



Drumlins Park Wind Farm Substation and Grid Connection

Chapter 5: Biodiversity

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5.1 Introduction

This chapter provides an assessment of the likely significant effects on biodiversity as a result of the construction and operation of the proposed Drumlins Park Wind Farm electricity substation and grid connection; the location of which is illustrated at **Figure 5.1** below.

The assessment provides a description of the baseline environmental setting of the proposed development in terms of biodiversity and identifies the likely and significant effects that the construction, operation and decommissioning of the proposed development will have on ecological receptors. Where required, appropriate mitigation measures to limit any identified effects on biodiversity are recommended. The residual effects of the proposed development post-mitigation are also assessed.

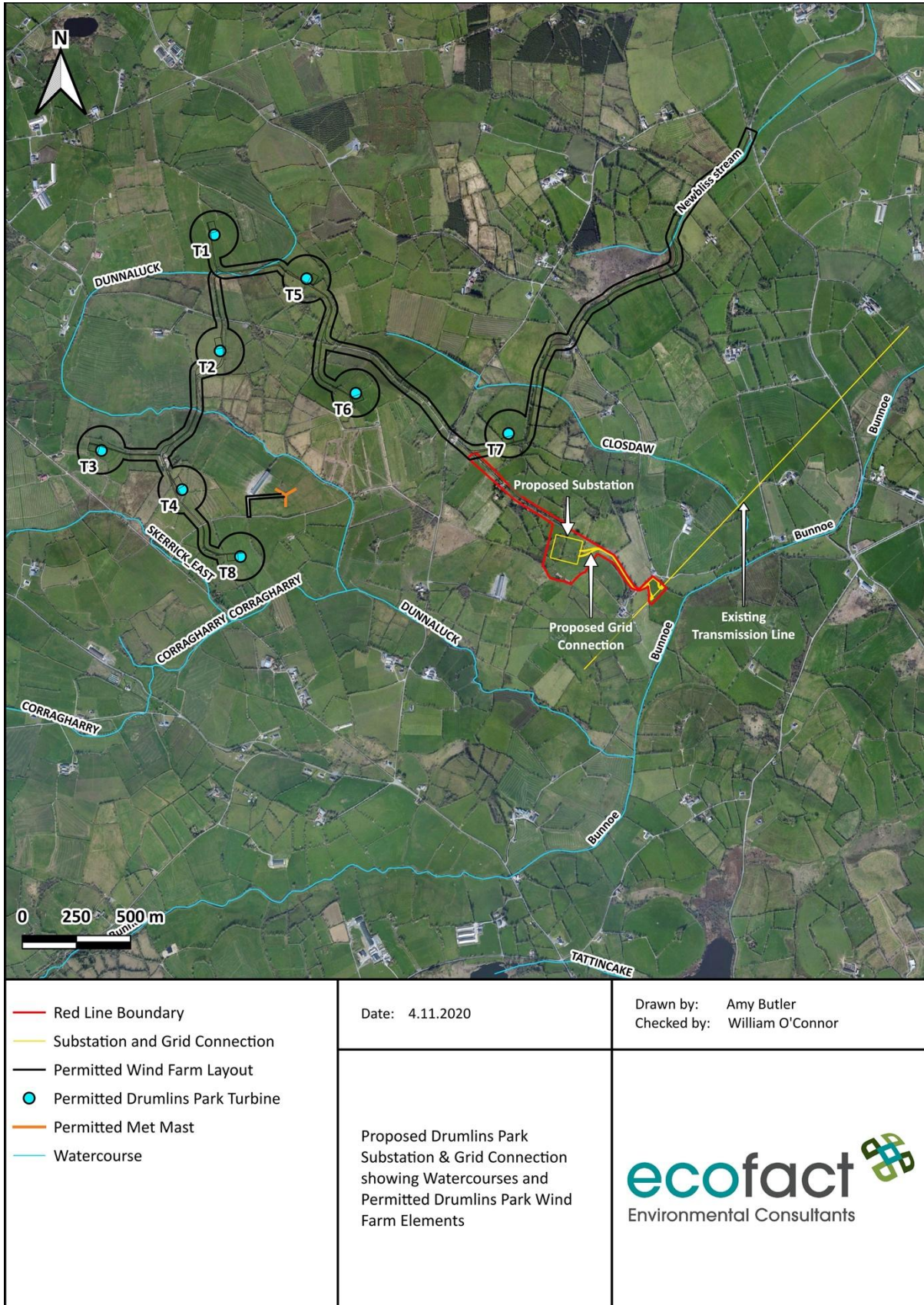


Figure 5.1: Proposed Drumlins Park Wind Farm Substation & Grid Connection

5.1.1 Guidance

This assessment has been prepared with regard to the following guidance documents, while further references are provided throughout this chapter:-

- Guidance Document on Wind Energy Developments and EU Nature Legislation (European Commission, 2020);
- EPA (2017) *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)*;
- European Commission (2017b) *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report*;
- CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*;
- National Roads Authority (2009) *Guidelines for Assessment of Ecological Impacts of National Road Schemes*; and
- Scottish Natural Heritage (2017) 'Recommended bird survey methods to inform impact assessment of onshore wind farms'

5.1.2 Description of the Proposed Development

A full description of the proposed development is presented in **Chapter 3**. In summary, the proposed development comprises the following main components:-

- A 110 kilovolt (kV) 'loop-in/loop-out' Air-Insulated Switchgear (AIS) electrical substation, including single-storey control buildings, energy storage system and all associated electrical equipment;
- Approximately 700m of 110kV underground electricity lines;
- Replacement of 1 no. existing pole-set with 2 no. lattice-type end masts, to a maximum height of up to 16m; and
- All associated and ancillary site development, excavation, construction, landscaping and reinstatement works, including provision of site drainage infrastructure.

The entirety of the proposed development is located within the administrative area of County Monaghan; while candidate quarries which may supply construction materials are also located within County Cavan.

5.1.3 Statement of Authority

5.1.3.1 Dr. William O'Connor (Principal Ecologist)

Dr. William O' Connor is a senior ecologist who has over 20 year's professional ecological management experience. Dr. O'Connor was the Principle Ecologist during the current assessment and was responsible for the co-ordination of all studies and production of this chapter. Dr. O'Connor has extensive experience of ecological assessments and has formal training and CPD in the areas of terrestrial ecology, mammal surveys and ornithological assessments relevant to the current appraisal.

Dr. O'Connor is a graduate of the National University of Ireland, Galway where he received a PhD degree in Zoology. He is a Fellow of the Royal Society of Biology and a Chartered Member of the Institute of Ecology and Environmental Management. He holds annual licences for a number of protected species – including a full national bat handling licence and national Freshwater Pearl Mussel survey licence. He also regularly holds project-specific licences for birds, non-volant mammals, white-clawed crayfish and fish species (electrical fishing surveys). William has extensive experience in managing Environmental Impact Assessment (EIA) and

Appropriate Assessment studies for large scale projects on behalf of public and private clients; including national infrastructural and renewable energy developments. He has particular experience in relation to preparing impact assessments for proposed wind farm developments, and recently wrote a chapter of the international book '*Wildlife and Wind Farms: Conflicts and Solutions*' (Perrow, 2017).

5.1.3.2 Kevin P. Collins (Senior Ornithologist)

Kevin Collins was the project ornithologist for the current project and worked with Dr. O'Connor in delivering the ornithological impact assessment. Mr Collins is a nationally recognised ornithologist, and former director of Birdwatch Ireland. Mr Collins is a graduate of UCC (Dip. Field Ecology, 1998) and has contributed to a number of scientific papers on birds in Ireland. Kevin is a fully qualified bird ringer and has held an 'A' permit from the British Trust for Ornithology since 1992, along with an annual license from NPWS. Mr Collins has been Ecofact's senior ornithological consultant since 2005 and has advised on the impact of birds from numerous projects, including numerous of wind farm projects throughout Ireland.

5.1.3.3 Amy Butler (Project Ecologist)

Amy Butler worked as an ecologist for the current project and has participated in bird surveys, habitat surveys and other ecological surveys since early 2016. She has also prepared all the GIS work and mapping for the current project. Ms. Butler is a graduate of the University of Limerick she was awarded an BSc (Hons) in Environmental Science in 2015.

5.1.3.4 Other Staff

Input to the various surveys of the adjacent wind farm was also provided by Harm Deenan (bats) along with Ecofact employees Christina O'Connor MSc. BSc., (2016-2018) and Grace Walsh BSc. (since 2017) and Saoirse McGrath BSc. (since 2019) who participated in the surveys completed to inform this chapter.

5.2 Methodology

5.2.1 Desktop Study

A desktop study was carried out to identify features of ecological importance within the proposed development site and surrounding areas. The ecological assessment included designated and sensitive areas in the vicinity of the proposed development site to enable sufficient assessment of the likelihood of significant effects on habitats, flora and fauna.

Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) in the vicinity of the proposed development site were identified. This information was collated by accessing the NPWS website.

The online database hosted by the Irish National Biodiversity Data Centre (NBDC) (www.biodiversityireland.ie) was also utilised to assess the importance of the study area for mammals and bats. Other sources accessed to gather information on bats in the study area include:-

- *Bat Conservation Trust Distribution Atlas of Bats in Britain and Ireland 1980-1999* (Richardson, 2000);
- *Irish Red Data Book 2: Vertebrates - Threatened Mammals, Birds, Amphibians and Fish in Ireland* (Whilde 1993); and

- *Irish Red List No. 3: Terrestrial Mammals* (Marnell et al. 2009).

Reports prepared in respect of previous surveys undertaken at the adjacent permitted wind farm site were also reviewed and assessed as part of the baseline assessment.

5.2.2 Field Survey

The proposed development site was visited for walkover surveys during July and September 2020. The site was also visited periodically during the 2019/2020 wintering bird surveys and the 2020 breeding bird surveys.

The habitats present on the site were identified following '*A Guide to Habitats in Ireland*' by J.A. Fossitt (2000) and with regard to '*Best Practise Guidance for Habitat Surveying and Mapping*' (Smith et al., 2011). Particular attention was paid to the primary habitats and land take to be directly affected by the proposed development. Habitat mapping was aided by aerial photography.

The walkover surveys involved a detailed study of the proposed development site and also took into account any signs of non-volant mammals or other species. All hedgerows, field boundaries and drainage ditches on the proposed site were walked and trails, droppings, digging, scratch marks, burrows etc. were sought and documented where found.

Photographic images captured during the various site visits are enclosed at **Annex 5.1**.

Bat surveys of the now permitted wind farm site were undertaken during the period of July to September 2017 which also took into account the area of the proposed development. The survey had regard to *Bat Surveys for Professional Ecologists: Good Practice Guidelines* by Collins (2016) and the *Bat Mitigation Guidelines for Ireland* by Kelleher & Marnell (2006). The surveys included habitat assessments, inspections of buildings and trees, inspection of local bridges, walkover bat activity surveys, transect surveys and car-based monitoring. Where possible, species identification was made in the field and any other relevant information was also noted, e.g. behaviour (hunting, commuting etc.). All bat echolocation calls were recorded for subsequent analysis to determine species identifications. Any potential bat foraging or roosting opportunities in the area were recorded. The walkover surveys in 2020 further examined the habitats on the proposed development site to ensure that there were no significant changes in the landscape.

5.2.2.1 Bird Surveys at Drumlins Park Wind Farm

Extensive bird surveys have been undertaken for the adjacent permitted Drumlins Park Wind Farm. Vantage point surveys, which comprise a key component of the survey methodology, were also designed so as to provide coverage of the proposed development site while areas which contained potentially suitable habitat for birds of conservation importance were also surveyed. Over a total of 66 no. days bird survey work was undertaken during the period January 2017 to August 2020.

The surveys had regard to the Scottish Natural Heritage *Guidance Recommended bird survey methods to inform impact assessment of onshore wind farms* (SNH, 2017). As well as completing full day vantage point surveys, due to the known presence of Whooper Swans at lakes in the local study area and *ad hoc* sightings of these birds in the vicinity of the then proposed wind farm site, local lakes were checked during general surveys. It is noted in the SNH guidance that target species, such as birds listed on Annex I of the EC Birds Directive or Schedule 1 of the Wildlife Act of Red-

listed Birds of Conservation Concern, should be given appropriate consideration. This includes Whooper Swans which are listed on Annex I of the EC Birds Directive, and Golden Plover. General surveys while travelling between vantage points or local lakes were also undertaken and any species observed during these general surveys were recorded.

The surveys completed were as follows:-

- 2017 winter bird surveys conducted from January 2017 to March 2017 and involved 4 full days survey work (Ecofact 2019d);
- 2017 breeding bird surveys conducted from April to June 2017 and involved 4 full days survey work (Ecofact 2019e);
- 2017-2018 winter bird surveys were completed over 10 full days extending from November 2017 to March 2018 (Ecofact 2019f);
- 2018 breeding bird surveys completed over 10 full days extending from March 2018 to July 2018 (Ecofact 2019g);
- 2018-2019 winter bird surveys conducted from October 2018 to March 2019 and involved 10 full days survey work (Ecofact 2019h);
- 2019 breeding bird surveys undertaken from April 2019 to July 2019 and involved 10 full days survey work (Ecofact 2019i);
- 2019-2020 wintering bird surveys undertaken from November 2019 to March 2020 and involved a total of 10 full days survey work (Ecofact, 2020b); and
- 2020 breeding bird surveys were undertaken from April 2020 to August 2020 and involved 8 full days survey work (Ecofact, 2020c).

5.2.3 Consultation

Consultation via publically available information was undertaken with the following statutory bodies:

- National Parks and Wildlife Service (NPWS);
- Inland Fisheries Ireland (IFI); and
- National Biodiversity Data Centre (NBDC).

Formal scoping and consultation was also undertaken with the NPWS, as set out at **Chapter 1**.

5.2.4 Evaluation

The evaluation of impact (effect) significance 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 therefore necessary to identify the value of ecological features within the study area in order to evaluate the significance and magnitude of possible effects. Ecological features are assessed on a scale ranging from international-national-county-local. The local scale is approximately equivalent to one 10 km square but can be operationally defined to reflect the character of the area of interest. This significance evaluation, taken from NRA (2009), for assessing impact magnitude is provided at **Annex 5.2**.

5.2.5 Study Area / Zone of Influence

The study area for the proposed development was defined with reference to the following:-

- The nature, size and location of the project;
- The sensitivities of the ecological receptors; and
- The likely cumulative effects.

The proposed development was assessed, having regard to its characteristics, to identify the extent over which likely significant effects on the ecological environment could occur. From this, the study area was defined.

In relation to terrestrial habitats and flora and terrestrial invertebrates, the study area was defined as 100m surrounding the footprint of the proposed development. No likely effects on terrestrial habitats and flora are envisaged beyond 100m from the footprint of the development.

In relation to aquatic habitats and flora as well as aquatic ecology, reptiles and amphibians; the study area was defined as 100m beyond the footprint of the proposed development, due to the topography of the site and the close proximity of the River Bunnoe (c.125m). Due to the size of the proposed development, the nature of the proposed development site, the sensitivity of the River Bunnoe and the possibility of cumulative effects with other developments, areas with a downstream hydrological connection up to 10km were assessed for likely significant effects.

In relation to non-volant mammals, bats and birds; the study area was defined as 100m surrounding the footprint of the proposed development as well as the site of the permitted Drumlins Park Wind Farm due to the possibility of cumulative effects. No effects on these species are envisaged beyond this study area

5.3 Description of Existing Environment

5.3.1 Natura 2000 Sites

The proposed development site is not located within any Natura 2000 site or in the immediate vicinity of a Natura 2000 site. There are a number of Natura 2000 sites located within 15km of the proposed development, as illustrated at **Figure 5.2**, however, the level of connectivity between the proposed development site and the designated sites is low.

There is a downstream hydrological connection to the Lough Oughter and Associated Loughs SAC, Lough Oughter Complex SPA, Upper Lough Erne SAC and Upper Lough Erne SPA via the River Bunnoe, which is located c. 125m (straight line) from the proposed development site. The river is located to the southeast of the proposed end masts.

The proposed development is located a considerable distance upstream of the designated sites, with c. 21.7rkm¹ (river kilometres) being the shortest distance to the Lough Oughter and Associated Loughs SAC and 26.7rkm to the Lough Oughter Complex SPA. The proposed development site is located c. 49rkm upstream of the Upper Lough Erne SAC and SPA.

All Natura 2000 sites are evaluated as being of International importance.

A standalone Natura Impact Statement has been prepared for the proposed development which assesses the possibility of effects on the Upper Lough Erne SPA, the Upper Lough Erne SAC, the Lough Oughter and Associated Loughs SAC and the Lough Oughter Complex SPA.

¹ Where the 'rkm' descriptor is used, this refers to the downstream distance via hydrological pathway. Where the 'km' descriptor is used, this refers to a direct overland distance.

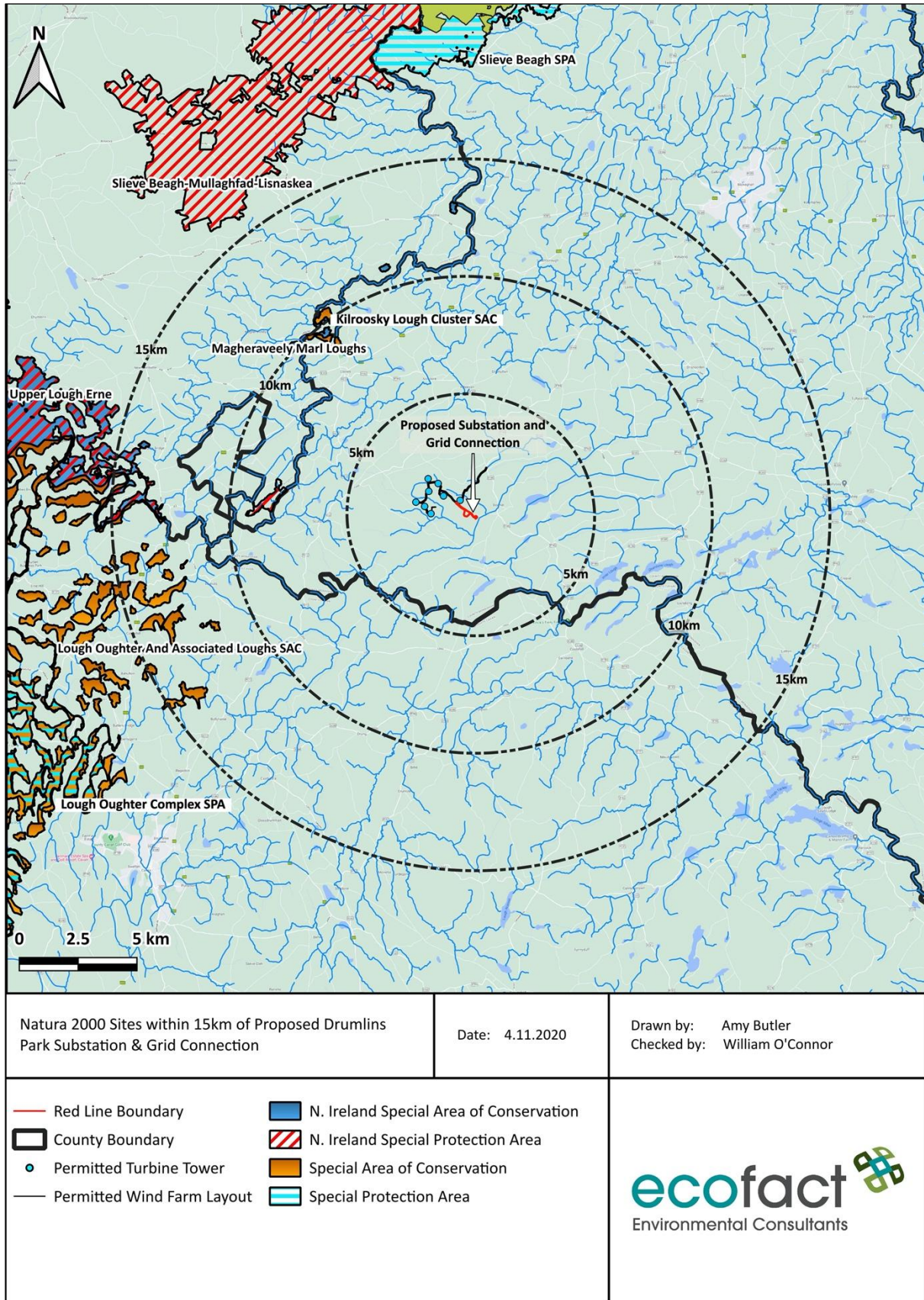
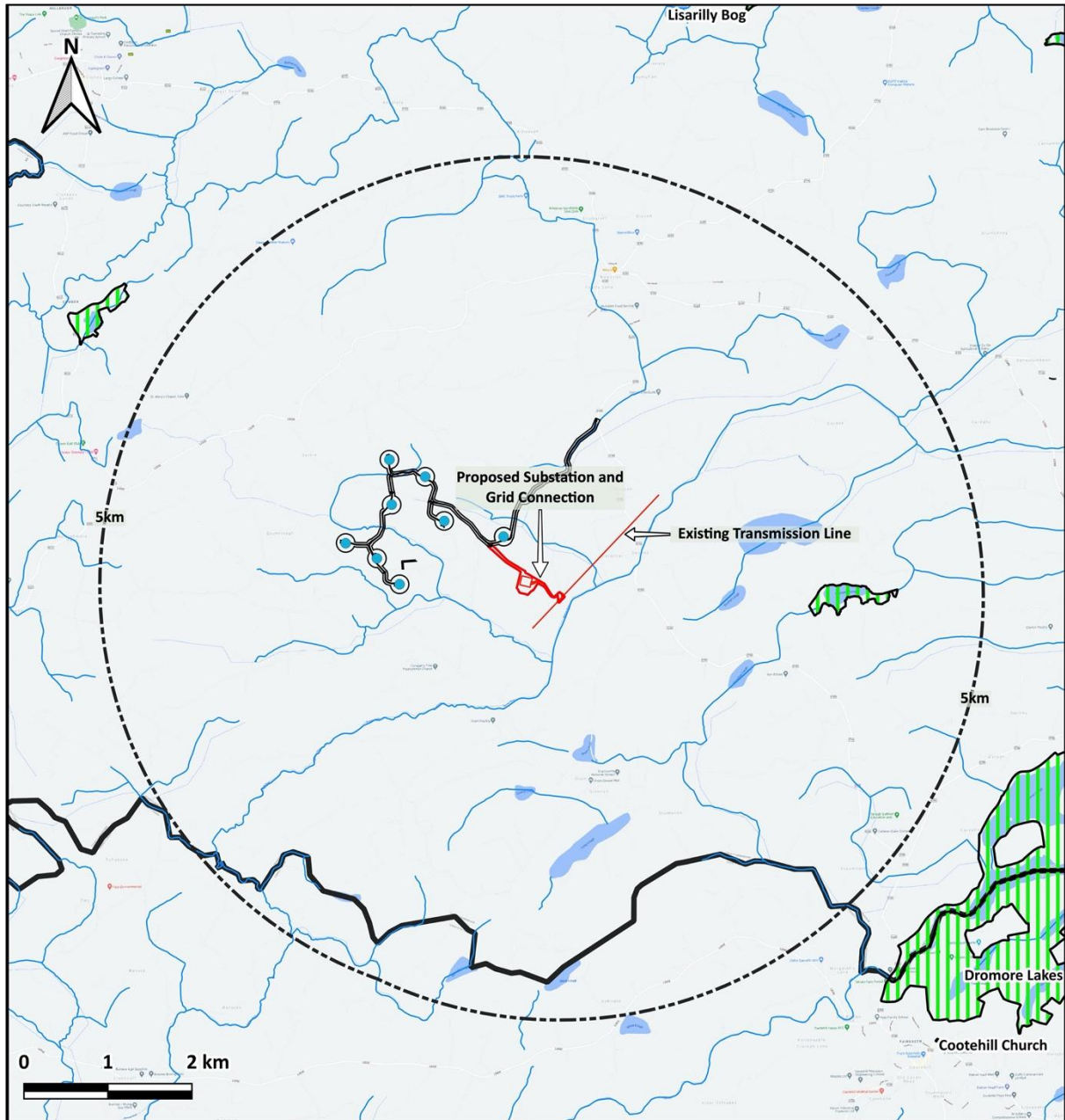


Figure 5.2: Natura 2000 sites within 15km of the proposed development

5.3.2 Natural Heritage Areas

There are no Natural Heritage Areas within 5km of the proposed development site. There is 1 no. proposed Natural Heritage Area within 5km of the proposed development; namely Drumgole Lough pNHA (Site Code: 001601), which is c. 2.9km (straight line) to the east. Drumgole Lough is a small lake situated almost 5km (straight line) north of Cootehill, Co. Cavan. The pNHA synopsis for Drumgole Lough notes the presence of reed swamp and wet grassland surrounding the lake although it notes that the lake is not of outstanding ecological interest. **Figure 5.3** illustrates the location of NHAs and pNHAs within 5km of the proposed development site.

All NHAs and pNHAs are evaluated as being of National importance.



<ul style="list-style-type: none"> — Substation and Grid Connection — Permitted Wind Farm Layout ● Permitted Turbine Tower Natural Heritage Area Proposed Natural Heritage Area 	<p>Date: 4.11.2020</p>	<p>Drawn by: Amy Butler Checked by: William O'Connor</p>
	<p>Natural Heritage Areas (none present) and Proposed Natural Heritage Areas within 5km of Proposed Drumlins Park Substation & Grid Connection</p>	

Figure 5.3: Natural Heritage Areas (none present) and proposed Natural Heritage Areas within 5km of the proposed development

5.3.3 Other

There are no Areas of Special Scientific Interest (ASSIs), Ramsar sites or other ecologically protected sites within 5km of the proposed development site. The closest Ramsar site to the proposed development is Lough Oughter (Ramsar Site No. 853) at c. 31km (river kilometre) from the proposed development.

The Magheraveely Marl Loughs is also noted as a Ramsar Site (No. 1717), and also an SAC, and is located c. 10.1km (straight line) from the proposed development; however, there is no connectivity to this designated site.

Ramsar sites are evaluated as being of International importance.

5.3.4 Habitats & Flora

The habitats at the proposed development site are typically of Local Importance and are habitats that are widespread and common across Ireland and the Co. Monaghan countryside. The habitat composition of the 100m study area around the proposed development has been assessed, as illustrated at **Figure 5.4** below. A total of 8 no. habitats were recorded within this area:-

- Buildings and Artificial Surfaces (BL3);
- Improved Agricultural Grassland (GA1);
- Treeline (WL2);
- Hedgerow (WL1);
- Drainage Ditch (FW4);
- Wet Grassland (GS4);
- Amenity Grassland (GA2); and
- Mixed Broadleaved Woodland (WD1).

The predominant habitats at the proposed development site comprise improved agricultural grassland, wet grassland, hedgerows and treelines. The mid-western extent of the site has the largest area of wet grassland, while the north-west and eastern sections are predominantly improved agricultural grassland. There are 2 no. main drainage ditches on the site, one of which travels from north to south and one from west to east. There are 2 no. local roads within the study area; one of which provides access to the proposed substation and end mast sites and the proposed underground electricity line is located within fields adjacent to the local road; while the second road is located north of the proposed end masts.

The hedgerows and treelines on the proposed development site are well maintained. There are only two very small sections of Mixed Broadleaved Woodland within the study area. The habitat types and their location with regards the proposed development are described at **Table 5.1** below.

Habitat Classification	Substation	Underground Electricity Line	End Masts
Buildings and Artificial Surfaces (BL3)		✓	
Improved Agricultural Grassland (GA1)	✓	✓	✓
Treeline (WL2)	✓	✓	
Hedgerow (WL1)		✓	
Drainage Ditch (FW4)	✓	✓	

Wet Grassland (GS4)	✓	✓	
Amenity Grassland (GA2)			
Mixed Broadleaved Woodland (WD1)			

Table 5.1: Fossitt habitat types present at each turbine location.

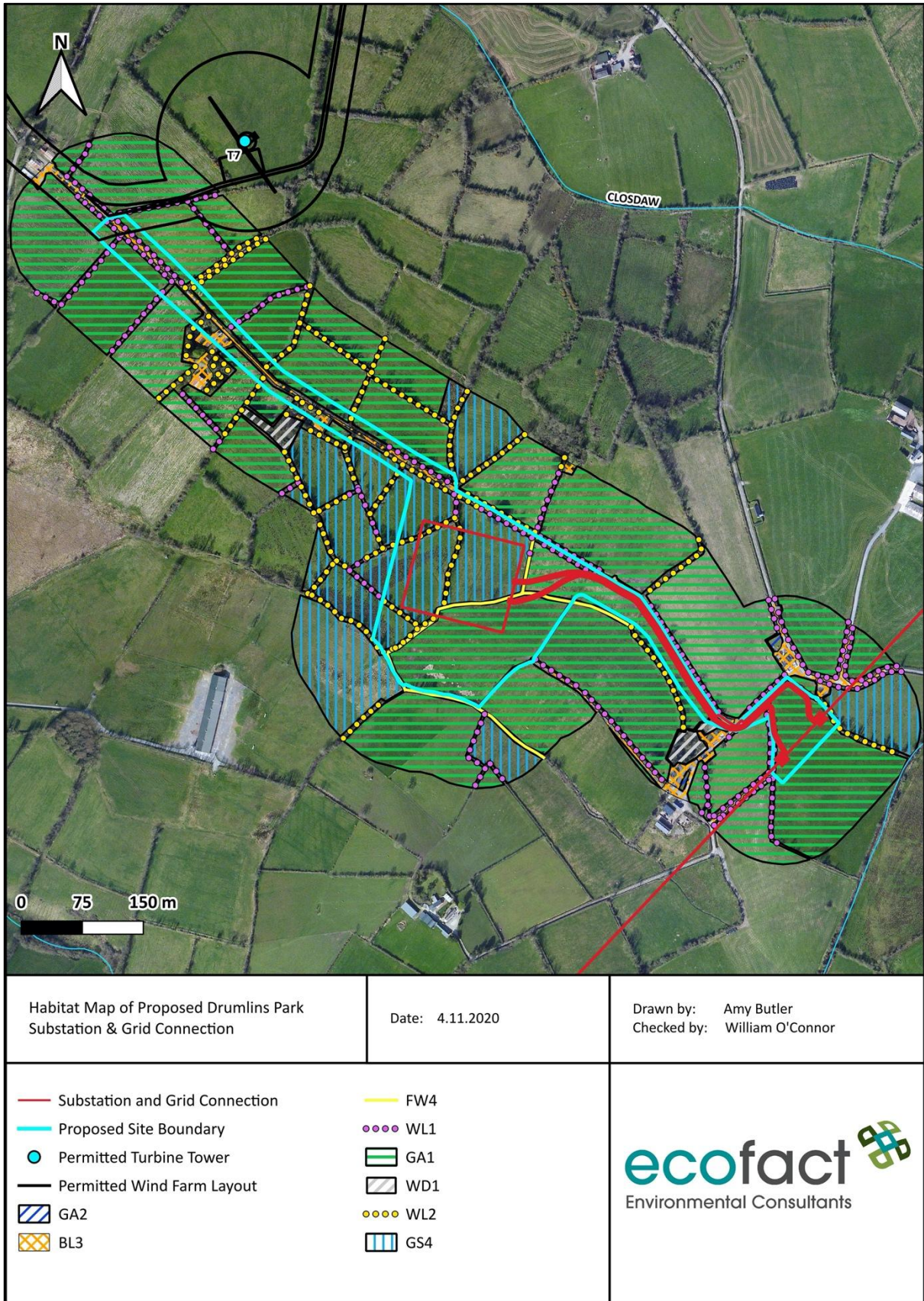


Figure 5.4: Habitat Map of Proposed Development Site

There are no EPA registered watercourses within 100m of the proposed development footprint. There are drainage ditches on the site, which were found to be generally

dry but are likely to have some levels of water during periods of rainfall. The closest watercourse to the proposed development site is the River Bunnoe (EPA Segment Code: 36_241), which is located c. 125m south-east of the proposed end masts. At this location, the river is a 3rd order watercourse and flows in a south-westerly direction.

The River Bunnoe continues in a south-westerly direction before turning south and flows into the River Annalee (EPA Segment Code: 36_231) c. 12.7rkm downstream of the proposed development site. From here, the River Annalee continues in a westerly direction for c. 10rkm before flowing into the Lough Oughter and Associated Loughs SAC.

A further 5rkm downstream, the River Annalee then flows into the boundary of the Lough Oughter SPA. A total of c. 30.4rkm downstream of the proposed development, the River Annalee flows into the River Erne (EPA Code: 36_898). From here, the River Erne flows in a northerly direction for c. 18.4rkm (before reaching the boundary of both the Upper Lough Erne SAC and SPA. The River Erne continues north-west, flowing into the Upper Lough Erne and the Lower Lough Erne before flowing into Donegal Bay at Ballyshannon.

5.3.4.1 Buildings & Artificial Surfaces (BL3)

Buildings and artificial surfaces is a broad habitat category that includes areas of built land comprising of domestic, industrial, agricultural and community buildings as well as derelict stone buildings and ruins. This habitat category also consists of artificial surfaces such as cement, tarmac, bricks, blocks, paving stones, astroturf, pavements, runways etc. Greenhouses, polytunnels and refuse dumps are not included in this category (Fossitt, 2000).

Buildings and Artificial Surfaces are present at the proposed development site in the form of local roads and residential and farm buildings. The footprint of the proposed substation does not cross over any of this habitat, but the majority of the underground electricity line is located adjacent to an existing road. There are a small number of one-off residential dwellings and associated outbuildings within 100m of the proposed development.

Buildings and Artificial Surfaces are evaluated as being of no ecological value.

5.3.4.2 Improved Agricultural Grassland (GA1)

Improved Agricultural Grassland (GA1) consists of heavily modified or intensively managed grassland typically used for grazing and / or silage making. This habitat type is generally species-poor with abundant Rye-grass (*Lolium* sp.) often associated with White Clover (*Trifolium repens*). Improved Agricultural Grassland comprises of monoculture grasslands and rye-grass leys which typically form part of an arable rotation. Common species which can be found in this type of habitat include Meadow grasses (*Poa* spp.), Dandelion (*Taraxacum* spp.), thistles (*Cirsium arvense*, *C. vulgare*), Timothy (*Phleum pratense*), Plantains (*Plantago* spp.), Creeping Buttercup (*Ranunculus repens*), Nettle (*Urtica dioica*), Crested Dog's-tail (*Cynosurus cristatus*), Yorkshire-fog (*Holcus lanatus*) and docks (*Rumex* spp.) (Fossitt, 2000).

Improved Agricultural Grassland is one of the most common habitats in the study area. The proposed end masts are located on this habitat type while the proposed substation and part of the underground electricity line are also located within this habitat. The habitat was found to be species-poor and consists mainly of Rough

Meadow-grass (*Poa trivialis*), Perennial Rye-grass (*Lolium perenne*) and Docks (*Rumex* spp.).

Improved Agricultural Grassland is evaluated as being of Local Importance.

5.3.4.3 Treeline (WL2)

Treelines include a single or narrow line of trees that are greater than 5m in height and, like hedgerows they typically occur at field or property boundaries. Hedgerows that are dominated by trees greater than 5m in height are also included within this category. Most treelines are planted and are spaced apart. The majority of treelines comprise non-native tree species such as Sycamore (*Acer pseudoplatanus*), Beech (*Fagus sylvatica*), limes (*Tilia* spp.), some poplars (*Populus* spp.), Horse Chestnut (*Aesculus hippocastanum*) and conifers (Fossitt, 2000).

Treelines in the study area are located along field boundaries and are well maintained. The dominant species present were Common Ash *Fraxinus excelsior* and Sycamore *Acer pseudoplatanus*. A Leyland cypress *Cupressus × leylandii* tree was also recorded on one of the field boundaries. Treelines are also located within the footprint of the proposed substation and will require removal to facilitate the construction of the proposed development.

Treelines in the study area are evaluated as being of 'Local Importance, Higher Value'. In a relatively poor ecological landscape, such as the subject study area, treelines are useful as wildlife corridors and provide safe commuting routes.

5.3.4.4 Hedgerow (WL1)

Hedgerows typically form field or property boundaries and consist of linear strips of shrubs and occasional trees. Dimensions vary considerably within this habitat type and are generally classified as being mostly less than 5m high and 4m wide. The majority of hedgerows are planted and can occur on raised banks created from the digging of drainage ditches. Overgrown hedgerows that have not been managed recently or are fragmented are also included in this category. If linear strips of scrub occur at field boundaries these are also included within this habitat type. Typical species that occur in hedgerows include Hawthorn (*Crataegus monogyna*), Gorse (*Ulex europaeus*), Dog-rose (*Rosa canina*), Blackthorn (*Prunus spinosa*), Holly (*Ilex aquifolium*) and Bramble (*Rubus fruticosus* agg.). Species of trees which can be frequently found within hedgerows are Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*), Willows (*Salix* spp.), Elder (*Sambucus nigra*), Beech (*Fagus sylvatica*) and elms (*Ulmus* spp.) (Fossitt, 2000).

The Hedgerows in the study area are located along field boundaries and were found to be generally well maintained. The majority of the species found in these hedgerows were Hawthorn *Crataegus monogyna*, Gorse *Ulex europaeus* and Bramble *Rubus fruticosus* agg. Some scattered Common Ash *Fraxinus excelsior* trees and Willows *Salix* spp were also present. Hedgerows are mostly present along the existing road where the underground cable will be placed.

Hedgerows in the study area are evaluated as being of 'Local Importance, Higher Value'. In a relatively poor ecological landscape, such as the subject study area, hedgerows here are useful as wildlife corridors and provide safe commuting routes.

5.3.4.5 Drainage Ditch (FW4)

Drainage ditches consist of entirely artificial linear water bodies or wet channels and also includes small sections of natural watercourses that have been excavated or

modified. These water bodies are not used for navigation and are generally created to improve drainage and control the flow of water. This habitat type must either contain water or be wet enough to support wetland vegetation. These water bodies must be maintained and cleared in order to keep them open. Water levels will undergo seasonal fluctuations and these habitats are generally associated with hedgerows (Fossitt, 2000).

Drainage ditches are located within the footprint of both the proposed substation and the underground electricity line. These ditches were found to be generally dry during the walkover surveys with little water flow in a number of others. It is considered that these drainage ditches would only contain a substantial amount of water following periods of intense or prolonged rainfall.

Given that drainage ditches are generally dry, they are only likely to be of limited use to wildlife during period of intense or prolonged rainfall are, therefore, evaluated as being of 'Local Importance'.

5.3.4.6 Wet Grassland (GS4)

Wet grassland typically occurs on wet or waterlogged mineral or organic soils that are poorly drained, and can be found on sloping or flat ground in upland and lowland areas. In some cases this habitat type can be influenced by seasonal or periodic flooding such as in the River Shannon Callows or the wet grasslands of turlough basins. This habitat type also consists of areas of poorly-drained farmland that has not recently been improved. Wet grassland located on sloping ground is typically confined to clay-rich gley soils and loams, or organic soils that are wet but not waterlogged. The most common species that can be found in this type of habitat are rushes (*Juncus effusus*, *J. acutiflorus*, *J. articulatus*, *J. inflexus*), Yorkshire-fog (*Holcus lanatus*), Marsh Foxtail (*Alopecurus geniculatus*), small sedges (*Carex flacca*, *C. hirta*, *C. ovalis*), Rough Meadow-grass (*Poa trivialis*), Creeping Bent (*Agrostis stolonifera*) and Tufted Hairgrass (*Deschampsia caespitosa*) (Fossitt, 2000).

Wet grassland mainly occurs to the mid-west of the proposed development site. These areas were not considered to be very wet during the current surveys but rushes were found to be dominant. This habitat type on the proposed development site is considered to be species-poor.

Wet Grassland in the study area may be of use to wildlife given the context of the wider study area. This habitat type is evaluated as being of 'Local Importance, Higher Value'.

5.3.4.7 Amenity Grassland (GA2)

Amenity grassland is improved, or species-poor, and is managed for purposes other than grass production. It includes amenity, recreational or landscaped grasslands, but excludes farmland. Most areas of amenity grassland have been reseeded and are regularly mown to maintain very short swards. Amenity grassland is typically associated with lawns and other managed grassland in gardens, parks, grounds of various buildings or institutions, golf course fairways, grassy sports fields and racecourses. Broadleaved herbs such as Daisy (*Bellis perennis*), Dandelion (*Taraxacum spp.*), Clovers (*Trifolium spp.*) and plantains (*Plantago spp.*) are common.

Amenity Grassland is present within the study area in the form of residential gardens. These are very small and contain well managed grassland. This is of limited value to wildlife.

Amenity grassland in the study area is evaluated as being of 'Local Importance'.

5.3.4.8 Mixed Broadleaved Woodland (WD1)

Mixed Broadleaved Woodland includes woodland with 75-100% cover of broadleaved trees and 0-25% cover of conifers with tree species of either native or non-native species. Plantations are included if the canopy height is greater than 5m or 4m in the case of wetland areas (Fossitt, 2000).

Mixed Broadleaved Woodland is present in the study area in two small and fragmented sections. This is located in the south-east of the site adjacent to a farmstead as well to the north-west of the proposed electricity substation.

Considering the context of the lack of ecological services in the study area, this small section of fragmented woodland is likely to be of use to local wildlife for protection and movement. Mixed Broadleaved Woodland is, therefore, evaluated as being of 'Local Importance, Higher Value'.

5.3.5 Fauna

5.3.5.1 Non-volant Mammals

The National Biodiversity Data Centre online maps hold records for non-volant mammals within the 10km grid square H51, within which the proposed development is located. **Table 5.2** below details the recorded species within the 10km grid square H51 in Co. Monaghan.

Species Group	Species	Record Count	Date of last record	Title of Dataset	Designation
Terrestrial Mammal	Daubenton's Bat (<i>Myotis daubentonii</i>)	6	01/09/2010	National Bat Database of Ireland	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Terrestrial Mammal	Eastern Grey Squirrel (<i>Sciurus carolinensis</i>)	1	31/12/2007	The Irish Squirrel Survey 2007	Invasive Species: Invasive Species Invasive Species: Invasive Species >> High Impact Invasive Species Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Terrestrial Mammal	Eurasian Badger (<i>Meles meles</i>)	72	31/12/2015	Badger Setts of Ireland Database	Protected Species: Wildlife Acts
Terrestrial Mammal	European Otter (<i>Lutra lutra</i>)	2	18/10/2010	Atlas of Mammals in Ireland 2010-2015	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex II Protected Species: EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts

Terrestrial Mammal	European Rabbit (Oryctolagus cuniculus)	2	31/12/2007	Hare Survey of Ireland 2006 & 2007	Invasive Species: Invasive Species Invasive Species: Invasive Species >> Medium Impact Invasive Species
Terrestrial Mammal	Fallow Deer (Dama dama)	1	31/12/1978	Deer of Ireland Database	Invasive Species: Invasive Species Invasive Species: Invasive Species >> High Impact Invasive Species Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) Protected Species: Wildlife Acts
Terrestrial Mammal	Irish Hare (Lepus timidus subsp. hibernicus)	2	31/12/2007	Hare Survey of Ireland 2006 & 2007	
Terrestrial Mammal	Pine Marten (Martes martes)	2	16/07/2014	Atlas of Mammals in Ireland 2010-2015	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex V Protected Species: Wildlife Acts
Terrestrial Mammal	Red Fox (Vulpes vulpes)	1	08/05/1991	Badger and Habitats Survey of Ireland	
Terrestrial Mammal	West European Hedgehog (Erinaceus europaeus)	3	27/08/2015	Atlas of Mammals in Ireland 2010-2015	Protected Species: Wildlife Acts

Table 5.2: Mammal records from the 10km Grid Square H51, within which the proposed development will be located (NBDC online maps).

It is considered unlikely that grey squirrels would be present in the study area and were not recorded during the walkover surveys. This is likely due to the lack of woodland habitats in the wider area. The habitats on the proposed development site are mainly agricultural, comprising grassland, hedgerows and treelines. There are two small fragmented sections of woodland within 100m of the proposed development footprint, but the limited spatial extent of these areas are considered to be too small to support any significant population of the invasive Grey Squirrel.

No badger setts or evidence of badgers was found during the walkover surveys. Due to the intensively farmed nature of the proposed development site and generally poor foraging habitat for badgers, it is considered unlikely that they use the site. Soil is relatively compacted on site due to agricultural activities and the ground is quite wet in areas.

Otter may use the River Bunnoe, located c.125m from the proposed development,

but are not likely to use the proposed development site due to the suboptimal habitats present and a lack of a suitable food source. No evidence of usage of the site by rabbits was noted although it was considered likely that they would be present. However, similarly to badgers, ground conditions may not be suitable for usage by rabbits. Hare are present within the proposed development site and were recorded nearby at the adjacent permitted Drumlins Park Wind Farm site; however, numbers are considered to be low.

Pine marten were recorded on the adjacent permitted wind farm site and, therefore, are also considered likely to use the proposed development site. Pine marten are considered likely to be present due to the presence of poultry farms in the area which would offer a reliable food source. Pine marten may make use of the small areas of woodland within the study area.

Foxes are also known to use to the study area based on the previous walkover surveys and trail camera surveys undertaken at the adjacent permitted wind farm. They are also considered likely to be supported by the poultry farms here. No signs of hedgehogs were noted during the walkover surveys but may be present. Fallow Deer were recorded on the adjacent permitted Drumlins Park Wind Farm site and therefore would be likely to occasionally use the proposed development site due to proximity.

Non-volant mammals on the site are evaluated as being of 'Local Importance, Higher Value'. No Annex II species were recorded on the proposed development site.

5.3.5.2 Bats

A desk study of available information on bats in the study area was undertaken for the proposed development site. The National Biodiversity Data Centre (NBDC) maps landscape suitability for bats based on Lundy *et al.*, (2011). The maps are a visualisation of the results of the analyses based on a 'habitat suitability' index. The index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. **Table 5.3** below gives the suitability of the study area for the bat species found in Ireland (based on NBDC) along with their Irish Red List Status (from Marnell *et al.*, 2009).

Common name	Scientific name	Suitability index	Irish red list status
All bats		30.11	
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	46	Least Concern
Leisler's bat	<i>Nyctalus leisleri</i>	46	Near Threatened
Natterer's bat	<i>Myotis nattererii</i>	41	Least Concern
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	44	Least Concern
Brown long-eared bat	<i>Plecotus auritus</i>	38	Least Concern
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	4	Least Concern
Whiskered bat	<i>Myotis mystacinus</i>	8	Least Concern
Daubenton's bat	<i>Myotis daubentonii</i>	38	Least Concern
Nathusius's pipistrelle	<i>Pipistrellus nathusii</i>	6	Least Concern

Table 5.3: Suitability of the study area for the bat species recorded previously (based

on the NBDC data). Irish Red list status also indicated (based on Marnell et al., 2009).

Habitats on the proposed development site were assessed for their bat potential including any buildings/structures in the wider study area. The habitats on site were considered to be suboptimal for bats, comprising of improved agricultural grassland, hedgerows and treelines. No significant signs of bat usage were noted during walkover surveys; however, given the presence of mature trees in the area, these may be used on occasion throughout the year. Some of the structures in the wider study area were noted for their potential to have bats. There is an old farm building (Irish Grid Ref: H55696 19708) which, upon external inspection, did show some potential suitability for bats. No evidence of bats was found but the building was noted to be potentially suitable and, as bat usage is transitional and varies considerably throughout the year, the building may be used on occasion. There are no significant woodland habitats nearby, but the identified areas of woodland may be used by bats.

Bat surveys were completed at the adjacent permitted Drumlins Park Wind Farm during July to September 2017. The surveys included habitat assessments, inspections of buildings and trees, inspection of local bridges, walkover bat activity surveys, transect surveys and car-based monitoring. The species recorded during these surveys were predominantly Common pipistrelles, Soprano pipistrelles and Leisler's bat. There were also some recordings of *Myotis sp.* and Brown long-eared Bat but these were infrequent and in low numbers.

Bats are evaluated as being of 'Local Importance, Higher Value. No Annex II Species were recorded during the current surveys.

5.3.5.3 Birds

Previous bird surveys were undertaken at the adjacent permitted Drumlins Park Wind Farm from 2017 to 2020 and included wintering and breeding bird surveys. The permitted wind farm site is located in a drumlin area where pasture and hedgerows dominate the landscape. The habitats on the wind farm site are of Local Importance only and are habitats that are widespread and common across Ireland. No important bird habitats occur on the site. The permitted wind farm site itself is not of any particular use to birds in general or to birds of conservation concern (Ecofact, 2019c).

Given the proximity of the proposed development site to the permitted development, vantage point surveys associated with the Drumlins Park Wind Farm also offered coverage of the proposed development site. Overall, no notable findings were made during the bird surveys undertaken. Common passerine species and occasional Buzzards and Kestrels were recorded while the most frequent sightings were of Wood pigeon and Rooks. No waders or red listed species were recorded on the proposed development site.

Breeding Season Surveys

There are no lakes, no bogs, no heather moor, no young forestry, no crags, no large rivers, no fields of arable land and no reed beds on the permitted wind farm site or proposed development site. Therefore, the variety of habitats on this site is limited and the diversity and abundance of birdlife is limited (Ecofact, 2019c).

The majority of bird species observed on the site during the bird surveys were either passerines or corvids. The only raptor species recorded were Buzzard, Sparrowhawk and Kestrels. Meadow pipit and Grey wagtail were the only two species recorded

(on the permitted wind farm site) which are red listed in Ireland. These species are red-listed due to the cold winters experienced in 2009/10 and 2011/12, although it is noted that these species have had a strong recovery since then. The hedgerows on both the permitted and proposed development sites support Chaffinch, Robin, Blackbird, Song thrush, Wren, Dunnock, Mistle thrush and Blue tit. The species observed associated with open grassland include Meadow pipit, Skylark and Snipe. The limited, small and fragmented patches of woodland in the wider area would be attractive to Jay, Buzzard, Coal tit, Goldcrest, Wood Wigeon, Rook and Raven.

The farmyards and old buildings in the vicinity attracted Jackdaws, Starlings and Pied Wagtails. The pair of Grey Wagtails observed on the permitted wind farm site were observed on the Dunaluck Stream, c. 1km (straight line) from the proposed development.

The habitat at the proposed development site is not optimal for breeding or foraging Hen Harrier.

Winter Season Surveys

The majority of observations made during the winter bird surveys again related to common passerine birds. The overall numbers of birds recorded was considered to be low. Small to medium-sized passerine birds were dominant in the area, such as Coal tit, Starling, Wren, Robin, Fieldfare, Great tit, Mistle thrush and Song thrush. The most common birds of prey recorded were Buzzards. Buzzards were seen frequently during the vantage point watches, and also seen while driving between sites in the study area near residential housing and adjoining agricultural grassland fields. Wood pigeons were regularly seen at the permitted wind farm site and the surrounding areas. Starlings were frequently observed flying in small flocks in the general study area and at the vantage point watches. There were also occasional observations of Sparrowhawk and Kestrel. A Merlin was seen hunting on the permitted wind farm site briefly in November 2018 and perched in a field on the site. This was a once-off observation (Ecofact, 2019c).

In the area, waterbird counts were carried out at local lakes during the winters of 2016-2017, 2017-2018 and 2018-2019. The most notable species observed at these lakes was the Whooper Swan. However, throughout the bird surveys it was confirmed that the development area (including permitted wind farm and proposed development site) is not located within regular flight paths for Whooper Swans, nor is the area itself used in large numbers. It is also not located along any areas for resting or staging. No Whooper Swans were ever recorded on the permitted wind farm site or proposed development site – and they would never use this site due to the absence of suitable habitat. Moreover, Whooper Swans were only recorded flying over the wind farm site once – well above rotor sweep height - in a small flock of 11 no. individuals during the wintering season of 2018/19 (Ecofact, 2019c). The highest number of Whooper Swans recorded during the three-year wintering period in the wider study area was 60 swans at Annagose Lough which is located c. 6.2km (straight line) from the proposed development. At other lakes, numbers were much lower and Whooper Swans were only recorded at 3 no. of the 16 no. lakes surveyed over the three winter surveys. Whooper Swans were recorded flying over the proposed wind farm site once

Golden plover were recorded on the permitted wind farm site in relatively small flocks on two separate occasions during vantage point watches; but no sightings were recorded at the proposed development site. The largest number recorded in

one of these flocks was 60 no. individuals.

5.3.5.4 Aquatic Ecology

There are no EPA registered watercourses within the proposed development site. The only surface water features present within the proposed development site are two drainage ditches with very low to no water present. It is considered likely that these drains only contain water following periods of intense or prolonged rainfall. These drains are likely to have been created to aid in drainage for the adjacent wet grassland fields for agricultural purposes. Due to low water levels and the nature of the drains on the site, these watercourses would have no importance to fisheries and limited benefit to general aquatic ecology in the area.

The closest watercourse to the proposed development site is the River Bunnoe (EPA Segment Code: 36_241), which is located c. 125m south-east of the proposed development. The EPA has a biological water quality monitoring station (EPA Station Code: 36B05 0300) upstream of the proposed development site at Doohat Bridge on the River Bunnoe. This station was last monitored in 2001 and was assigned a score of Q2-3, which corresponds to WFD status 'Poor'. The nearest downstream monitoring station is at Dianmore Bridge on the River Bunnoe and was rated as Q3-4 in 2019, corresponding to WFD status 'Moderate' (EPA Station Code: 36B05 0400). The EPA's most recent assessment of the River Bunnoe was in 2019 and is as follows: *'Five sites were sampled throughout the Bunnoe River in 2019. There were slight improvements observed at four of the five sites with good quality reached at the lower two sites. Good numbers of pollution sensitive taxa were observed here. Site 0300 was the only site that remained at poor quality in the Bunnoe River. Agricultural pressure appears to be the primary pressure in the upper reaches of the River'*.

There are records of White-clawed Crayfish in the River Bunnoe, both upstream and downstream of the proposed development site. The latest record is from 2007, by the EPA, downstream of the proposed development site. Brown trout are present in the River Bunnoe and it is considered likely that Salmon would also be found here as it is present downstream in the River Annalee.

Aquatic Ecology on the proposed development site is evaluated as being of 'Local Importance, Higher Value', as the River Bunnoe is located within close proximity to the proposed development site.

5.3.5.5 Reptiles & Amphibians

There are no records of any reptiles on or near the proposed development site according to the NDBC online maps. There are records of Common frog *Rana temporaria* and it is considered that there is the potential for this species to occur on or near the site due to the presence of wet grassland and drainage ditches.

However, it is recognised that the drainage ditches on the site were found to contain very low, if any, water during the walkover surveys, This is not suitable for breeding frogs. Nonetheless, during periods of wet weather these drains could become filled with water and could be suitable at some point during the year. Common frogs typically breed around February and spawn in March and therefore, if the conditions were suitable, they may breed on the site. There are no records of Smooth Newt on or near the proposed development site.

Reptiles and Amphibians on the proposed development site are evaluated as being of 'Local importance, Higher Value'.

5.3.5.6 Terrestrial Invertebrates

There are no records of protected terrestrial macroinvertebrates on the proposed development site. The Butterflies of Ireland dataset shows records of the Green-veined White butterfly north of Doohat townland in 2018; c. 1.3km (straight line) from the proposed development site. The Distribution Atlas of Butterflies in Ireland 1979 dataset shows records of Orange tip, Green-veined White and Large White butterfly from the 10km grid square H51. These species are common and widespread across the island.

There are no other records of terrestrial macroinvertebrates from the study area. It is considered that the habitats on the proposed development site are not of particular importance to terrestrial macroinvertebrates. These habitats are mostly improved agricultural grassland and hedgerows and treelines which are of limited benefit to these species. However, in the local context, wet grassland, located to the west of the site, would be of some benefit to terrestrial macroinvertebrates in the study area.

Terrestrial Macroinvertebrates in the study area are evaluated as being of 'Local importance'.

5.3.6 Key Ecological Receptors

On the basis of extensive desktop analysis of available records and the current surveys, it is possible to identify the Key Ecological Receptors (KERs) which may experience an impact as a result of the construction and operation of the proposed development. The KERs identified and recorded in the study area are presented in **Table 5.4** below.

Ecological Receptors	Summary Description of the Ecological Receptors	Evaluation of the ecological receptors (Key Ecological Receptors are those identified as being > Local Importance)
Treeline (WL2)	Network of treelines, although suboptimal, do function as wildlife corridors and can be used by birds for breeding and bats for roosting	Local Importance, Higher Value
Hedgerow (WL1)	Network of hedgerow habitats, although suboptimal, do function as wildlife corridors and can be used by birds for breeding	Local Importance, Higher Value
Wet grassland (GS4)	Mostly located to the west of the proposed development site, would be of some importance to wildlife in the area	Local Importance, Higher Value
Mixed Broadleaved Woodland (WD1)	Although only present in two small fragmented sections, this habitat would be of importance to ecology given the paucity of it in the study area	Local Importance, Higher Value
River Bunnoe	Present c. 125m from the site, this watercourse is of importance to aquatic ecology in the study area.	Local Importance, Higher Value
Hare	Were recorded in the study area, previous records on NBDC maps	Local Importance, Higher Value

Pine Marten	Were recorded in the study area, previous records on NBDC maps	Local Importance, Higher Value
Fox	Were recorded in the study area, previous records on NBDC maps	Local Importance, Higher Value
Fallow Deer	Were recorded in trail camera surveys on the adjacent permitted wind farm site and are likely to use the proposed development site	Local Importance, Higher Value
Bats	Bat suitability for the study area is considered to be average to low, with common species having the highest range	Local Importance, Higher Value
Birds	Usage of the site by birds is covered in Appendix 2. Extensive bird surveys carried out for the adjacent permitted Drumlins Park Wind Farm	Local Importance, Higher Value
Common frog	Considered likely to be present, using either wet grassland or potentially some of the drainage ditches on site at certain wetter periods of the year	Local Importance, Higher Value

Table 5.4: Key Ecological Receptors recorded within the study area, including a summary description and evaluation.

5.4 Description of Likely Effects

5.4.1 Designated Sites

The likely effects on Natura 2000 sites arising from the proposed development are discussed and assessed in detail in the Natura Impact Statement (NIS) prepared by Ecofact (2020a). The screening matrix identified the potential for significant effects on Whooper Swan designated as part of the Upper Lough Erne SPA, Natural Eutrophic Lakes and Otters in the Upper Lough Erne SAC, Natural Eutrophic Lakes and Otters in the Lough Oughter and Associated Loughs SAC and Wetland and Waterbirds, Whooper Swans, Wigeon and Great Crested Grebe in the Lough Oughter Complex SPA.

The proposed development is located at a considerable distance upstream of the designated sites with c. 21.7rkm (river kilometre) being the shortest distance to the Lough Oughter and Associated Loughs SAC, and 26.7rkm upstream of the Lough Oughter Complex SPA. It was determined that water quality, invasive species and collision risk with overhead structures had only limited potential to arise in the absence of mitigation. Due to the diluting effects which would occur over the substantial distances between the proposed development site and the affected Natura 2000 sites, it is considered very unlikely that any low-magnitude localized impacts could affect any of the qualifying interests of the Natura 2000 sites. Similarly, due to large separation distances, no significant adverse impacts are likely to arise in relation to invasive species. Due to low levels of usage, the nature of the proposed development and underground line, and the separation distances between the SPAs and the site, there would be no significant impacts arising that would impact bird species in the Natura 2000 network. As a precautionary measure, mitigation measures have been provided to ensure certainty regarding the avoidance of any adverse effects.

Given the detailed assessment undertaken in respect of Natura 2000 sites and the conclusions reached in the NIS (Ecofact, 2020a), effects on SPAs and SACs are not considered further in this section. The remainder of this section will focus on Natural Heritage Areas (NHAs), proposed Natural Heritage Areas (pNHAs) and other designated sites.

5.4.1.1 Construction Phase

Direct Effects

There will be no likely direct effects arising from the construction phase of the proposed development that could affect any NHAs, pNHAs or other designated areas as none are present within the footprint of the proposed development.

Indirect Effects

The proposed development site is hydrologically connected with the Lough Oughter and Associated Loughs pNHA, which is also a Ramsar Site, via the River Bunnoe, which is located c. 125m (straight line) from the proposed development. This designated site is also a Special Area of Conservation (SAC). Therefore, it is considered that the likely effects on this pNHA / Ramsar Site would be the same as those discussed in the NIS for the SAC. There is no likelihood of local water quality effects travelling to this designated site c. 22rkm downstream. Localised water quality effects may arise from construction run-off or accidental spillages of oils/fuels from the site.

There are no pathways identified which could give rise to likely significant effects on any other NHAs or pNHAs.

Cumulative Effects

There are no pathways identified for likely effects on any other designated site. Likely effects on the Lough Oughter and Associated Loughs pNHA / Lough Oughter Ramsar Site are the same as those discussed in the NIS for the SAC (Ecofact, 2020a). Localised water quality effects on adjacent surface water features do not have any likelihood of travelling c. 22rkm downstream to this designated site.

It is likely that the permitted wind farm will be constructed at the same time as the proposed development. Mitigation measures are provided for the permitted wind farm in the NIS for the project (Ecofact, 2019b). These mitigation measures are best practice and of the highest standard and are considered more than sufficient to avoid impacts on localised water quality. Taking the already prescribed mitigation for the adjacent permitted wind farm into account, as well as the localised water quality effects that may arise from the proposed development and the large separation distance, there are no likely significant cumulative effects envisaged to arise.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

5.4.1.2 Operational Phase

Direct Effects

There will be no likely significant direct effects arising from the operational phase of the proposed development that could affect any NHAs, pNHAs or other designated areas as none are present within the footprint of the proposed development.

Indirect Effects

Indirect effects which are likely to arise during the operational phase are assessed as being limited to water quality effects. However, due to the design of the proposed development and the limited quantities of polluting materials which will be stored on-site, together with the substantial separation distance between the proposed development site and the pNHA / Ramsar Site, the hydrological connections do not have the capacity to transport water quality pollution some c. 22rkm downstream to this designated site.

No other pathways for likely significant effects have been identified.

Cumulative Effects

There are no likely significant cumulative effects during the operational phase that could affect the Lough Oughter and Associated Loughs pNHA and Lough Oughter Ramsar Site. As noted previously, this site is also a SAC and therefore this site is assessed fully in the NIS (Ecofact, 2020a). The adjacent permitted wind farm will likely be constructed at the same time as the proposed development. Mitigation measures are provided for the permitted wind farm in the NIS for the project (Ecofact, 2019b). These mitigation measures are best practice and of the highest standard and are considered more than sufficient to avoid impacts on localised water quality. Taking the already prescribed mitigation for the adjacent permitted wind farm into account, as well as the localised water quality effects that may arise from the proposed development and the large separation distance, there are no likely significant cumulative effects envisaged to arise.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

5.4.1.3 Decommissioning Phase

As set out at **Chapter 3 (Sections 3.2 and 3.8)**, the proposed development will form part of the national electricity network and decommissioning of the substation is not proposed. Therefore, decommissioning phase effects will not occur.

5.4.2 Habitats & Flora

5.4.2.1 Construction Phase

Direct Effects

A total of 8 no. habitats were recorded in the study area during the habitat survey. Six of these habitats are directly within the footprint of the proposed development. **Table 5.1** above provides a breakdown of the habitats present within the footprint of each of the elements of the proposed development. Each of these habitats will be directly affected by the construction phase of the proposed development. While some habitats have a higher value than others and some provide good ecosystem services to the study area, the majority of habitats in the footprint are not of particular importance (considered to be locally important).

Treelines, hedgerows and wet grassland are locally important habitats to wildlife in the area. Minor habitat loss will occur during the construction of the proposed development. The construction of access roads, electricity substation, trenches for the underground electricity line and the end masts will result in habitat loss only in the area of direct construction; with the exception of underground electricity lines where excavated trenches will recolonise; all areas of direct landtake will result in a

loss of habitat.

The drainage ditches that traverse the area of the proposed substation are proposed to be realigned to other areas. As the drainage ditches were relatively dry during the surveys of the site, they are not considered to be of significant ecological importance. These drainage ditches may be of limited local importance during periods of heavy rainfall, but again, this would not be considered significant. There are no likely significant effects envisaged regarding the realignment of the drainage ditches on the site. These ditches will be realigned nearby and will remain of some local ecological value during periods of rainfall.

Similarly, hedgerows and treelines in the footprint of the proposed development will be lost during site clearance and this loss will be permanent. However, the hedgerows and treelines that will be lost are not considered to be of significant ecological importance. These are habitats that are abundant in this area and the footprint that will be lost is relatively minor in the context of the landscape. There will be some localised effects on birds relating to disturbance, and loss of foraging habitat for bats. The surveys have shown, however, that this impact would be in the local context. No likely significant effects regarding the loss of hedgerows and treelines are envisaged.

The effects relating to habitat loss caused by the construction of the proposed development is evaluated as being imperceptible, negative and temporary to permanent in duration in the local context.

Indirect Effects

On a local level and in the absence of mitigation, significant water quality effects may arise, affecting the watercourses and drainage ditches in the study area. Siltation and water pollution effects can arise indirectly through surface water run-off and accidental spillages of oil/fuel/concrete/cement. These effects could also travel downstream to other areas. Water quality effects such as these can affect the levels of oxygen present in the water column, as well as food sources for fish. There are no EPA registered watercourses on the proposed development site but the River Bunnoe is located c. 125m (straight line) south. Due to the slope here, surface water could run-off into this watercourse and result in significant effects. These effects are likely in the absence of any mitigation. Nonetheless, due the size of the River Bunnoe and downstream assimilative capacity, these effects would not be long-term or permanent.

These effects are assessed as being significant, negative and temporary to short-term in duration in the local context.

Although no non-native invasive species were recorded on site, invasive species could be introduced to the area. This may occur through the utilisation of machinery which has been previously operating on a contaminated site. Vectors such as tools or personnel can also bring invasive species on to a site. Invasive species can quickly throw an ecosystem off-balance and compete with species and habitats for resources.

The effects relating to invasive species, in the absence of mitigation, is assessed as being significant, negative and long-term to permanent in duration in the local context.

Cumulative Effects

In the absence of mitigation measures, there are likely significant cumulative effects

that could arise as a result of the proposed development. These comprise water quality impacts in-combination with existing agricultural activities in the area. The EPA do note that the River Bunnoe is impacted by water quality pressures arising from agricultural practices. It is also likely that the adjacent permitted Drumlins Park Wind Farm will be constructed at the same time as the proposed development. Similarly, to indirect effects, water quality effects relate to siltation, water quality pollution, surface water run-off and accidental spillages. All of these effects can degrade the quality of the watercourses in the study area. The already prescribed mitigation measures for the permitted Drumlins Park Wind Farm are taken into account but likely significant effects remain in relation to agricultural activities.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

In the absence of mitigation measures, these effects relating to cumulative water quality pollution are assessed as being significant, negative and short-term in duration in the local context.

5.4.2.2 Operational Phase

Direct Effects

There are no ongoing operational impacts expected affecting habitats and flora arising from the proposed development other than the direct loss of these habitats during the construction phase.

Indirect Effects

Localised water quality impacts may arise in relation to the chemicals and oils that are required during the operational phase. Accidental spillages may occur on site and could run-off into the River Bunnoe. These impacts can result in reduced dissolved oxygen and impact food sources for fish.

In the absence of mitigation, these impacts are likely to be significant, short-term and in the local context.

Cumulative Effects

There are likely significant cumulative effects that could arise in relation to water quality impacts affecting habitats and flora during the operational phase. Any oils/fuels used for maintenance of the proposed development could be discharged to the River Bunnoe downstream of the proposed development, in-combination with the water quality effects from the adjacent permitted wind farm and existing agricultural practices in the study area. Accidental spillages could result in reduced dissolved oxygen, in-combination with pollution and siltation impacts from agriculture and result in the degradation of water quality in the River Bunnoe. The already prescribed mitigation measures for the permitted Drumlins Park Wind Farm are taken into account but likely significant effects remain in relation to agricultural activities.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

In the absence of water quality protection measures, these effects relating to cumulative water quality pollution are assessed as being significant, negative and short-term in duration in the local context.

5.4.2.3 Decommissioning Phase

As set out at **Chapter 3 (Sections 3.2 and 3.8)**, the proposed development will form part of the national electricity network and decommissioning of the substation is not proposed. Therefore, decommissioning phase effects will not occur.

5.4.3 Fauna

5.4.3.1 Non-volant mammals

Construction Phase

Direct Effects

While no active mammal dwellings were identified on the proposed development site during the field investigations, it is considered that Hares may breed on the site. Pine martens are likely to be using the farm buildings in the wider study area and no pine marten dwellings were noted on the site itself. Foxes are also known to use the study area. No non-volant mammals of international importance were recorded during the survey nor are any considered likely to occur within the proposed development site.

Effects on the non-volant mammals listed above will include the direct loss of habitat and the fragmentation of existing habitat due to the construction of the proposed development in conjunction with the increased activity on the site leading to disturbance and noise effects. The footprint of the proposed development will affect hedgerows, treelines, wet grassland, improved agricultural grassland habitats and therefore would result in a slight negative impact on habitat connectivity for mammal species.

These effects will be limited to the local context where habitual commuting routes along hedgerows may be affected. The likely effect on hares, pine martens, foxes and fallow deer is assessed as being slight negative in the local context and will not be significant. The mobility of these species and the availability of suitable habitat, including forage and cover within the vicinity of the proposed development, reduces the likelihood of significant effects on these species.

Direct effects affecting non-volant mammals during the construction phase are evaluated as being slight negative and temporary to short-term in the local context.

Indirect Effects

It is assessed that the only likely indirect effects arising from the proposed development during the construction phase would constitute water quality and the effects of invasive species being introduced. As the non-volant mammals recorded during the surveys are not dependent on water quality, there is no likelihood of significant effects arising with regards water quality.

Invasive species could affect mammal populations however by degrading the habitats within the proposed development site. Invasive species can quickly result in shifting ecosystem balance by outcompeting other species. No non-native invasive species were recorded but could be introduced to the area in the absence of mitigation measures.

It is recognised, however, that other mammal species, such as Otter, could be present downstream in larger watercourses such as the River Bunnoe or the River Annalee. Water quality effects arising from siltation, resulting from excavations and/or accidental spillages of fuel/oil/cement/concrete during the construction

phase could indirectly affect downstream waters and therefore Otters food sources.

Indirect effects on non-volant mammals during the construction phase are evaluated as being imperceptible negative in the local context.

Cumulative Effects

The proposed development may result in increased disturbance, habitat loss/fragmentation and/or water quality impacts on non-volant mammals in the study area. The proposed development could give rise to cumulative impacts with the adjacent permitted Drumlins Park Wind Farm. The habitats on both sites are not considered to be of particular ecological importance and would only be of importance to local wildlife. However, there is an abundance of similar habitats in the Co. Monaghan countryside and therefore this impact is not considered to be significant. These mammals are found throughout Ireland and are adaptable, opportunistic species.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

Cumulative effects on non-volant mammals during the construction phase are evaluated as being imperceptible negative in the local context.

Operational Phase

Direct Effects

Due to the nature of the proposed development during its operational phase, no likely significant direct effects on non-volant mammals will arise.

Indirect Effects

Likely indirect effects during the operational phase of the proposed development also comprise water quality effects on non-volant mammals. Although there are no EPA registered watercourses on the site, the River Bunnoe is located c. 110m south, where Otters are likely to be present. Chemicals and oils will be required during the operational phase that could affect water quality in the absence of mitigation measures. Accidental spillages may occur on site which could lead to a deterioration of water quality in the River Bunnoe. This could indirectly affect Otters by reducing the quality or availability of their primary food source, i.e. fish.

In the absence of mitigation measures, effects on non-volant mammals during the operational phase would be slight negative and long-term in the local context.

Cumulative Effects

Likely cumulative effects on non-volant mammals during the operational phase of the proposed development also comprise water quality effects in-combination with the permitted Drumlins Park Wind Farm. A deterioration in water quality in local watercourses, arising from the concurrent construction of the permitted wind farm and proposed development could lead to indirect effects on Otters, for which fish are their primary food source, and fish could be impacted by a decline in water quality. In-combination effects could also arise in relation to the existing background agricultural pressures, which are also affecting water quality in the downstream River Bunnoe.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in

combination with the proposed development.

In the absence of mitigation, effects on non-volant mammals during the operational phase are assessed as moderate negative and long-term in the local context.

Decommissioning Phase

As set out at **Chapter 3 (Sections 3.2 and 3.8)**, the proposed development will form part of the national electricity network and decommissioning of the substation is not proposed. Therefore, decommissioning phase effects will not occur.

5.4.3.2 Bats

Construction Phase

Direct Effects

Based on previous surveys of the adjacent permitted wind farm site and targeted walkover surveys of the proposed development site, the bat species using the study area would be common species that are typically found in agricultural habitats in Ireland. Effects that may arise include disturbance and habitat loss/fragmentation. Some of the mature trees on the site do have potential for bats and the trees within the direct footprint of the proposed development will be felled. If bats are present in the trees at the time of felling these bats could be killed or displaced.

Disturbance effects will arise during the construction phase due to the increase of machinery and human activity on the site. If bats are roosting in trees nearby this could result in disturbance during daylight hours. During site clearance and earthworks, hedgerows and treelines will be removed resulting in a loss of foraging and commuting habitat. The majority of species recorded are common and would readily utilise adjacent habitats outside the proposed development site for foraging and commuting purposes.

In the absence of any mitigation, effects on bats arising during the construction phase are assessed as being significant negative, permanent and in the local context.

Indirect Effects

Ground clearance works can result in indirect effects on bats during the construction phase. This will result in the removal of vegetation, which could result in decreased insect production and therefore affects the food sources available for bats in the study area. Again, it is noted that the majority of species recorded on the site are common species that would readily utilise adjacent habitats outside the proposed development site for foraging. This reduces the likelihood of significant effects on bats.

In the absence of mitigation, effects on bats are assessed as being slight negative, permanent and in the local context.

Cumulative Effects

Cumulative effects on bats during the construction phase relate to disturbance, habitat loss and a decrease in insect/food production. The majority of bats recorded on the site were common species that are widespread over Ireland and would readily use adjacent agricultural habitats for foraging and commuting. There are no pristine woodlands, lakes or other habitats that would be of ecological importance to bat species in the study area. It is considered that the common species utilising the site would be adaptable and able to move freely within the landscape to other

areas of habitat similar to the proposed site. Nonetheless, the removal of potential tree roosts on the site could result in a moderate effect locally.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

Therefore, in the absence of any mitigation measures, cumulative effects on bats during the construction phase are assessed as being moderate negative, permanent and in the local context.

Operational Phase

Direct Effects

It is considered that due to the nature of the proposed development, there would be no direct effects on bats arising from the operational phase. Direct effects during the operational phase are evaluated as none.

Indirect Effects

It is considered that due to the nature of the proposed development, there would be no indirect effects on bats arising from the operational phase. Indirect effects during the operational phase are evaluated as none.

Cumulative Effects

Cumulative effects on bats during the operational phase only concern the adjacent permitted Drumlins Park Wind Farm. The biodiversity chapter prepared for the now permitted wind farm site (Ecofact, 2019c), outlined the potential for bat fatalities involving direct collision and barotrauma relating to the wind turbines. Mitigation was provided for this, including providing buffer distances from treelines and hedgerows and reducing the idle rotation speed of the turbine blades. The most recent Scottish Natural Heritage guidance notes that these measures can significantly reduce the potential for bat fatalities by up to 50% (SNH, 2019).

It is considered that due to the nature of the proposed development, which involves infrastructure that would be clearly visible to bats, and stationary, and the implementation of previously prescribed mitigation measures for bats in the permitted wind farm adjacent, cumulative effects on bats during the operational phase would not be significant.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

In the absence of any mitigation measures for the proposed development itself, cumulative effects on bats are assessed as being slight negative, long-term and in the local context.

Decommissioning Phase

As set out at **Chapter 3 (Sections 3.2 and 3.8)**, the proposed development will form part of the national electricity network and decommissioning of the substation is not proposed. Therefore, decommissioning phase effects will not occur.

5.4.3.3 Birds

Construction Phase

Direct Effects

No significant direct effects on birds are envisaged to arise. The only effects that may arise would be during site clearance and tree felling. Any hedgerows or treelines removed as part of the proposed development would result in a loss of nesting/foraging habitat on the site. However, it is again noted that the majority of bird species recorded on the site are common species that utilize the typical agricultural habitats found in Co. Monaghan and around Ireland. These habitats are not pristine and are abundant in this area of County Monaghan.

In the absence of mitigation, direct effects on birds during the construction phase of the proposed development are evaluated as being slight negative, short-term and in the local context.

Indirect Effects

No significant indirect effects on birds are envisaged. Indirect effects may arise during the construction phase relating to disturbance from an increase in human activity and noise on the site. This can result in disturbance and displacement effects. Again, the majority of birds recorded on the site are common passerine species that would readily use the adjacent landscape would not be significantly impacted.

In the absence of any mitigation, indirect effects on birds during the construction phase are evaluated as being slight negative, temporary to short-term and in the local context.

Cumulative Effects

Cumulative effects may arise during the construction phase in relation to the adjacent permitted Drumlins Park Wind Farm. This relates to increased disturbance, habitat loss and fragmentation. Mitigation was provided for the adjacent permitted wind farm site, which included measures to reduce disturbance levels as well as replanting mitigation to reinstate hedgerows and treelines. The proposed development footprint in itself is small in comparison to the permitted Wind Farm site and comprises of common species and habitats in Co. Monaghan.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

In the absence of any mitigation measures for the proposed development itself, cumulative effects on birds are evaluated as being slight negative, temporary to short-term and in the local context.

Operational Phase

Direct Effects

There will be no direct effects on birds during the operational phase of the proposed substation and grid connection development. Direct effects during the operational phase are evaluated as none.

Indirect Effects

Due to the nature of the development, and the underground cabling, there will be no significant indirect effects on birds. No collisions with the end masts are envisaged to arise. The end masts are large stationary structures that are clearly visible. In general, birds do not collide with pylons/towers, but the risk lies with species that may nest on the top of pylons which may collide with wires adjacent to the pylons

due to the location of their nest. No species were identified in the extensive bird surveys at the site that would be likely to nest on top of pylons or end masts in the study area and no such behaviour was recorded at existing pylon/tower structures in the study area. Indirect effects during the operational phase are evaluated as imperceptible negative.

Cumulative Effects

Cumulative effects on birds during the operational phase concern the already permitted adjacent Drumlins Park Wind Farm. The biodiversity chapter prepared for the now permitted wind farm site (Ecofact, 2019), outlined the potential for some disturbance and displacement impacts on common passerine birds in the study area. Mitigation was provided for this in Ecofact (2019c). By nature, the proposed development, consisting of a substation, underground cabling and end masts is not considered to be of any particular risk to birdlife. These are stationary structures that the birds in the study area would easily avoid and, therefore, there is no cumulative risk of collision with structures.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

In the absence of any mitigation measures for the proposed development itself, cumulative effects on birds are evaluated as being imperceptible negative, long-term and in the local context.

Decommissioning Phase

As set out at **Chapter 3 (Sections 3.2 and 3.8)**, the proposed development will form part of the national electricity network and decommissioning of the substation is not proposed. Therefore, decommissioning phase effects will not occur.

5.4.3.4 Aquatic Ecology

Construction Phase

Direct Effects

There are no direct effects on aquatic ecology envisaged to arise during the construction phase as there are no EPA registered watercourses on the site. There are drainage ditches present on the site, which will be realigned as part of the proposed development, but as mentioned previously these drains are not of importance to aquatic ecology and most of the drains are dry.

In the absence of mitigation measures, direct effects on aquatic ecology are evaluated as being imperceptible negative, short-term and in the local context.

Indirect Effects

Indirect effects on aquatic ecology during the construction phase relate to water quality. Site excavations and the digging of trenches for the underground cabling can result in sediment run-off to the River Bunnoe which is c. 125m south, in the same field as the proposed end masts. The construction of foundations for the end masts, in the absence of mitigation measures, could result in cement run-off that could enter the water column. Accidental spillages of oils or fuels could also run-off into the River Bunnoe. All of the above activities could lead to water quality impacts that can harm aquatic life. Such impacts include a reduction of dissolved oxygen, increased turbidity and suspended solids, or fish mortality.

Of particular risk to fisheries waters would be the introduction of riparian invasive plants such as Japanese Knotweed *Fallopia japonica*, Himalayan balsam *Impatiens glandulifera*, or Rhododendron *Rhododendron ponticum* which can block light to fisheries channels reducing the carrying capacity for fish. Machinery, tools or personnel can act as vectors to bring invasive species on to the site.

In the absence of mitigation measures, indirect effects on aquatic ecology are evaluated as being significant negative, short-term and in the local context.

Cumulative Effects

Cumulative effects on aquatic ecology during the construction phase of the proposed development comprises water quality impacts in combination with existing agricultural activities in the area as well as the adjacent permitted Drumlins Park Wind Farm. The EPA notes that the River Bunnoe is impacted by water quality pressures arising from agricultural practises in the area. Cumulative water quality effects on the catchment may arise if these activities are undertaken at the same time. These effects are outlined above in indirect effects but can all harm aquatic life. Water quality protection mitigation is provided for the adjacent permitted Wind Farm in the NIS (Ecofact, 2019b).

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

In the absence of any mitigation for the proposed development in itself, cumulative effects on aquatic ecology during the construction phase are evaluated as being significant negative, temporary to short-term and in the local context.

Operational Phase

Direct Effects

There are no direct effects on aquatic ecology during the operational phase as there are no EPA registered watercourse on the site. There are drainage ditches present on the site, which will be realigned as part of the proposed development, but as mentioned previously these drains are not of importance to aquatic ecology and most of the drains are dry. Direct effects on aquatic ecology during the operational phase are therefore evaluated as being imperceptible negative in the local context.

Indirect Effects

Indirect effects during the operational phase of the proposed development comprise water quality pollution. Although there are no EPA registered watercourses on the site, the River Bunnoe is located adjacent. Chemicals and oils are required during the operational phase that could affect water quality in the absence of any mitigation measures. Accidental spillages may occur on site and could run-off into the River Bunnoe. This can harm aquatic life by resulting in reduced dissolved oxygen, increased turbidity and even fish mortality.

In the absence of mitigation measures, indirect effects on aquatic ecology are evaluated as being moderate negative, long-term and in the local context.

Cumulative Effects

Cumulative effects on aquatic ecology during the operational phase of the proposed development also comprise water quality impacts in-combination with

the permitted Drumlins Park wind farm development and existing background agricultural practises. Any oils/fuels used for maintenance of the wind farm could be discharged to the River Bunnoe downstream of the proposed development, in combination with water quality impacts from the proposed development.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

In the absence of mitigation measures, cumulative effects on aquatic ecology during the operational phase are evaluated as being moderate negative, long-term and in the local context.

Decommissioning Phase

As set out at **Chapter 3 (Sections 3.2 and 3.8)**, the proposed development will form part of the national electricity network and decommissioning of the substation is not proposed. Therefore, decommissioning phase effects will not occur.

5.4.3.5 Reptiles & Amphibians

Construction Phase

Direct Effects

There are no records of reptiles on the site and no reptiles were recorded during the current surveys of the site. Direct effects on amphibians concern direct water quality, disturbance and habitat loss impacts. There are no EPA registered watercourses on the site, and the drainage ditches present, which will be realigned, are generally dry. Therefore, there is limited potential for amphibians breeding on the site. Nonetheless, during periods of heavy rainfall, if the works did take place during the breeding season, breeding amphibians on the site could be killed or disturbed during the realignment of the drains. It is again noted that these drains are not considered to be optimal habitat and are common in the study area.

In the absence of mitigation, direct effects on amphibians are evaluated as being moderate negative, short-term and in the local context.

Indirect Effects

Indirect effects on amphibians mainly concern water quality impacts, which can travel to downstream watercourses away the proposed development site. Water quality effects such as suspended solids run-off and accidental spillages of oil/fuel/concrete/cement at the end masts, in the same field boundary as the River Bunnoe, can be transported downstream. This can indirectly affect amphibians by degrading their habitat, which could lead to displacement or a decline in food availability. This can also indirectly affect breeding success.

In the absence of mitigation measures, indirect effects on amphibians are evaluated as being slight negative, short-term and in the local context.

Cumulative Effects

Cumulative effects on amphibians during the construction phase of the proposed development site comprise water quality effects in combination with existing agricultural activities in the area and with the adjacent permitted Drumlins Park Wind Farm. Cumulative water quality effects on the catchment or drains in the study area that may be used by amphibians, may arise if these activities are undertaken at the same time. This could negatively affect amphibian habitat and potential

breeding areas, as well as impacting food supply by reduced insect production. It is noted that no ponds / lakes or significant wetlands are located in the study area that would be considered optimal habitat for amphibians. This will reduce the magnitude of cumulative effects.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

In the absence of mitigation measures, cumulative effects on amphibians during the construction phase are evaluated as being slight negative, short-term and in the local context.

Operational Phase

Direct Effects

No habitat for reptiles was identified on the proposed development site and no previous records are present for the area. During the operational phase, direct effects may arise on water quality in relation to chemicals and oils that may be required for the maintenance. This could affect any amphibians that may use the realigned drainage ditches on the site during periods of heavy rainfall. Water quality effects could still arise affecting these realigned drainage ditches due to run-off or accidental spillages of chemicals or oils. Again, it is noted that this is not optimal habitat which will reduce the magnitude of the effect.

In the absence of mitigation measures, direct effects on amphibians during the operational phase are evaluated as being slight negative and long-term in the local context.

Indirect Effects

Indirect effects during the operational phase also concern water quality effects as mentioned above for direct effects. However, water quality effects could travel downstream into other drains or watercourses that may be used by amphibians in the local area. This could result in displacement or a decline in food availability or reduced breeding success. No ponds/lakes or significant wetlands are located in the study area that would be considered optimal habitat for amphibians.

In the absence of mitigation measures, indirect effects on amphibians are evaluated as being slight negative, long-term and in the local context.

Cumulative Effects

Cumulative effects on amphibians during the operational phase of the proposed development comprise water quality effects in combination with existing agricultural activities in the area and with the adjacent and already permitted Drumlins Park Wind Farm. Cumulative water quality effects on the catchment or drains in the study area that may be used by amphibians, may arise due to chemicals and oils that are required for the maintenance of both the proposed development and the adjacent wind farm. This could negatively affect amphibian habitat and potential breeding areas. It is noted that no ponds/lakes or significant wetlands are located in the study area that would be considered optimal habitat for amphibians. This will reduce the magnitude of cumulative effects.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

In the absence of mitigation measures, cumulative effects on amphibians during the construction phase are evaluated as being slight negative, short-term and in the local context.

Decommissioning Phase

As set out at **Chapter 3 (Sections 3.2 and 3.8)**, the proposed development will form part of the national electricity network and decommissioning of the substation is not proposed. Therefore, decommissioning phase effects will not occur.

5.4.3.6 Terrestrial Macroinvertebrates

Construction Phase

Direct Effects

Typical direct effects on terrestrial macroinvertebrates mainly concern habitat loss/fragmentation and disturbance. From the desktop study and the surveys of the site, the only species present are common species typical of agricultural type habitats that are widespread across Co. Monaghan and Ireland. This habitat loss would be relatively minor taking into account the small footprint of the development. There are no pristine habitats on the site that would be of significant importance to terrestrial invertebrates.

In the absence of mitigation measures, direct effects on terrestrial invertebrates are evaluated as being imperceptible negative and permanent and in the local context.

Indirect Effects

Indirect effects on terrestrial invertebrates' concern disturbance. Increased noise, machinery and human activity is likely to result in disturbance of the common species found at the site. Again, the only species present are common species typical of agricultural type habitats that are widespread across Co. Monaghan and Ireland. There are no pristine habitats in the zone of influence that would be of significant importance to terrestrial invertebrates.

In the absence of mitigation measures, direct effects on terrestrial invertebrates are evaluated as being imperceptible negative, temporary to short-term and in the local context.

Cumulative Effects

Cumulative effects on terrestrial invertebrates' concern habitat loss / fragmentation, disturbance and invasive species impacts in combination with existing activities in the study area such as agricultural practises and the permitted wind farm. There are no optimal habitats on the proposed development site for terrestrial invertebrates. The habitats on the site mainly comprise agricultural grassland, hedgerows and treelines that are well maintained. The proposed development site is of a small footprint in the context of the wider Co. Monaghan countryside and there are no pristine habitats in the zone of influence that would be of significant importance to terrestrial invertebrates.

Other existing, permitted and proposed developments; including those outlined at **Chapter 1**; are not considered likely to give rise to effects which could act in combination with the proposed development.

In the absence of mitigation measures for the proposed development in itself, cumulative effects on terrestrial invertebrates are evaluated as being slight

negative, long-term and in the local context.

Operational Phase

Direct Effects

Due to the nature of the proposed development during the operational phase, there would be no direct effects arising that could affect terrestrial macroinvertebrates.

Indirect Effects

Due to the nature of the proposed development during the operational phase, there would be no indirect effects arising that could affect terrestrial macroinvertebrates.

Cumulative Effects

Due to the nature of the proposed development during the operational phase, there would be no cumulative effects arising that could affect terrestrial macroinvertebrates.

Decommissioning Phase

As set out at **Chapter 3 (Sections 3.2 and 3.8)**, the proposed development will form part of the national electricity network and decommissioning of the substation is not proposed. Therefore, decommissioning phase effects will not occur.

5.5 Mitigation & Monitoring Measures

5.5.1 Designated Sites

Mitigation measures for Natura 2000 sites are provided in the NIS for the proposed development prepared by Ecofact (2020a). These mitigation measures are considered sufficient to also avoid any construction phase effects on the Lough Oughter and Associated Loughs pNHA and Ramsar site, as this is also a SAC. The mitigation measures included in the NIS are provided below for clarity.

5.5.1.1 Construction Phase

In the first instance, water quality will be protected through best practice construction phase management process. For example, excavation works will not be undertaken during times of prolonged or intense rainfall or if such weather events are forecast and no development works will be commenced at a specific location until such time as the drainage management system is in place, to the satisfaction of the Environmental Manager, for the relevant works.

Secondly, the implementation and management of the drainage network will be subject to strict control measures set out in the Construction Environmental Management Plan (CEMP) and Surface Water Management Plan (SWMP) (see **Annex 3.5**). Outline plans, which will be developed further prior to the commencement of development to include precise details of water quality protection measures, have been prepared and have had regard to the 'Guidelines for the crossing of watercourses during the construction of national road schemes' (NRA, 2008b) and 'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters' (IFI, 2016). The (detailed) SWMP will set out measures to avoid siltation, erosion, surface water run-off and accidental pollution events which all have the potential to adversely affect water quality within the site during the construction phase. The implementation of these measures will ensure that no

surface water runoff is discharged to any watercourse without being fully treated in advance.

Where access tracks pass close to drainage ditches, silt fencing will be used to protect the drainage ditches. The maintenance and monitoring of such silt fences will be subject to an on-site quality management system which will be outlined in the detailed CEMP.

Erosion and sediment control will be put in place to protect agricultural drains before commencement of any site clearance and earthworks. Exposed soil will be kept to a minimum throughout construction to further reduce risk of sediment release during rainfall events. Silt fences and bunds where necessary will be kept in place until exposed soil can be revegetated naturally in the growing season. Erosion and sediment controls will be monitored and maintained on a continuous basis throughout the construction phase.

Measures to be employed during the construction phase to prevent the transport of deleterious substances to the River Bunnoe and potentially to downstream Natura 2000 sites are as follows:

- Prior to the commencement of construction activities, silt fencing will be placed along the southern boundary of the proposed substation site which is up-gradient of the main drain to the south of the proposed substation and spoil deposition area. Silt fencing will also be installed around the proposed end mast works area;
- Interceptor and collector drains will be installed up-gradient and down-gradient respectively of the earthworks areas
- Surface water will pass through interception infrastructure, such as silt traps, to ensure suspended solids will not reach any watercourses;
- Silt traps/settlement ponds and temporary interceptors and traps will be put in place on site prior to any site clearance/earthworks and will be used until such time as permanent facilities are constructed;
- The silt fences will be embedded into the local soils to ensure all site water is captured and directed to the surface water drainage system;
- All fuels, lubricants and hydraulic fluids will be kept in secure bunded areas, within the permitted Drumlins Park Wind Farm construction compound (also used for the proposed development), away from watercourses. The bunded area will accommodate 110% of the total capacity of the containers within it;
- Containers will be properly secured to prevent unauthorised access and misuse. An effective spillage procedure will be put in place and spill kits provided with all staff properly briefed and trained;
- Any waste oils or hydraulic fluids will be collected, stored in appropriate containers and disposed of offsite in an appropriate manner;
- Fuelling and lubrication will not be conducted within 50m of any surface water feature;
- Spoil heaps from the excavations required will be covered with geotextile and surrounded by silt fences;
- Secure concrete washout areas will be designated on site; and
- Wheel washing facilities will be provided at the site entrance draining to silt traps.

Two existing agricultural drains on site will be realigned to facilitate the construction of the proposed substation. The outfall channel of the existing drains and proposed realigned drains will be temporarily blocked before the realignment works begin.

During the realignment of these drains, a sealed silt fence will be placed on the downstream end of the ditch to prevent any excess siltation entering the receiving watercourse. The realignment of these drains will also be carried out following and during a period of dry weather to avoid the entrainment of silt or sediment in surface water runoff. Following construction, Disturbed Sediment Entrainment Mats - SEDIMATS (see http://www.hy-tex.co.uk/ht_bio_sed.html) will be installed on the base of the new realigned drains for a period post construction. These will be installed according to the manufacturer's instructions at suitable locations along the realigned drain.

Biosecurity measures will follow as relevant the manual 'The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads' by NRA (2010). While no non-native invasive species were recorded during the walkover surveys, the implementation of best practice measures will avoid the importation of invasive species to the site.

5.5.1.2 Operational Phase

The following surface water protection measures will be implemented to avoid effects from hydrocarbon/chemical spillage:-

- All storage containers will be labelled appropriately, including hazardous markings;
- All holding tanks will be constructed of material appropriate for fuel/chemical storage and will be bunded to at least 110% of the maximum tank volume or 25% of the total capacity of all the tanks within the bund, whichever is greatest;
- Bunds will be to standard specified in CIRIA Report 163 'Construction of bunds for oil storage tanks' and CIRIA Report C535 'Above-ground proprietary prefabricated oil storage tank systems';
- Barrels and bunded containers will be stored upright and internally where appropriate and always on drip trays or sump pallets;
- Appropriate spill kits will be available at all storage locations;
- All fuel/chemical storage facilities will be subject to weekly inspection; and,
- Leaking or empty drums will be removed from the site immediately and disposed of via a registered waste disposal contractor.

Stormwater, arising from car parking areas and the transformer within the completed development, will be discharged to ground via an oil interceptor. Stormwater discharge will be limited to greenfield runoff rates, following attenuation through comprehensive sediment control infrastructure ensuring that no deleterious material is discharged, and no adverse water quality effects are experienced. The mimicking of greenfield runoff rates is a key part of the surface water management system and will ensure that the hydrological regime is not altered by the proposed development. The operational phase of the proposed development will have a negligible effect on local watercourses.

Waste will be generated during the operational phase including cooling oils, lubricating oils and packing from spare parts or equipment. All waste will be removed from site and reused, recycled or disposed of in accordance with best-practice and all regulations in a licensed facility.

5.5.2 Habitats & Flora

5.5.2.1 Construction Phase

All water quality mitigations listed above are considered sufficient to avoid impacts

regarding water quality and invasive species on the site (Ecofact, 2020a).

Land clearance and soil stripping within the footprint of the works will be limited to the works area, with habitats outside of the required works or access requirements left intact. Disturbed areas within the footprint of the works will be allowed to regenerate naturally or will be reseeded with native species. The required works footprint for the proposed development will be clearly defined and sited to reduce land take impacts affecting habitats. Fencing of the works area during construction will minimise impacts on adjoining habitats.

While the construction of the proposed development will require the removal of c. 215m of hedgerow, it is proposed to create c. 360m of new hedgerow around the boundary of the proposed substation. Replanting measures for the loss of hedgerows and treeline habitats will ensure that there is no net loss of these locally important habitats within the study area. The proposed planting (see **Chapter 3**) will utilise native species only and will take cognisance of the existing habitat structure within the local landscape. Prescriptions for landscape planting should be prepared by a qualified landscape architect with input from a qualified ecologist, making reference to the baseline habitats and ecological conditions; i.e. hedgerows and treelines.

5.5.2.2 Operational Phase

No further habitat or flora mitigation is required during the operational phase of the proposed development.

5.5.3 Fauna

5.5.3.1 Non-volant Mammals

Construction Phase

Temporary fencing (paling with 25mm mesh) will be erected around the required site works to delineate the works area and to minimize the potential for disturbance impacts outside of the works area. As no mammal dwellings were identified within the impact area of the proposed development, there is no specific mitigation required for the protection of mammals in relation to relocation/construction of artificial dwellings. However, prior to the commencement of development, a pre-construction walkover survey will be undertaken to ensure no active mammal dwellings have been created.

The retention of areas of habitats and linear features such as treelines and hedgerows will reduce effects on many common mammal species within the site, where deer occur within the study area. It is recommended that hedgerow removal, if required will be carried out slowly to ensure that any mammals present can escape, such as hares. It is again noted that while the construction of the proposed development will required the removal of c. 215m of hedgerow, it is proposed to create c. 360m of new hedgerow around the boundary of the proposed substation.

Operational Phase

No further mitigation for non-volant mammals is required for the operational phase of the proposed development.

5.5.3.2 Bats

Construction Phase

Bats are most active, particularly in relation to foraging, at nighttime and therefore

construction works will only be undertaken during daylight hours with no works being carried out between dusk and dawn. Furthermore, there will be no illumination of adjacent hedgerows/treelines/scrub habitats during dark hours as these are likely to be used by commuting/foraging bats as any such illumination may interrupt normal behavior.

Any mature trees required to be felled will be checked in advance for usage by bats by a suitably qualified bat ecologist. Bats will also benefit from the replanting scheme through the increased generation of insects and increased foraging corridors.

Operational Phase

The lamp posts/lights within the proposed substation will be cowled to ensure that adjacent vegetation is not illuminated. The substation lighting will only be used when maintenance personnel are present.

No further mitigation for bats is required for the operational phase of the proposed development.

5.5.3.3 Birds

Construction Phase

Site clearance works or felling of trees will be undertaken outside of the bird nesting season, which runs from the 1st of March to the 31st of August each year.

Operational Phase

No further mitigation for birds is required for the operational phase of the proposed development.

5.5.3.4 Aquatic Ecology

Construction Phase

The water quality mitigation listed in the NIS, **Section 5.5.1** above, and **Chapter 7** (Water) are considered sufficient to avoid negative effects on aquatic ecology.

Operational Phase

The water quality mitigation listed in the NIS, **Section 5.5.1** above, and **Chapter 7** (Water) will avoid negative effects on aquatic ecology.

5.5.3.5 Reptiles & Amphibians

Construction Phase

The water quality mitigation listed in the NIS, **Section 5.5.1** above, and **Chapter 7** will avoid negative effects on water quality that may affect amphibians. As a precautionary measure, a pre-construction common frog breeding survey will be undertaken to assess frog spawning activity in the drains on the proposed development site. This will be undertaken by a suitably qualified ecologist. If no spawning activity is present, works may commence. If frog spawn is found, works may be delayed in the drainage ditches until June/July, when froglets typically leave their breeding areas.

Operational Phase

The water quality mitigation listed in the NIS, **Section 5.5.1** above and **Chapter 7** are considered sufficient to avoid negative effects on amphibians during the operational phase.

5.5.3.6 Terrestrial Macroinvertebrates

Construction Phase

The mitigation measures provided above for the protection of habitats and flora during the construction phase will also avoid negative effects on terrestrial invertebrates during the construction phase.

Operational Phase

No specific mitigation measures are required for the operational phase to avoid negative effects on terrestrial macroinvertebrates.

5.6 Residual Effects

Residual effects are those which occur following the implementation of mitigation measures. The majority of species/habitats in the study area are considered to be of low ecological value, with the exception of some hedgerows, treelines, wet grassland and scattered sections of woodland which are important to local wildlife. The mitigation measures proposed will provide robust and effective protection to each species/habitat identified and as a result significant residual effects are not assessed as likely to occur.

5.6.1 Designated Sites

The residual effects on affected Natura 2000 sites are discussed in the NIS for the proposed development (Ecofact, 2020a) which concluded that following the implementation of appropriate mitigation measures, there is no likelihood of integrity level effects on any Natura 2000 site (Ecofact, 2020a).

The proposed development will not result in likely significant direct, indirect or cumulative residual effects on pNHAs following the implementation of mitigation measures. No residual effects on designated sites are envisaged.

5.6.2 Habitats & Flora

Subject to the implementation of mitigation measures, the proposed development will not result in the spread of non-native invasive species. Water quality mitigation measures implemented during the construction and operational phases will ensure no significant effects occur to the aquatic habitats in the study area. The residual effect on habitats and flora are therefore assessed as 'none'.

5.6.3 Fauna

5.6.3.1 Non-volant Mammals

Subject to the implementation of best practise construction measures and the targeted measures outlined above, there will be no residual effect on non-volant mammals. The overall effect on non-volant mammals is assessed as 'none'.

5.6.3.2 Bats

Mitigation measures listed above will ensure that negative effects on bats are reduced insofar as possible. Following the implementation of mitigation measures, some cumulative effects remain as the proposed development facilitates the permitted adjacent Drumlins Park Wind Farm. Negative effects were identified for the now permitted wind farm relating to collision risks with bats and mitigation measures were provided in this report (Ecofact, 2019c). With the implementation of these mitigation measures for the adjacent permitted wind farm, the overall cumulative residual effect is assessed as being slight negative.

5.6.3.3 Birds

Mitigation measures listed above will ensure that negative effects on birds are reduced insofar as possible. Following the implementation of mitigation measures, some cumulative effects remain as the proposed development facilitates the permitted adjacent Drumlins Park Wind Farm. Negative effects were identified for the now permitted wind farm relating to collision risks, displacement and mitigation measures were provided in this report (Ecofact, 2019c). With the implementation of these mitigation measures for the adjacent permitted wind farm, the overall cumulative residual effect is assessed as being slight negative.

5.6.3.4 Aquatic Ecology

Following the implementation of appropriate mitigation as discussed above, the residual effect on aquatic ecology is assessed as 'none'.

5.6.3.5 Reptiles & Amphibians

Following the implementation of mitigation measures, the residual effect on reptiles and amphibians is assessed as 'none'.

5.6.3.6 Terrestrial Macroinvertebrates

Mitigation measures listed will ensure that negative effects on terrestrial macroinvertebrates are reduced insofar as possible. Following the implementation of mitigation measures, habitat loss effects remain; however, due to the small footprint of the development and the quality of habitat present, the residual effect is assessed as imperceptible negative.

5.7 Summary

The following table presents Key Ecological Receptors (KERS) which have been identified as likely to be affected by the proposed development; identifies the impacts which are assessed as likely to occur and outlines the residual impacts predicted to occur following the implementation of mitigation measures. Residual impacts on these KERS are at the lower end of the significance spectrum and range from 'none' to 'slight-negative'

Ecological Receptors	Likely Effects	Mitigation	Residual Effects
Treeline (WL2)	Habitat Loss, Invasive Species	Land clearance and soil stripping limited; disturbed areas allowed to regenerate naturally, fence works areas, replanting to ensure no net loss using native species only, landscape plan prepared by qualified landscape architect and ecologist, NRA Guidelines for Biosecurity followed	None
Hedgerow (WL1)	Habitat Loss, Invasive Species	Land clearance and soil stripping limited; disturbed areas allowed to regenerate naturally, fence works areas, replanting to ensure no net loss using native species only, landscape plan prepared by qualified landscape architect and ecologist, replant c. 400m of new hedgerow (c. 350m removed), NRA Guidelines for Biosecurity followed	None
Wet grassland	Habitat Loss, Invasive	Land clearance and soil stripping limited; disturbed areas allowed to regenerate	None

(GS4)	Species	naturally, fence works areas, landscape plan prepared by qualified landscape architect and ecologist, NRA Guidelines for Biosecurity followed	
Mixed Broadleaved Woodland (WD1)	Invasive Species	NRA Guidelines for Biosecurity followed	None
River Bunnoe	Water Quality (Surface water run-off, accidental spillages), Invasive Species	Detailed measures provided above	None
Hare	Habitat Loss, Habitat Fragmentation, Disturbance (Human Activity, Noise), Invasive Species	Temporary fencing erected around site works, pre-construction surveys, hedgerow removal carried out slowly to ensure any mammals can escape, replanting with native species and no net loss of hedgerows (c. 360m planted and c. 215m removed), NRA guidelines followed for biosecurity	None
Pine Marten	Habitat Loss, Habitat Fragmentation, Disturbance (Human Activity, Noise), Invasive Species	Temporary fencing erected around site works, pre-construction surveys, hedgerow removal carried out slowly to ensure any mammals can escape, replanting with native species and no net loss of hedgerows (c. 360m planted and c. 215m removed), NRA guidelines followed for biosecurity	None
Fox	Habitat Loss, Habitat Fragmentation, Disturbance (Human Activity, Noise), Invasive Species	Temporary fencing erected around site works, pre-construction surveys, hedgerow removal carried out slowly to ensure any mammals can escape, replanting with native species and no net loss of hedgerows (c. 360m planted and c. 215m removed), NRA guidelines followed for biosecurity	None
Fallow Deer	Habitat Loss, Habitat Fragmentation, Disturbance (Human Activity, Noise), Invasive Species	Temporary fencing erected around site works, pre-construction surveys, hedgerow removal carried out slowly to ensure any mammals can escape, replanting with native species and no net loss of hedgerows (c. 360m planted and c. 215m removed), NRA guidelines followed for biosecurity	None
Bats	Habitat Loss, Mortality (if present in Trees), Disturbance,	Works only during daylight hours with no works carried out between dusk and dawn, no illuminated of hedgerows / treelines / scrub habitats during dark hours, any mature trees to be felled will be checked in advance	Slight negative

	Reduced Food Sources	by suitably qualified ecologist, will benefit from replanting with native species, no net loss of hedgerows (c. 360m planted and c. 215m removed), NRA guidelines for the treatment of bats will be followed	
Birds	Habitat loss, Disturbance	Site clearance works or tree felling outside of bird nesting season, will benefit from replanting with native species, no net loss of hedgerows (c. 360m planted and c. 215m removed)	Slight negative

Table 5.6: Summary of impacts, mitigation and residual impacts on Key Ecological Receptors.

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