of dry calcareous grassland (GS1).	Imperceptible
Habitats			
Hedgerows / Treelines	Cumulatively the network of these habitats is of high value to wildlife by providing ecological corridors (Article 10 Habitats Directive).	Vegetation clearance at construction sites. Trimming and lopping of trees that occur beneath conductors. It is predicted that 180m of hedgerow (six locations) and 60m of treelines (two locations) will need to be removed to facilitate the development. A further 92 hedgerows and 56 treelines will be affected by trimming and lopping of trees.	Permanent Moderate
Watercourses	Local Importance (Higher Value)	Release of sediment during excavation and movement of earthen material. Construction activity (concrete pouring / re-fuelling etc.) at sites in proximity to drainage ditches and natural watercourses. Few drainage features occur in proximity to works areas.	Moderate
Protected Species			
Whooper Swans	Annex I EU Birds Directive	Construction related noise and activity may cause temporary disturbance to foraging Whooper Swans.	Temporary Imperceptible
Badger	Wildlife (amendment) Act 2000	Disturbance on resident badger population associated with construction activity. A single non-breeding sett has been identified approximately 25m from Tower 151 (see above).	Temporary Moderate
Otter	Annex II of Habitats Directive; Annex IV of Habitats Directive	Construction related activity that may give rise to disturbance. Absence of suitable habitat in proximity of works areas means this impact is extremely unlikely to occur.	Temporary Moderate

Site / Feature	Evaluation	Potential Impact Source	Assessment of Potential Impact
Bats	Wildlife (amendment) Act 2000; Annex IV of Habitats Directive	Tree felling and vegetation management may impact temporary roost sites. Impact is deemed unlikely due to the rare occurrence of mature trees that could potentially provide roost sites. Loss of foraging habitat in those areas where hedgerows / treelines are to be removed (at eight tower locations, totalling 240m in length).	Temporary Moderate Permanent Imperceptible

6.5.3 Operational Impacts

294 Key identified impacts during the operational phase are discussed throughout this section. The main features of the operational phase of the proposed development that could give rise to ecological impacts include:

- The presence of the line (conductors and earthwires) presents a collision risk to vulnerable bird species;
- Ongoing trimming of tall vegetation where the line crosses hedgerows; and
- Ongoing maintenance of equipment as may be required.

6.5.3.1 Direct Impacts (Habitats)

6.5.3.1.1 Habitat Loss and Disturbance

295 There will be a requirement for ongoing trimming of hedgerow, treeline and woodland vegetation that occur between towers over a cycle of approximately five years. This is to ensure adequate clearance beneath the OHL is maintained throughout the operational phase of the project. Such trimming will only be carried out on those individual trees that exceed approximately 6m in height (depending on local topography and ground elevation) at each crossing point and will therefore only be carried out at a selection of sites during each cycle. The value of hedgerows as wildlife corridors for dispersing and feeding birds and mammals, and as commuting corridors for bats, will not be adversely affected. This impact is therefore deemed to be an ongoing (every five years), short term imperceptible impact.

296 There may also be minor disturbance impacts to mammals and birds associated with vegetation management. This impact is deemed to be a temporary imperceptible negative impact.

6.5.3.2 Secondary (Indirect) Impacts to Habitats

6.5.3.2.1 Habitat Alteration

297 The operational phase will lead to potential localised ecological changes around tower locations due to any changes in land management associated with the presence of the tower. In many instances grazing in the area surrounding tower locations may be reduced (controlled) and as a result, scrub may become established in areas that were formerly improved pasture. In this regard there is a potential local increase in semi-natural habitat. This is regarded as an imperceptible impact.

298 Elsewhere, towers that occur within agricultural grassland tend to be targeted by grazing livestock for shelter and scratching. Increased grazing and soil poaching can have local impacts on the grassland habitat. Where a tower is located within a hedgerow gap, such grazing and increased presence of grazing livestock may impair the re-establishment of the hedgerow. This is considered a permanent imperceptible negative impact.

6.5.3.2.2 Water Quality (Aquatic Receptors)

299 There is potential for impacts to water quality in particular where works are proposed close to streams and rivers during operational maintenance. Potential impacts may arise to downstream aquatic receptors. This is predicted as a short term, minor, localised impact.

6.5.3.3 Direct and Indirect Impacts on Fauna (Birds and Mammals)

6.5.3.3.1 Birds

300 The operational phase of a transmission line can result in the following potential impacts to birds: bird mortalities caused by collisions with conductors or earth wire, electrocution, displacement / barrier effects from previously used areas.

301 Electrocution from phase to phase contact with powerlines has been highlighted in literature as a potential issue for large raptors in particular (e.g. Golden Eagles). However, this issue is largely confined to lower voltage distribution lines, when birds attempt to alight on support structures. The design of a transmission line is such that the distance between live elements cannot be bridged by even the largest bird species occurring in Ireland (Golden Eagle). Therefore, electrocution is not considered a significant issue for raptor species or for wildfowl in the study area.

6.5.3.3.1.1 Whooper Swans

302 The assessment of potential impacts and effect on Whooper Swan populations was informed by the following:

- An extensive desktop study was conducted to inform this evaluation, refer to Winter Bird Study in **Appendix 6.6, Volume 3C Appendices** of the EIS and refer to reference list in the **Bibliography,** in this volume of the EIS).

- Seven years of winter bird studies conducted to gather evidence on flightlines, numbers, local concentrations and evidence of ringed birds (which can be used to identify bird movements).

- Potential displacement and collision impacts were informed by observed interactions of swans (Mute, Whooper and Bewick) and geese (species) with powerlines and wind turbines, existing published scientific information, EISs for similar type developments and consultation with relevant experts (including Royal Society for Protection of Birds and BirdWatch Ireland).

- Swans are identified as a species group susceptible to collision with powerlines (EirGrid (2012); Becker & Lichtenberg (2005)). There are likely to be increased collision risks to juvenile and less experienced birds in particular during periods of poor visibility (e.g. at night and during misty conditions) (Hunting, 2002).

- Geese species including Greylag and Pink-footed were subject of a specific transmission line interaction study by the author, refer to MBEC[18] (2006b). The ecology assessment in this chapter of the EIS was informed by surveys conducted of bird collision mortalities along an existing 400 kV line in Scotland. The sites surveyed were locations where geese (species) concentrated, and fly regularly over 400 kV and 220 kV transmission lines. Sites surveyed support internationally important numbers of Greylag and Pink-footed Geese (relatively similar species in terms of potential susceptibility to collision with transmission lines). No signs were ever noted of geese or indeed swans (present in the area) colliding with transmission lines, despite regular flights observed across transmission lines in this study. Species recorded as colliding with transmission lines during these surveys included common species such as Grey Heron and species not present in the MSA e.g. Guillimot (sea bird).

[18] The author of this chapter of the EIS was a co-author of the MBEC McKenzie Bradshaw (2006b). *Bird - Power Line Collision Field Study*. Prepared for Scottish and Southern Energy plc.

- Whooper Swan (and Mute Swan) interaction with existing transmission lines has been recorded by the author in counties Mayo, Monaghan and at Toome Bridge in Northern Ireland. Whooper Swan have been observed flying over and foraging close by, beside and under transmission lines. These observations and surveys serve as an indication that Whooper Swans may habituate to transmission lines.

- A number of observed sites in Northern Ireland support internationally important numbers of Whooper Swan (e.g. Toome Bridge area – near Lough Neagh SPA). Toome Bridge in particular, supports internationally important numbers of Whooper Swan which regularly forage and flyover a 275 kV transmission line which was constructed between 1963 and 1978 (source Northern Ireland Electricity). While occasional collisions occur (source, RSPB), these areas have been recently marked with flight diverters and the area continues to support a thriving population of Whooper Swan (Hall et al, 2012) at favourable conservation status.

- Studies conducted in the Netherlands (Fijn et al., 2012) on wintering swans found low levels of collision mortality within wind farm developments (and associated electricity infrastructure), even in sites with a high degree of transit flights through operational wind farms and relatively high numbers (>500) of birds regularly present. In a review of swan and goose fatalities at wind farms only two Whooper Swans were recorded as fatalities from monitoring undertaken at 46 different wind farms across eight countries (Rees 2012). Wind farms similarly to transmission lines present an identifiable collision risk to birds including Whooper Swan. Available research such as the above indicates that actual collision risk from wind farms is low even where wintering Swans concentrate and regularly fly over.

- During the course of the Whooper Swan study conducted in Meath and Monaghan (2007–2014), signs of Whooper Swan and or Mute Swan collisions with distribution lines were observed at various locations (including two sites near Ballybay and the Cruicetown site in the MSA). This is consistent with general (non-published) observations that low and mid voltage lines close to (within 500m) concentrations of wintering swans are a localised collision hazard.

- The Icelandic Whooper Swan population (population which winters in Ireland) is considered to be at favourable conservation status (source: JNCC) and populations in Ireland increased between 2000 and 2005 by 11% (Crowe et al. 2005) and by 6% between 2005 and 2010 (Boland *et al.* 2010), notwithstanding the already extensive transmission and distribution line infrastructure which they may potentially collide with.

- Observations of Whooper Swan flocks (between 2007 and 2014) by the author in MSA and CMSA, noted good recruitment of juveniles to flocks observed with regular observations of adults with larger broods (3+ fledged juveniles) in recent years

indicating that the population is recruiting. Whooper Swans continue to concentrate in areas even where distribution and transmission line infrastructure cross nationally or county important sites.

- A submission received from NPWS as part of a previous application for approval for this proposed project identified and acknowledged that collision impacts on Whooper Swan may arise at a local level, however, it is unlikely that the national population or any SPA population will be impacted, refer to Appendix 6.6.

- APLIC, 1994 cites that collisions with transmission lines "*are not a biologically significant source of mortality for thriving bird populations".* The Whooper Swan population in Ireland is increasing based on current data and can be considered as being at favourable conservation status.

303 Based on the information summarised above it is considered highly unlikely that the proposed development will give rise to substantial or profound impacts to Whooper Swan populations and sub populations in the MSA during the operational phase. The key approach therefore in the assessment is to identify local areas where a moderate or less adverse impact could arise.

Collision Impacts

304 The approach in this evaluation was to identify areas with relatively regular yearly and inter year Whooper Swan flightlines which are bisected by the route of the proposed alignment and also to consider the location of observed flocks relative to the proposed alignment. Whooper Swan site usage differs somewhat to the most important areas in MSA as Whooper Swans are clustered in distribution at lake sites which provide both roost and forage opportunities without the requirement for extensive daily flights (in most cases). This means flights are sporadic and irregular. Typical observed flight heights during surveys were generally at heights at or just above hedgerow / treeline height (15 - 20m). This height would be within the height range of the lowest conductors which range from 39.5 m at the tallest proposed tower down to 9 m at the point of maximum sag (the 9 m maximum sag would rarely arise as it would only occur at maximum operating conditions, typically the lowest most conductor would be some metres higher than this at its lowest point). Based on the scientific literature Whooper Swan flight behaviour is such that they tend to fly over the highest conductors, and in this regard the greatest risk of collision is associated with collision with the earth (shield) wires (APLIC 2012). These are located above the conductors and as they are thinner than the conductors, can be less visible. The typical height of the earth wires range from 50 m at the tallest proposed tower down to 19.5 m at the point of maximum sag.

305 Based on the results of the flightline surveys between 2010 and 2014 (findings of which are consistent with survey findings noted prior to this); the following assessment is made regarding

the regularity of flightlines and assessment of whether a potential impact will arise, refer to **Table 6.19**.

Table 6.19: Regularity of flightlines observed across the proposed alignment, collision impact determination and requirement for mitigation based on data from 2010 – 2014

Whooper Swan area identified as relevant to the preferred line route	Relevant section of alignment	Regularity of flightlines and comments	Potential Collision Impact (yes/ no) – Mitigation Requirements
Ballintra	Between Towers 139 and 147 at the River Blackwater crossing point	Flightlines recorded in 20% surveys - four identified flightlines (maximum 25 birds) across the alignment. A **regular** flightline was identified. A higher count (45 birds) was recorded in March 2009. Otherwise numbers were similar to the most recent surveys.	Yes. Mitigation required.
Bocks Lough	Bocks Lough is at the end of a string of lake wetlands. The alignment bisects Bocks Lough and a linear cluster of Whooper Swan sites west of here close to towers 175 - 177.	No flightlines observed following 30 surveys. No Whooper Swans recorded on Bocks Lough in all years of survey.	No. Mitigation not required.
Comertagh	Between Towers 196 and 203. Alignment bisects a cluster of Whooper Swan sub-sites including Raferagh, Comertagh, Greaghlone and Mill loughs.	No flightlines observed following 57 surveys. Whooper Swans in this area stay on lakes for extended periods (days/ weeks) with very few flightlines. Unconfirmed relatively irregular flightlines are likely to occur across the alignment given it is close to a number of these sites (within 500m).	Yes. Mitigation required.
Egish	Between Towers 160 and 169 the alignment passes between Lough Egish and Morne.	Flightlines recorded in 1% surveys - one identified flightline observed by 4 birds across the alignment during 63 surveys. Very irregular flightlines and very low numbers recorded in the vicinity of the alignment.	Yes. Precautionary Mitigation required (also for MS and CA).
Lough Nahinch	The northern section of the alignment between 115 and 118.	No flightlines observed following 25 flightline surveys. Whooper Swans are very irregular in this area.	No. Mitigation not required.
Cremartin Lough (area)	The northern section of the alignment between 123 and 130.	No flightlines observed following 3 flightline surveys and regular counts of the area. Whooper Swans not recorded since January	No. Mitigation not required.

		2012	

Note: MS = Mute Swan, CA = Cormorant

306 Based on the field survey conducted, potential collision risks are identified as being at specific key areas along the proposed development. These areas include:

- At Ballintra (500m west of Tower 143) a regular flight line was confirmed between this feeding area and two small lakes namely Loughs Tonyscallan and Toome or Crinkill which are located approximately 1.5km and 2km east and south east of Ballintra respectively. This flightline crosses the alignment.

- Whooper Swans disperse between Loughs Comertagh, Mill and Raferagh (section of alignment between Towers 197 and 200) throughout the winter. They also occasionally use two further lakes close by – Loughs Greaghlone and Corvally (observed in 2013 / 2014 only). Hence unconfirmed relatively irregular flightlines cross the alignment.

- Loughs Morne and Egish (section of alignment between Towers 161 and 163). Very few Whooper Swans irregularly utilise these lakes even though these lakes are bisected by the alignment. It is considered that risks to Whooper Swans are relatively low at this location although occasional flights do occur.

307 Figure 6.3.2, **Volume 3C Figures** of the EIS details a summary of all flightlines observed over the course of the baseline studies including those at these locations which are considered relevant for consideration of potential impacts.

308 The key locations where a potential collision impact is identified are highlighted below for further consideration. The assessment is based on the identified flightlines and their regularity. Estimates of avian collision rates with powerlines from a range of other studies were reviewed (Erickson et al, 2001, Hunting, 2002, SPSSE, 2006). In particular Hunting (2002) provides a comprehensive review of studies which have examined the factors contributing to collision risk with powerlines. Based on his review of research there is some evidence to suggest that juvenile birds can be more susceptible to collision than adults and there is strong evidence to indicate that weather / visibility is a key factor increasing collision risk. Studies varied in their methodologies and target species however reported collision rates quoted ranged from <0.001 to 0.74%. With regard to the final assessment below a 'worst-case scenario' of 1% is taken and following the criteria outlined in **Table 6.5** the magnitude of this impact is considered low.

309 The evaluation of impact significance (refer methodology and terminology described in **Section 6.2.6**, **Table 6.5** and **Table 6.6**), prior to mitigation, is detailed below for Whooper Swan at relevant locations identified:

- **Ballintra Area (Whooper Swan):**

  Sensitivity = High. Whooper Swan are listed on Annex 1 (Birds Directive). The site is used in some years (2007/2008, 2008/2009, 2009/2010 and 2013/2014). An irregular County important population uses this area.

  Magnitude Description = Low. Visibility and flight activity potentially affected at this location by alignment (in association with irregular topography) which bisects a roost site at Tooncrinkell Lough and the forage area at Ballintra. Based on existing research information and observations at existing transmission lines Whooper Swan will continue to use this area and will habituate (fly over) the alignment. A low level of collisions may potentially occur with conductors / earth wire, in particular during the short term, before mature Whooper Swan habituate. Collison risk is likely to be higher for immature birds and during periods of poor visibility. Mitigation proposed in the next section will reduce collision risk.

  Significance = Low.

- **Lough Comertagh (Whooper Swan)**

  Sensitivity = High. Whooper Swan are listed on Annex 1 (Birds Directive). Lakes in this area were recorded as being used in all years and on a regular basis with very irregular (unrecorded) flightlines likely. A regular County important population uses this area.

  Magnitude Description = Low. Flight activity potentially affected at this location by alignment which bisects lake sites used. The sub-population in this area is dispersed and very sedentary with very few and irregular flights minimising collision risk. Based on existing research information and observations at existing transmission lines Whooper Swan will continue to use this area and will habituate (fly over) the alignment. A low level of collisions may potentially occur with conductors / earth wire, in particular during the short term, before mature Whooper Swan habituate. Collision risk is likely to be higher for immature birds and during periods of poor visibility. Mitigation proposed in the next section will reduce collision risk.

  Significance = Low.

- **Loughs Morne and Egish (Whooper Swan)**

  Sensitivity = Medium. Annex 1 listed. Lakes in this area to the west of Lough Morne were recorded as being used in all years and on a regular basis. The Lough Egish and Morne area which is bisected by the alignment is very irregularly used by low numbers and in this regard this sub-population is avoided though occasional flights are likely (refer to **Appendix 6.6**, **Volume 3C Appendices** of the EIS). An irregular locally important population requires consideration in this area.

  Magnitude Description = Very Low. Visibility and flight activity potentially affected at this location by alignment (in association with irregular topography) which bisects lake sites used. Based on existing research information and observations at existing transmission lines Whooper Swan will continue to use this area and will habituate (fly over) the alignment. A low level of collisions may potentially occur with conductors / earth wire, in particular during the short term, before mature Whooper Swans habituate. Collision risk is likely to be higher for immature birds and during periods of poor visibility. Mitigation proposed in the next section will reduce collision risk.

  Significance = Very Low.

310 Site specific mitigation is required to reduce this identified collision risk as much as possible. Refer to **Section 6.6.2**.

Displacement Impacts

311 The route of the alignment avoids observed foraging and roost sites (refer to **Appendix 6.6**, **Volume 3C Appendices** of the EIS). Sites where Whooper Swans were observed are located away from the alignment including the most regularly used and most important sites. The closest site regularly used is Raferagh Pond (approximately 130m). Lough Morne is an irregularly used site and is located approximately 220m from the alignment. Other sites are over 500m from the alignment. It is considered that displacement impacts are very low as no direct habitat loss will occur to roost and lakeside forage habitat observed.

6.5.3.3.1.2 Other Birds

312 A number of bird species are identified in **Table 6.11** which may potentially collide with the OHL. The key species requiring consideration are those with high susceptibility to collision. These include Mute Swan, Cormorant and Great Crested Grebe.

313 Golden Plover and Lapwing flocks are regular during spring and autumn passage periods around Lough Egish. These species will not be measurably impacted by the proposed development, the significance of potential impact is therefore considered imperceptible.

314 Mute Swan are scattered throughout a large number of lake sites in the study area. A key area where there may be a low potential impact is between Lough Egish and Lough Morne which are bisected by the alignment. Non breeding individual numbers can build up on these lakes in some years. A Mute Swan flight line between Lough Egish and Lough Morne has been confirmed. These species will not be measurably impacted (collision / displacement / loss habitat) by the proposed development and therefore the significance of the potential impact is considered imperceptible.

315 Most other lakes, other than those highlighted for Whooper Swans, typically are utilised by low densities of Mute Swan and Great Crested Grebe. Significance of potential impact is considered imperceptible.

316 Occasional trimming of hedgerows beneath lines may cause temporary disturbance to common breeding bird species that utilise the relevant hedgerows. This impact is deemed to be on-going temporary imperceptible negative impact that will recur at intervals of approximately every five years.

6.5.3.3.2 Mammals

6.5.3.3.2.1 Disturbance

317 No significant disturbance impacts are expected to protected mammals including badger, otter or bat species.

318 The level of operational traffic and ongoing maintenance is expected to be sufficiently low so as to avoid any disturbance impacts on birds and mammals that utilise the CMSA.

6.5.3.4 Operational Impacts on Key Ecological Receptors

319 A summary of potential impacts associated with the operational phase is presented in **Table 6.20**. The magnitude of the predicted impacts range from imperceptible to moderate in significance.

Table 6.20: Summary of Potential Operational Phase Impacts, prior to mitigation, on Identified Key Ecological Receptors within the CMSA

Site / Feature	Evaluation	Potential Impact Source	Assessment of Potential Impact
Designated Conservation Areas			
Lough Egish pNHA (Towers 161-163)	National	Possible collision during operation	Very Low
Non-designated Ecological Sites (listed as they occur along alignment from South to North)			

Site / Feature	Evaluation	Potential Impact Source	Assessment of Potential Impact
Cordoagh Scrub (Towers 227-228)	Local Importance (Higher Value)	Any maintenance works may cause disturbance to badgers resident in the area (known sett occurs approximately 60m from tower location).	Temporary Minor
Corglass Stream (Towers 221-222)	Local Importance (Higher Value)	Ongoing tree trimming will be required.	Imperceptible
Lisagoan Stream (Towers 213-214)	Local Importance (Higher Value)	Ongoing tree trimming will be required.	Imperceptible
Corlea Bog (Tower 206	National	N/A	None foreseen
Cornalaragh Marsh (Tower 201)	Unknown (unsurveyed)	N/A	None foreseen
Comertagh and Raferagh Loughs (Towers 197-200)	County	Possible collision during operation.	Low negative impact
Tullynahinnera Bog (Towers 158-159)	Unknown (unsurveyed)	Possible deterioration in water quality due to surface water run-off in the event of maintenance of tower (sediment / accidental spillages). Drainage ditch and wetland approximately 20m west of Tower 158.	Imperceptible
Greagh Marsh (Towers 156-157)	Local Importance (Higher Value)	N/A	None predicted
Drumhawan (Towers 150-151)	Local Importance (Higher Value)	Any maintenance works may cause disturbance to badgers resident in the area (known sett occurs approximately 25m from the tower location). Ongoing tree trimming will be required.	Temporary Moderate. Long term imperceptible
Clogher Marsh (Towers 144-146)	Local Importance (Higher Value)	Ongoing tree trimming will be required.	Long term imperceptible
Ballintra (500m west of Tower 142)	County	Possible collision during operation.	Low
Terrygreeghan Marsh (Towers 142-143)	Local Importance (Higher Value)	Maintenance works may cause disturbance to badgers resident in the area (known sett occurs beneath the line in vicinity of mature trees). Ongoing tree trimming will be required.	Temporary moderate Imperceptible
Cornanure Marsh (Towers 138-139)	Local Importance (Higher Value)	Ongoing tree trimming along northern boundary of site.	Imperceptible
Caraghramer Marsh (Towers 135 – 136)	Local Importance (Higher Value)	NA	None foreseen

Site / Feature	Evaluation	Potential Impact Source	Assessment of Potential Impact
Clarderry Bog (Towers 127-128)	County importance	Ongoing tree trimming along the southern boundary of site.	Imperceptible
Tassan Grassland (Towers 117-118)	National Importance	Lopping of some higher limbs of mature trees will be required along eastern boundary of site. Damage may be caused to grassland if heavy machinery is used.	Imperceptible
Farmland at Latnakelly (Towers 113-114)	Local Importance (Higher Value)	Maintenance works may cause disturbance to badgers resident in the area (known active main sett occurs approximately 115m from tower location in vicinity of mature trees beneath the line). Ongoing tree trimming will be required.	Temporary moderate Imperceptible
Annaglogh grassland and scrub (Towers 110-111)	Local Importance (Higher Value)	Maintenance works may cause short term cause disturbance to semi-natural grassland in southern part of site.	Imperceptible
Habitats			
Hedgerows / Treelines	Cumulatively the network of these habitats is of high value to wildlife by providing ecological corridors (Article 10 Habitats Directive).	Trimming of trees that occur beneath conductors. It is predicted that such trimming will be required on an ongoing basis at 92 hedgerows and 56 treelines during operation phase.	Imperceptible
Watercourses	Local Importance (Higher Value)	Maintenance works: potential release of sediment during excavation and movement of earthen material. Construction activity (concrete pouring / re-fuelling etc.) at sites in proximity to drainage ditches and natural watercourses.	Imperceptible
Protected Species			
Whooper Swans	Annex I EU Birds Directive	Possible collision during operation.	Low negative impact
Badger	Wildlife (amendment) Act 2000	Disturbance to resident badger population associated with maintenance works.	Temporary Moderate
Otter	Annex II of Habitats Directive Annex IV of Habitats Directive	Maintenance related activity may give rise to disturbance. Absence of suitable habitat in proximity of works areas means this impact is extremely unlikely to occur.	Temporary Moderate
Bats	Wildlife (amendment) Act 2000; Annex IV of	NA	None predicted

Site / Feature	Evaluation	Potential Impact Source	Assessment of Potential Impact
	Habitats Directive		

Note 1: Collision risk assessment for Whooper Swan based on Percival (2003)

6.5.4 Decommissioning

320 The proposed development will become a permanent part of the transmission infrastructure. The expected lifespan of the development is in the region of 50 to 80 years. This will be achieved by routine maintenance and replacement of hardware as required. There are no plans for the decommissioning of the OHL. In the event that part of, or the entire proposed infrastructure is to be decommissioned, all towers, equipment and material to be decommissioned will be removed off site and the land reinstated. Impacts would be expected to be less than during the construction phase and would be of short term duration.

6.6 MITIGATION MEASURES

6.6.1 Mitigation by Avoidance

321 Consideration of various design options has led to the current proposed design that is deemed to have the least ecological impact taking account all other location factors and constraints.

322 The alignment has been selected to avoid all designated areas.

323 Towers, temporary access routes and stringing areas avoid wetland sites that are common throughout the wider study area.

324 Where possible, towers (and indicative work areas), temporary access routes and stringing areas have been located away from habitats and sites of ecological importance. Furthermore, where possible, access to tower locations will be via existing tracks used by farm machinery on a regular basis. Existing field access points (e.g. gaps / farm gates) to local roads will be used to avoid creating additional hedgerow gaps.

325 The alignment has avoided areas where Whooper Swans concentrate for foraging. Key roost sites are generally at least 500m from the alignment except at Raferagh Lough (regular site) and Lough Morne (irregular site).

326 It also avoids locally important breeding bird habitats such as semi-natural woodlands, wetlands and the vast majority of hedgerow / treelines.

327 The tower locations and temporary access routes will avoid potential breeding sites that protected mammals (such as otter, badger, bats) and birds typically use including: field boundaries (treelines / hedgerows), stream / rivers and associated riparian habitats, wetlands, woodlands, old buildings, caves, bridges and souterrains etc.

328 All towers are located a minimum of 20m away from major rivers and 5m away from other smaller natural watercourses.

329 Suitable breeding sites for amphibians such as drainage ditches will be avoided as far as possible.

330 During the construction phase, as part of the construction management plan, aquatic monitoring will take place by a suitably qualified Ecological Clerk of Works (ECoW) to confirm that pollution control measures are effective. Following detailed design consideration, and as required, temporary silt screens will be installed in drains / small streams, deemed to be possibly at risk of water pollutant discharge.

331 It is intended that excavated material will be used on site for landscaping or for re-instatement measures within managed farmland only. Semi-natural habitats such as wetlands and hedgerows will be avoided. Other wastes will be removed for disposal at an appropriate licensed waste disposal facility (refer to **Chapter 12** of this volume of the EIS).

332 The spread and introduction of invasive species and noxious weeds will be avoided by adopting appropriate mitigation measures as per guidance issued by the NRA (2010). Any invasive plant material noted on site will be removed off site and disposed of at appropriate licensed waste disposal facility. Any invasive species found to occur within 15m of working areas will require a specialist method statement for its eradication to avoid the spread of invasive species, this will ensure compliance with the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I. No. 477 of 2011]. The presence of non-native species and requirement for actions will be confirmed by the ECoW.

333 For all landscaping or tree planting / must ensure that only native species are utilised. All invasive species should be avoided.

6.6.2 Mitigation by Reduction

334 The potential impacts detailed in **Section 6.5** can be reduced through careful mitigation. The key approach for minimising risks such as disturbance to wildlife and protection of water quality is the appointment of an appropriately experienced ECoW on site during construction, to advise on the detailed implementation of the design approach and ecological mitigation as detailed in

the EIS and as will be detailed in the CEMP. An outline CEMP has been included in **Appendix 7.1, Volume 3B** of the EIS, and forms part of the application documentation.

335 The role of the ECoW will include:

- Supervision of construction works and ensure compliance with legislation;
- Monitoring habitats and species during the course of construction works and effectiveness of mitigation;
- Provision of advice regarding the avoidance and minimisation of potential disturbance to wildlife;
- Provide recommendations on appropriate responses / actions to site specific issues (e.g. identification of previously unrecorded breeding sites during construction works); and
- Liaison with NPWS, IFI and other prescribed authorities, when required.

336 In addition to the construction phase, it is recommended that the ECoW will be appointed during the pre-construction (landowner liaison stage) and post construction phases (minimum two years) in particular, to monitor mitigation measures, refer to **Section 6.7.1**.

6.6.2.1 Construction Phase Mitigation

337 A CEMP will be implemented for the construction phase of the project with respect to all mitigation detailed in this EIS. The mitigation measures to be included in the CEMP in relation to flora and fauna will be implemented as part of the construction management. All relevant mitigation measures set out in the EIS are included in the outline CEMP and will be incorporated into the final CEMP (refer to **Appendix 7.1, Volume 3B** of the EIS).

338 Work method statements, which will incorpoarate all the mitigation measures identified in the EIS, will be developed by construction and site contractors, agreed with statutory authorities and ECoW (where appropriate), and implemented by construction crews for all construction activities, and these will be detailed in the CEMP.

6.6.2.1.1 Habitats

339 The works area will be clearly marked. Hedgerow, tree and scrub vegetation that are to be retained which are located in close proximity to working areas will be clearly marked and fenced off to avoid accidental damage during excavations and site preparation. No materials will be

stored within 5m of hedgerows / trees / scrub. Materials, especially soil burden can prevent air and water circulating to the roots of trees / shrubs.

340 Where towers are to be located on field boundaries comprised of hedgerows, the vegetation will be removed to ground level. Works will be implemented in a manner to minimise soil disturbance and compaction outside of the tower foundations. Post construction, a wooden fence will be installed around the tower base to prevent livestock access and replanting carried out with low growing woody species of local provenance including Blackthorn, Hawthorn and Hazel. This will allow re-establishment of the hedgerow in the gap where the tower is located. It is expected that the hedgerows would be sufficiently robust within five years following construction that fencing could be removed. Where required, disturbed areas of grassland will be appropriately prepared and reseeded with a locally sourced grass mix, similar to that already occurring within the surrounding fields. Reseeding works will be undertaken within three weeks of construction works to avoid flushing of exposed soil downstream.

341 Tree cutting and lopping at linear woodland features under conductors will be undertaken in a manner which minimises the requirement for extensive tree lopping. Large mature trees will be pollarded by qualified foresters / tree surgeons so as to retain as much of the treeline / linear habitat structure and in a manner which retains ground flora species and which does not kill the tree. The trimming regime will involve a scalloping or profiling effect which will minimise the effect on vegetation. Overall, it will not change the structure and ecological function of these linear woodland features, and will not measurably affect associated fauna post construction.

342 There will potentially be a requirement for 74m wide corridors in woodland identified in **Table 6.17**. Machinery access to these areas will be minimised as much as possible to minimise soil compaction and damage to woodland ground flora. In consultation with landowners areas of dead wood will be retained so as to improve local biodiversity. Low growing scrub (woodland vegetation) habitat will be retained under the conductors.

343 Where construction work is required close to mature trees, the National Joint Utilities Group '*Guidelines for the Planning Installation and Maintenance of Utility Services in Proximity to* Trees' (NJUG 10) will be followed so as to minimise damage.

344 Tree cutting will be undertaken by a qualified foresters / tree surgeon and aimed at minimising the degree of cutting. The ECoW will provide input where necessary, to minimise the impact on surrounding habitats and / or species e.g. through suggesting the direction of tree fall. As part of this the ECoW will also advise on sensitive areas to avoid in particular at river crossings.

345 As noted, impacts to hedgerows and linear woodland caused by access requirements will be avoided by the selection of access routes via existing farm access points and gaps in

hedgerows. Existing gates onto local roads will be used, rather than creating additional hedgerow gaps. Any alteration to temporary access routes will be agreed with the ECoW in advance to ensure avoidance of impacts to ecologically sensitive receptors.

346 Following the completion of construction any temporary material used to allow machinery access will be removed post works to allow for habitat regeneration.

6.6.2.1.2 Water Quality

347 A drainage and sediment control plan will be implemented by contractors during site works. The plan will detail specific mitigation measures (taken from mitigation measures, outlined in this chapter and **Chapter 8** of this volume of the EIS to address site specific issues. This will be implemented as part of the CEMP. The drainage and sediment control plan will implement all specific mitigation measures outlined in the EIS to address site specific issues and will achieve this by including all relevant mitigation measures detailed in the outline CEMP. The outline CEMP has been included in **Appendix 7.1, Volume 3B** of the EIS, and forms part of the application documentation.

348 Risks of significant amounts of potential pollutants from construction activities reaching local watercourses are considered minimal due to the strict pollution control measures which will be taken. The CEMP will be prepared at detail design stage which will include measures for works in the vicinity of watercourses based on mitigation measures detailed in **Chapter 8** of this volume of the EIS. As noted above, the outline CEMP has been submitted with this EIS and forms part of the application documentation. This approach has referred to relevant requirements for the *Protection of Fisheries Habitats during Construction and Development Works at River Sites* (Eastern Regional Fisheries Board, 2006).

349 Potential impacts caused by spillages, drip and or spills during the construction phase will be reduced by the maintenance of an adequate supply of spill kits and hydrocarbon adsorbent packs at labelled stations at all working areas, with all vehicles on site carrying spill kits. All personnel will be fully trained in the use of the equipment. Any used spill kits will be disposed of appropriately off site.

350 As part of the CEMP, a spill method statement will be drawn up which all personnel will adhere to.

351 A 24 hour, 7 day per week Emergency Response protocol for leaks / spill of hydrocarbons and / or chemicals will be drawn up and implemented. This must be implementable in the unlikely event of an accidental spillage of chemicals, hydrocarbons or release of sediment to the surface or ground water system.

352 No infilling or storage of soil cleared for construction works will take place within 5m of drainage ditches and other identified wetlands or other habitats of ecological value as identified by the ECoW. Excavated materials from construction works will be deposited within the works area where there is no significant risk of run-off into local watercourses.

353 During the excavation and removal of soil for construction works, fuel oil interceptors and silt traps or sedimentation ponds will intercept surface water run-off in particular at tower locations close to (within 5m of smaller streams and drainage ditches). As part of their environmental and works requirements, the contractor will establish a maintenance schedule and operational procedure / method statement for silt and pollution control measures during the construction period. This will be monitored for effectiveness by the contractor and ECoW.

354 Oil, petrol and other fuels containers will be double-skinned and bunded to be able to contain 110% volume. Bund specification will conform to the current best practice for oil storage such as Enterprise Ireland's *Best Practice Guide BPGCS005 Oil Storage Guidelines*. All waste oil, empty oil containers and other hazardous wastes will be disposed of in conjunction with the requirements of the *Waste Management Acts 1996 to 2014*, as amended.

355 Pouring of concrete will only take place in designated locations and concrete washings will be treated off site following current best practice guidelines including *Pollution Prevention Guidelines for Northern Ireland and Scotland SEPA PPG 5* (2007). Concrete washings will not be discharged to surface water and poured concrete will be allowed to cure for a minimum of 48 hours in the dry.

356 Raw or uncured waste concrete or similar will be disposed of by removal to approved / licensed disposal site. It is noted that there will be a concrete truck wash out at the batching plant area. This washout will be directed to the three bay water recycler provided at this location.

357 Water courses which have been identified as potentially at risk of pollution from construction activities, will have appropriately designed silt traps (based on drain and potential runoff characteristics identified) and installed in consultation with IFI (where necessary).

358 Refuelling of machinery, will be carried out on level, hard surfaced designated areas where possible, at least 20m from watercourses and drainage ditches. In the event that refuelling is required outside of this area, fuel will be transported in a mobile double skinned tank and a spill tray will be employed during refuelling operations.

359 All machinery will be regularly maintained and checks for leaks. Services will not be undertaken within 50m of aquatic features, including dry drainage ditches. Servicing must be undertaken on level, hard surfaced designated areas where possible.

360 Construction materials such as hydrocarbon, cement and grout will be stored in bunded areas or silos which will be regularly inspected by the site manager. General construction practices will adhere to the requirements for the protection of fisheries habitat during construction and development works at river sites published by IFI (Eastern Regional Fisheries Board 2006).

361 Weather conditions will be taken into account when planning construction activities to minimise risk of extreme run-off from works areas.

6.6.2.1.3 Fauna (Birds and Mammals)

362 Scrub, hedgerow or tree removal / trimming should be undertaken outside of the bird nesting period, which begins on March 1st and continues until August 31st, in order to protect nesting birds. All birds and their nesting places are protected under the *Irish Wildlife Act 1976* (as amended), though there are exceptions for exempted developments.

363 Given the intervening timescale between any decision to grant planning approval and the commencement of the actual site clearance and construction, and once exact felling requirements of the project are known, confirmatory bat surveys of specific mature trees identified for felling will be undertaken by a bat specialist prior to tree cutting, in order to verify and update the conclusion set out in this EIS. This pre-construction survey will aim to re-confirm the number and location of bat roosts that would be impacted by felling (no bat roosts were confirmed as part of field surveys for the proposed development). In order to proceed with the felling of trees that may be identified as bat roosts, it will be necessary to acquire a derogation license from NPWS. NRA, (2006a) guidance in relation to tree felling and hedgerow removal will be followed throughout the site clearance phase of the project. These measures will be outlined in detail in the CEMP that is to be drawn up for the construction phase of the proposed development.

364 Pre-construction surveys will be undertaken at watercourses and adjacent habitats that occur in close proximity to tree felling areas to the presence / absence of otter breeding sites in relation to the conditions which have been evaluated in the EIS. This is required due to the strict legal protection of otters (and their resting or breeding places) and given the likely timescale between any decision to grant planning approval and the commencement of development (likely to be greater than two years). Details of the pre-construction survey methodology and the approach to be taken will be outlined in the CEMP that is to be drawn up for the construction phase of the development with reference to relevant guidance documents (NRA 2006c). No direct impacts are expected to arise as works will require an agreed method statement and be monitored by the ECoW.

365 Pre-construction surveys for badger setts, to confirm the conclusion set out in this EIS, will be conducted at woody vegetation required for cutting. This is required to inform site clearance

activities given the legal protection of badger breeding sites and expected timescale between any decision to grant planning approval and construction (likely to be greater than two years). A buffer zone will be established around any known badger setts through the erection of temporary posts and wires with 'no entry' signs erected. In the case of the known badger sett located in proximity to Tower 151, confirmatory pre construction surveys will also be undertaken at this badger sett location. All works to be undertaken at Tower 151 will be carried out under license from NPWS due to potential disturbance of the sett. Based on the current level of use of the site by badgers and the location of sett entrances, exclusion and destruction of the sett is not foreseen as a requirement as the works are sufficiently removed from the sett entrances. No direct impacts are expected to arise as works will require an agreed method statement and be monitored by the ECoW (NRA 2006b).

6.6.2.2 Operational Phase Mitigation

6.6.2.2.1 Water Quality

366 There will be no direct discharges to the water environment during the operational phase. No other potentially significant impacts to water quality are anticipated during the operational phase.

6.6.2.2.2 Fauna (Birds)

367 The key operational impacts identified are associated with the potential collision risk to Whooper Swans at locations identified in **Table 6.20**.

368 Mitigation by avoidance of feeding and roosting sites has been implemented as far as possible in the selection of the alignment. However, given the geographic spread of Whooper Swans in this area and other significant non-ornithological constraints, it will not be possible to avoid crossing regular Whooper Swan flightlines between roost and feeding sites. In this regard there is potential for collisions in particular with the earth wire component of the alignment.

369 Mitigation measures to reduce impacts at specific sites are required in the form of earth wire marking with bird flight diverters. Based on available information and research based studies reviewed, this will reduce potential collision risks associated with the new alignment. Studies where a reduction in swan collisions was observed on transmission lines include Frost (2008) and Slater (2006). Barrientos *et al*. (2011) in a review of 21 line marking studies concluded that line marking reduced bird mortalities by 55-94% where an observed effect was noted pre-line marking. In this regard, precautionary line marking is a best practice approach to minimise the collision risk of the proposed alignment. Swan flight diverters type, effectiveness and configuration are discussed in detail in APPLIC (2012) and this informed the proposed

mitigation. As with all line marking mitigation, the success of this will require ongoing monitoring, as specified in **Section 6.7.1**.

370 The type of flight diverters recommended are swan flight diverter markers constructed from high impact grey PVC (UV stabilised) fitted approximately 5m apart along each earth wire. This line marking is proposed for the earth wires to increase visibility of the earth wires to flying birds.

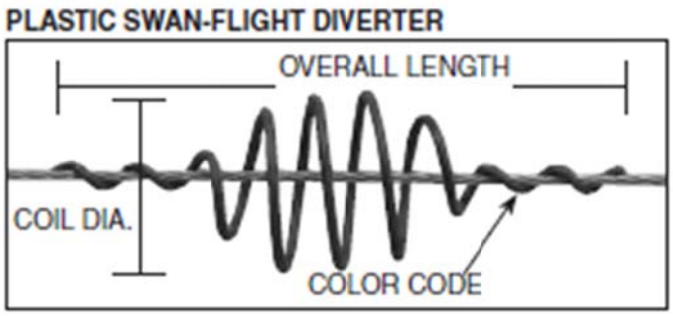

Figure 6.2: Swan Flight Diverter

371 Areas identified as requiring line marking are defined as: "*Locations in which the alignment bisects observed relatively regular flight paths by Whooper Swan between feeding and roosting areas".*

372 Areas and lengths of alignment proposed for marking with flight diverters are highlighted in Figures 6.3.3 and 6.3.4, **Volume 3C Figures** of the EIS, and described as follows:

- Between Towers 196 and 203 in the vicinity of Comertagh and Raferagh Loughs, it is recommended that approximately 2.5km of the earth wires are marked with swan flight diverters (see Figure 6.3.4, **Volume 3C Figures** of the EIS). Key target bird species identified which may collide with the alignment include Whooper Swans which were recorded using flightlines that cross the alignment at this location during the winter bird surveys (see Figure 6.3.2, **Volume 3C Figures** of the EIS).

- Between Towers 160 and 169 where the alignment passes to the west of Lough Egish it is recommended that approximately 3.0km of the earth wires are marked with swan flight diverters (see Figure 6.3.3, **Volume 3C Figures** of the EIS). Key target bird species identified which may collide with the alignment include Whooper Swan which were recorded using flightlines that cross the alignment at this location during the winter bird surveys (see Figure 6.3.2, **Volume 3C Figures** of the EIS).

- Between Towers 139 and 147 where the alignment passes to the east of Ballintra it is recommended that approximately 2.8km of the earth wires are marked with swan flight

diverters (see Figure 6.3.3, **Volume 3C Figures** of the EIS). Key target bird species identified which may collide with the alignment include Whooper Swan which were recorded using flightlines that cross the alignment at this location during the winter bird surveys (see Figure 6.3.2, **Volume 3C Figures** of the EIS).

373 Scrub, hedgerow or tree trimming should be undertaken outside of the bird nesting period, which begins on March 1st and continues until August 31st, in order to protect nesting birds. All birds and their nesting places are protected under the *Irish Wildlife Act 1976* (as amended 2000), though there are exceptions for exempted developments.

6.6.3 Mitigation by Remedy

374 The following remedial mitigation is proposed:

- Hedgerow re-establishment success will be checked two years after construction at tower locations by the ECoW. Where poor or no hedgerow re-growth has occurred, replanting with similar native hedgerow species will be carried out so as to ensure linear habitats are retained / re-established. If new fencing is required or maintenance works are required then this will be implemented in consultation with the landowner.

375 Monitoring will be undertaken to confirm the effectiveness of proposed flight diverter mitigation (see **Section 6.7.1** for further information).

6.7 RESIDUAL IMPACTS

376 The post mitigation residual impacts for each Key Ecological Receptors identified as potentially impacted during the construction and operational phases are detailed below in **Tables 6.21** and **6.22** respectively.

377 In summary the residual adverse impacts of the proposed development on ecological receptors identified within the study area range from imperceptible to minor in significance.

Table 6.21: Summary of Residual Impacts (following adoption of mitigation) Relevant to Specific Key Ecological Receptors Associated with the Construction Phase

Site / Feature / Area	Description of Impact Source	Potential Impact	Mitigation	Residual Impact
Designated Conservation Areas				
Lough Egish pNHA (Towers 161-163)	Construction related noise and activity may cause temporary disturbance to foraging Whooper Swans.	Temporary imperceptible	CEMP to outline construction stage monitoring by ECoW so as to confirm impacts as detailed and implement approaches for minimising impacts if relevant.	Imperceptible
Non-designated Ecological Sites (listed as they occur along alignment from South to North)				
Cordoagh Scrub (Towers 227-228)	Construction related noise and activity may cause disturbance to badgers resident in the area (known sett occurs approximately 60m of tower location) if construction undertaken in breeding season. Minor temporary habitat disturbance associated with erection of guard poles.	Temporary minor	Undertake land clearance and construction works outside of badger breeding season.	Imperceptible
Corglass Stream (Towers 221-222)	Lopping of some higher limbs of mature Ash trees is likely to be required. Suitable mammal habitat is present. Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible	CEMP to include measures to minimise works area. Pollard rather than completely lop trees. Pre-construction monitoring by ECoW to inform if timing constraints on works activity regarding protected species breeding sites (see below).	Imperceptible
Lisagoan Stream (Towers 213-214)	Lopping of some higher limbs of mature Ash trees is likely to be required. Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible	CEMP to include measures to minimise works area. Pollard rather than completely lop trees. Pre-construction monitoring by ECoW to inform if timing constraints on works activity regarding protected species breeding sites (see below).	Imperceptible
Corlea Bog (Towers 206	Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible	CEMP to include measures to minimise works area and limit disturbance.	Imperceptible

Site / Feature / Area	Description of Impact Source	Potential Impact	Mitigation	Residual Impact
Cornalaragh Marsh (Tower 201	Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible	CEMP to include measures to minimise works area and limit disturbance.	Imperceptible
Comertagh and Raferagh Loughs (Towers 197-200)	Construction related noise and activity may cause disturbance to foraging Whooper Swans.	Temporary imperceptible	CEMP to outline construction stage monitoring by ECoW so as to confirm impacts as detailed and implement approaches for minimising impacts if relevant.	Imperceptible
Tullynahinnera Bog (Tower 158-159)	Possible deterioration in water quality due to surface water run-off (sediment / accidental spillages). Drainage ditch and wetland approximately 20m west of Tower 158.	Imperceptible	CEMP to include measures to control water pollution.	Imperceptible
Greagh Marsh (Towers 156-157)	Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible	CEMP to include measures to minimise works area and limit disturbance.	Imperceptible
Drumhawan (Towers 150-151)	Disturbance on resident badger population associated with construction activity. Known sett occurs beneath line (approximately 25m from the tower). Trimming and lopping of mature treelines between tower locations.	Temporary moderate Imperceptible	Works to be carried out under license from NPWS and will be bound by the conditions set out in that licence. CEMP to include measures to minimise works area. Pollard rather than completely lop trees. Pre-construction monitoring by ECoW to inform if timing constraints on works activity regarding protected species breeding sites (see below).	Imperceptible
Clogher Marsh (Towers 144-146)	Trimming and lopping of mature trees between tower locations.	Imperceptible	CEMP to include measures to minimise works area. Pollard rather than completely lop trees. Pre-construction monitoring by ECoW to inform if timing constraints on works activity regarding protected species breeding sites (see below).	Imperceptible
Ballintra (500m west of Tower 143)	Construction related noise and activity may cause temporary	Imperceptible	CEMP to outline construction stage monitoring by ECoW	Imperceptible

Site / Feature / Area	Description of Impact Source	Potential Impact	Mitigation	Residual Impact
	disturbance to foraging Whooper Swans.		so as to confirm impacts as detailed and implement approaches for minimising impacts if relevant.	
Terrygreeghan Marsh (Towers 142-143)	Disturbance on resident badger population associated with construction activity. Known sett occurs at treeline beneath line. Trimming and lopping of mature Ash between tower locations. Minor temporary disturbance associated with erection of guard poles.	Temporary moderate Imperceptible	CEMP to include measures to minimise works area. Pollard rather than completely lop trees. Pre-construction monitoring by ECoW to inform if timing constraints on works activity regarding protected species breeding sites (see below).	Imperceptible
Cornanure Marsh (Towers 138-139)	Lopping of some higher limbs of mature Ash trees is likely to be required along northern boundary of site.	Imperceptible	CEMP to include measures to minimise works area. Pollard rather than completely lop trees. Pre-construction monitoring by ECoW to inform if timing constraints on works activity regarding protected species breeding sites (see below).	Imperceptible
Caraghramer Marsh (Tower 135 – 136)	Minor temporary habitat disturbance associated with erection of guard poles.	Imperceptible	CEMP to include measures to minimise works area and limit disturbance.	Imperceptible
Clarderry Bog (Towers 127-128)	Lopping of some higher limbs of mature Ash trees is likely to be required along southern boundary of site.	Imperceptible	CEMP to include measures to minimise works area. Pollard rather than completely lop trees. Pre-construction monitoring by ECoW to inform if timing constraints on works activity regarding protected species breeding sites (see below).	Imperceptible
Tassan Grassland (Towers 117-118)	Lopping of some higher limbs of larger trees will be required in southern part of site. Potential damage to grassland surface if heavy machinery used to access trimming / lopping site.	Imperceptible	Undertake felling from western side of boundary fence thereby avoiding the requirement to traverse to grassland with heavy machinery.	Imperceptible
Farmland at Latnakelly (Towers 113-	Disturbance on resident badger population associated with	Temporary moderate	CEMP to include measures to minimise works area. Pollard	Imperceptible

Site / Feature / Area	Description of Impact Source	Potential Impact	Mitigation	Residual Impact
114)	construction activity. Known sett located 115m from tower at hedgerow beneath alignment. Trimming and lopping of mature Ash between tower locations.	Imperceptible	rather than completely lop trees. Pre-construction monitoring by ECoW to inform if timing constraints on works activity regarding protected species breeding sites (see below).	
Annaglogh grassland and scrub (Towers 110-111)	Short term habitat loss and disturbance affecting approximately 0.1ha of dry calcareous (GS1).	Imperceptible	CEMP to include measures to minimise works area and soil compaction. Reinstate grassland using appropriate seed mix of local provenance.	Imperceptible
Habitats				
Hedgerows / Treelines	Vegetation clearance at construction sites. Trimming and lopping of trees that occur beneath conductors. It is predicted that 180m of hedgerow (6 locations) and 60m of treelines (two locations) will need to be removed to facilitate the development. A further 92 hedgerows and 56 treelines will be affected by trimming and lopping of trees.	Moderate	CEMP to include measures to minimise works area and soil compaction. Fence area post works so gap with tower is not accessible to livestock. Replant with low growing native woody species similar to surrounding species. Monitor success re-growth and additional replanting as required. In the case of hedgerows / treelines that are oversailed, the CEMP will include measures to minimise works area. Pollard rather than completely lop trees. Pre-construction monitoring by ECoW to inform if timing constraints on works activity regarding protected species breeding sites (see below).	Minor
Watercourses	Release of sediment during excavation and movement of earthen material. Construction activity (concrete pouring / refuelling etc.) at sites in proximity to drainage ditches and natural watercourses. Few drainage features occur in proximity to works	Moderate	CEMP to include measures to control water pollution.	Imperceptible

Site / Feature / Area	Description of Impact Source	Potential Impact	Mitigation	Residual Impact
	areas.			
Protected Species				
Whooper Swans	Construction related noise and activity may cause temporary disturbance to foraging Whooper Swans.	Temporary imperceptible	CEMP to outline construction stage monitoring by ECoW so as to confirm impacts as detailed and implement approaches for minimising impacts if relevant.	Imperceptible
Badger	Disturbance on resident badger population associated with construction activity.	Temporary moderate	Known badger setts mostly avoided by design of project. Pre-construction surveys to confirm the conditions which have been anticipated to be encountered in the EIS will be undertaken by ECoW to confirm findings of current assessment and advise on appropriate mitigation for inclusion in the CEMP.	Imperceptible
Otter	Construction related activity that may give rise to disturbance. Absence of suitable habitat in proximity of works areas means this impact is extremely unlikely to occur.	Temporary moderate	Tower locations avoid potentially suitable habitat. Pre-construction surveys to confirm the conditions which have been anticipated to be encountered in the EIS will be undertaken by ECoW to confirm findings of current assessment and advise on appropriate mitigation for inclusion in the CEMP.	Imperceptible
Bats	Tree felling and vegetation management may impact temporary roost sites. Impact is deemed unlikely due to the rare occurrence of mature trees that could potentially provide roost sites. Loss of foraging habitat in those areas where hedgerows / treelines are to be removed (at eight tower locations, totalling 240m in length).	Temporary moderate Permanent imperceptible	Pre-construction surveys to confirm the conditions which have been anticipated to be encountered in the EIS will be undertaken by ECoW to confirm findings of current assessment and advise on appropriate mitigation for inclusion in the CEMP following guidance as outlined in NRA (2005).	Imperceptible

Table 6.22: Summary of Residual Impacts (following adoption of mitigation) relevant to Specific Key Ecological Receptors associated with the Operational Phase

Site / Feature / Area	Description of Impact Source	Potential Impact	Mitigation	Residual Impact
Designated Conservation Areas				
Lough Egish pNHA (Towers 161-163)	Collision with earth and conductor wires.	Very Low	Earth wire marked with flight diverters.	Imperceptible
Non-designated Ecological Sites (listed as they occur along alignment from South to North)				
Cordoagh Scrub (Towers 227-228)	Any maintenance works may cause disturbance to badgers resident in the area (known sett occurs approximately 60m from tower location).	Temporary minor	Should maintenance works be required then mitigation applied during construction phase will be implemented.	Imperceptible
Corglass Stream (Towers 221-222)	Ongoing tree trimming will be required.	Imperceptible	Works should be undertaken outside of bird breeding season.	Imperceptible
Lisagoan Stream (Towers 213-214)	Ongoing tree trimming will be required.	Imperceptible	Works should be undertaken outside of bird breeding season.	Imperceptible
Comertagh and Raferagh Loughs (Towers 197-200)	Collision with earth and conductor wires.	Low	Earth wire marked with flight diverters.	Imperceptible
Tullynahinnera Bog (Towers 158-159)	Possible deterioration in water quality due to surface water run-off in the event of maintenance of tower (sediment / accidental spillages). Drainage ditch and wetland approximately 20m west of structure 158.	Imperceptible	In the event of maintenance works measures to control water pollution in line with those applied during construction phase will be implemented.	Imperceptible
Drumhawan (Towers 150-151)	Any maintenance works may cause disturbance to badgers resident in the area (known sett occurs approximately 25m from the tower location). On-going tree trimming will be required.	Temporary moderate Long term imperceptible	Should maintenance works be required then mitigation applied during construction phase will be implemented. Tree trimming should be undertaken outside of bird breeding season.	Imperceptible
Clogher Marsh (Towers 144-146)	Ongoing tree trimming will be required.	Long term imperceptible	Tree trimming should be undertaken outside of bird breeding season.	Imperceptible
Ballintra	Collision with earth	Low	Earth wire marked with	Imperceptible

Site / Feature / Area	Description of Impact Source	Potential Impact	Mitigation	Residual Impact
(500m west of Tower 143)	and conductor wires.		flight diverters.	
Terrygreeghan Marsh (Towers 142-143)	Maintenance works may cause disturbance to badgers resident in the area (known sett occurs beneath line in vicinity of mature trees). On-going tree trimming will be required.	Temporary moderate Imperceptible	Should maintenance works be required then mitigation applied during construction phase will be implemented. Tree trimming should be undertaken outside of bird breeding season.	Imperceptible
Cornanure Marsh (Towers 138-139)	Ongoing tree trimming along northern boundary of site.	Imperceptible	Tree trimming should be undertaken outside of bird breeding season.	Imperceptible
Clarderry Bog (Towers 127-128)	Ongoing tree trimming along southern boundary of site.	Imperceptible	Tree trimming should be undertaken outside of bird breeding season.	Imperceptible
Tassan Grassland (Towers 117-118)	Lopping of some higher limbs of mature trees will be required along eastern boundary of site. Damage may be caused to grassland if heavy machinery is used.	Imperceptible	Undertake felling from western side of boundary fence thereby avoiding the requirement to traverse to grassland with heavy machinery.	Imperceptible
Farmland at Latnakelly (Towers 113-114)	Maintenance works may cause disturbance to badgers resident in the area (known active main sett occurs approximately 115m from tower location in vicinity of mature trees beneath line). Ongoing tree trimming will be required.	Temporary moderate Imperceptible	Should maintenance works be required then mitigation applied during construction phase will be implemented. Tree trimming should be undertaken outside of bird breeding season.	Imperceptible
Annaglogh grassland and scrub (Towers 110-111)	Maintenance works may short term cause disturbance to semi-natural grassland in southern part of site.	Imperceptible	Should maintenance works be required then mitigation applied during construction phase will be implemented.	Imperceptible
Habitats				
Hedgerows / Treelines	Trimming of trees that occur beneath conductors. It is predicted that such trimming will be required on an ongoing basis at 92 hedgerows and 56 treelines during	Imperceptible	Should maintenance works be required then mitigation applied during construction phase will be implemented. Tree trimming should be undertaken outside of bird breeding	Imperceptible

Site / Feature / Area	Description of Impact Source	Potential Impact	Mitigation	Residual Impact
	operation phase.		season.	
Watercourses	Maintenance works: Release of sediment during excavation and movement of earthen material. Construction activity (concrete pouring / refuelling etc.) at sites in proximity to drainage ditches and natural watercourses.	Moderate	In the event of maintenance works measures to control water pollution in line with those applied during construction phase will be implemented.	Imperceptible
Site / Feature / Area	**Description of Impact Source**	**Potential Impact**	**Mitigation**	**Residual Impact**
Protected Species				
Whooper Swans	Collision with earth and conductor wires.	Low	Earth wire marked with flight diverters.	Negligible[1]
Badger	Disturbance to resident badger population associated with maintenance works.	Temporary moderate	Should maintenance works be required then mitigation applied during construction phase will be implemented.	Imperceptible
Otter	Maintenance related activity may give rise to disturbance. Absence of suitable habitat in proximity of works areas means this impact is extremely unlikely to occur.	Temporary moderate	Should maintenance works be required then mitigation applied during construction phase will be implemented.	Imperceptible
Bats	N/A	None foreseen	N/A	None foreseen

Note 1: Collision risk assessment for Whooper Swan based on Percival (2003)

6.7.1 MONITORING

378 In order to ensure the effectiveness of the mitigation measures monitoring will be required, specifically regarding the success of implementing Whooper Swan bird flight diverters. This monitoring will be conducted by an appropriately qualified and experienced ornithologist in consultation with NPWS.

379 A clearly defined monitoring programme will be implemented for Whooper Swans to assess the effectiveness of line marking. All locations where flightlines were identified will be surveyed during the pre-construction stage, construction and operation stages (up to 5 years). Surveys will be conducted at all sites identified, monthly between October and April when Whooper Swans are present in the area. Throughout the lifetime of the proposed monitoring works,

additional areas where flightlines or collisions are recorded will be added to the list of areas to be surveyed. Landowners with towers on their land will be engaged with and encouraged to get in touch with the bird surveyor regarding observed Whooper Swan or other bird species collisions. The results of winter monitoring studies and engagement with landowners will inform further actions to minimise risks as highly transient species (in terms of distribution and flightlines) like Whooper Swans require ongoing consideration after the planning stage. Yearly monitoring reports for the construction and operational phases will detail required actions and will be drafted in consultation with NPWS or other relevant experts as appropriate.

380 Hedgerow reestablishment at all tower locations will be monitored to ensure robust hedgerow re-establishment. Further replanting of hedgerow species and fencing will be implemented in agreement with landowners as may be required.

6.8 INTERRELATIONSHIPS BETWEEN ENVIRONMENTAL FACTORS

381 Interrelationships have been identified between impacts on flora and fauna and impacts on human beings and land use (see **Chapter 3** of this volume of the EIS). The approach of locating towers in areas of low ecological interest (mostly managed grassland) has had the effect of minimising the impacts on ecology while at the same time potentially increasing the impact on agricultural production. Some towers located, in particular, on arable farmland will lead to small permanent areas under towers where intensive agriculture will not take place. There is a potential for interactions between EMF (see **Chapter 5** of this volume of the EIS**)** and fauna species. However, the operating conditions for the proposed development will ensure that EMF will remain below the restriction levels specified in EMF guidelines for Ireland and the EU. A review of scientific research on topics relating EMF to health of animal species did not show that EMF at these levels would have adverse effects on these populations.

382 Interrelationships have been identified between flora and fauna and soils, geology and hydrogeology (see **Chapter 7** of this volume of the EIS) and between flora and fauna and water (see **Chapter 8** of this volume of the EIS). This chapter should be read in conjunction with both these chapters for a full understanding of the main interrelationships between these environmental topics.

383 The transport of soil or vegetative material during construction works could potentially facilitate the spread of invasive alien species such as Japanese Knotweed (*Fallopia japonica*). Appropriate controls will be in place to ensure that the proposed works do not result in the spread of invasive alien species. The mobilisation and transport of soil via surface water runoff could potentially impact ecologically sensitive receptors that occur within watercourses downstream of the proposed development. Soil water runoff controls during construction are also a key consideration relevant to downstream aquatic species and habitats and suitable

mitigation controls are detailed. Construction works will not be undertaken within wetland sites and no significant impacts on the eco-hydrology of wetlands are foreseen.

384 The conclusions of the water chapter (see **Chapter 8** of this volume of the EIS) are that based on a review of the construction methodology, flora and fauna and soils, geology and hydrogeology chapters; there are no significant cumulative (interrelated) impacts as a result of the proposed development. Any impacts on surface or ground water quality could impact on water dependant habitats and species that occur within the CMSA. In this regard appropriate mitigation is detailed to protect water quality which is adequate for protecting such water dependant ecological receptors.

385 There are also interrelationships between ecological impacts and landscape (see **Chapter 11** of this volume of the EIS) in the case where the removal or trimming of wooded features (including woodlands, hedgerows and treelines) may have adverse effects on both flora and fauna and landscape. As mentioned throughout this chapter, the impacts on such wooded features has been minimised by, where possible, locating towers away from hedgerows and other wooded areas. The use of bird flight diverters may also increase the visual impact of the alignment at specific location.

6.9 CONCLUSION

386 This chapter presents an evaluation of the potential ecological impacts (direct, indirect and cumulative) of the proposed development on the flora and fauna of the CMSA and details appropriate mitigation where an impact is predicted.

387 The project design has sought to minimise impacts on flora and fauna as far as possible insofar as not locating towers in semi-natural habitats of ecological value (including hedgerows) and away from rivers / streams (and associated riparian habitats). This is a key approach and best practice for avoiding and minimising impacts to ecological receptors. The context of the study area a highly managed landscape dominated by habitats of low ecological value is a key fact which has informed the overall evaluation. The key ecological features considered are rivers, boundary hedgerows / treelines and Whooper Swans. The EIS has drawn on extensive studies to inform the assessment of impacts and appropriate mitigation has been identified.

388 The development and implementation of a CEMP, which will include monitoring of construction by an ECoW, is a key instrument in ensuring the implementation of all mitigation measures during construction. Operational phase monitoring is a key recommendation regarding the success of mitigation of impacts on Whooper Swans. An outline CEMP has been included in **Appendix 7.1, Volume 3B** of the EIS, and forms part of the application documentation. All

relevant mitigation measures set out in the EIS are included in the outline CEMP and will be incorporated into the final CEMP.

389 It is concluded that the impacts of the construction and operation of the proposed development on the flora and fauna of the study area are likely to range from imperceptible to minor, provided construction, reinstatement and management follow best practice procedures and the proposed mitigation measures are adopted.