
Maighne Wind Farm

Review of Ecological Submissions on behalf of An Bord Pleanála



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Executive Summary

Element Power Ireland Ltd. has submitted an application to An Bord Pleanála (ABP) for a Strategic Infrastructure Development¹ (SID): Case Ref 09.PA0041 – Maighne Windfarm Co. Kildare/Co. Meath.

The proposed development consists of the erection of up to 47 no. wind turbines with a tip height of up to 169m, access tracks, a sub-station, a permanent metrological mast, borrow pits and associated works, temporary compounds as well as temporary minor alterations to the public road for the delivery of turbines to the site. The turbines are arranged in five wind farm clusters; Ballynakill (10 turbines), Windmill (3 turbines), Drehid-Hortland (21 turbines), Derrybrennan (2 turbines) and Cloncumber (11 turbines). Installation of approximately 75km of medium voltage (MV) underground cabling will be required (which will operate at a voltage up to 33kV) between the proposed turbines and proposed on-site substation. The development will also require installation of high voltage (110kV) underground cabling between the proposed on-site substation located at Drehid to the existing ESB substation at Dunfirth near Johnstown Bridge, Co. Kildare.

The application is supported by an Environmental Impact Statement (EIS) and a Natura Impact Statement (NIS), with additional Addenda and Errata to these prepared by experts in the relevant fields, on behalf of the Applicant. Subsequent clarifications and responses have been provided by the Applicant, statutory and non-statutory consultees and interested third parties and individuals. This review has considered all submissions provided by An Bord Pleanála, including the Department of Arts, Heritage and Gaelacht, Inland Fisheries Ireland, Birdwatch Ireland and a large number of other submissions.

In September 2015, ABP appointed the author of this report to assess the EIS and NIS presented with the application with regards to Ecology.

A critical review of the EIS, NIS and associated further submissions is provided, comprising:

1. A review of the adequacy of the NIS for the Purposes of Appropriate Assessment.
2. A review of the adequacy of the EIS
3. A review of the risks to Annex 1 and 'red listed' birds
4. A review of the risks to bats

The author reviewed the Applicant's reports and all further submissions in respect of Ecology and with regards to the information presented by the Applicant on Hydrology and Water Quality where these are relevant to ecology. The author also completed a site visit in November 2015.

Review of the adequacy of the NIS for the Purposes of Appropriate Assessment

The report includes an appraisal of the Applicant's NIS with regards to Appropriate Assessment (AA), as required in accordance with Article 6(3) of the EC Habitats Directive in respect of Screening (Stage 1) and Appropriate Assessment (Stage 2). The appraisal concludes that the NIS is deficient in a number of areas. The NIS does not adequately demonstrate that the proposed development individually, or in combination with other plans or projects, will not adversely affect the integrity of the identified European sites in view of these sites' conservation objectives. Whilst some of these deficiencies are minor and subsequently immaterial, critically consideration has not been given to key elements, namely:

1. Lack of Stage 2 (AA) inclusion of Rye Water/Carton cSAC and Ballynafagh Lake cSAC;
2. Failure to adequately address all potentially significant effects, namely those arising from removal and replanting of forestry and the possible spread of alien invasive species;

¹ In accordance with the provisions of Section 37 of the Planning and Development Acts 2000-2010. The proposed development represents a SID as defined in Schedule 7 of the Planning and Development Acts 2000-2010.

3. Insufficient detail on the proposed mitigation measures leading to uncertainty in their efficacy; and,
4. Failure to consider development plans, namely the Kildare County Development Plan 2011-2017 and the Meath County Development Plan 2013-2019, which is a requirement of the AA process.

Subsequently, whilst it is possible that the proposed development will not result in likely significant effects upon the identified European sites, the NIS in its current format is unfit for purpose.

Review of the adequacy of the EIS

The EIS concludes that the residual impacts upon the identified ecological receptors, with implemented mitigation measures, will be low (or negligible) and not significant; however in many areas the EIS does not provide a transparent and reasoned pathway which allows this conclusion to be independently tested or verified. The impact assessment process outlined in the methodology has not been accurately followed and inconsistent or undefined terminology is used throughout. In this respect the EIS is clearly deficient.

Whilst the Applicant has undertaken desk studies and baseline surveys, these are not comprehensive and generally lack detail, providing a broad qualitative overview rather than a detailed understanding of the application site and surrounding environs. Baseline information detailed in the EIS and Appendices is limited and lacks clarity in presentation. These deficiencies undermine the impact assessment process and the conclusions of the Applicant's EIS.

The EIS fails to provide a clear and transparent assessment of the likely impacts arising from the development and frequently does not follow its own or referenced methodologies. Whilst the identified pathways for impact are appropriate, the extent or magnitude of impacts has not been considered or presented in a consistent and verifiable manner. It is acknowledged that uncertainty often exists and this is an acceptable part of the EIA process; however such uncertainties should be acknowledged within the submissions and a precautionary approach applied. No indication is given as to the level of certainty that exists around the assessment conclusions (confidence levels), yet in a number of instances, the supporting evidence is very limited. The EIS does not acknowledge uncertainty in its conclusions, which is potentially misleading and clearly deficient.

The Applicant's proposed mitigation measures include inherent design, pollution controls and habitat creation / re-instatement. These are reasonable; however the assessment again fails to quantify or accurately detail potential impacts and there is limited detail provided on the mitigation measures proposed. Mitigation measures are not detailed fully and would primarily be designed at a later date. As such their efficacy cannot be verified. It is not sufficiently demonstrated that the proposed mitigation and habitat management measures are appropriate, or will be fully effective, in relation to the possible nature, scale or duration of effects on habitat and species.

A number of minor inadequacies have been identified which do not materially undermine the conclusions drawn in the EIS. However key potential adverse impacts which are inadequately assessed and therefore of most concern relate to: populations and individuals European and Nationally Protected Species, and direct and indirect effects on the aquatic environment during construction.

A review of the risks to Annex 1 and 'red listed' birds

Species considered relevant to this assessment were defined as those listed on Annex I of EC Directive 2009/147/EC on the Conservation of Wild Birds ('the Birds Directive'); or '*Birds of Conservation Concern in Ireland 2014–2019*'.ⁱ

The EIS concludes that the residual impacts upon Annex I species (notably whooper swan) and the general bird assemblage, with implemented mitigation measures, will be negligible; however the EIS does not provide a transparent and reasoned pathway which allows this conclusion to be independently tested or verified.

Most importantly, the value of the development site and surrounding areas for ornithological features has not been adequately surveyed or quantified to allow a confident evaluation of impacts to be completed. Baseline information on the number and distribution of sensitive ornithological features and the level of flight activity within the development site is deficient and so the full extent of potential impacts posed by the development as a whole cannot be robustly determined.

The outline of mitigation measures presented within the EIS and subsequent clarifications for avifauna including inherent design, pre-construction surveys for nesting birds and an operational monitoring strategy is acknowledged. Additional mitigation measures, which shall be considered in the event that monitoring results, contradict the conclusions of the EIS also presented by the Applicant. No clear mechanism for enforcement or independent verification is proposed by the Applicant and so it remains unclear as to how and when any additional measures would be triggered and applied. Such surveys and monitoring should not be used to supplement inadequate baseline information within the initial assessment, as appears to be the case here.

The deficiencies within the EIS, particularly with regards to data gathering cannot easily be overcome without the need for further and more extensive survey work by the Applicant in clear accordance with applicable guidance. Subsequently it is concluded that the assessment of the risks to Annex I and red listed birds is inadequate.

A review of the risks to bats

Bats are protected under the Wildlife Act 1976 and subsequent amendments and the EU Habitats Directive (92/43/EEC).

The EIS states that the residual impact of the proposed development on local bat populations, with implemented mitigation measures, is considered to be 'minor negative' with the favourable conservation status (FCS) of bat species "*unaffected and all species confirmed or expected on or near the study areas are anticipated to persist*". This conclusion is not supported by the impact assessment process outlined in the EIS, which is largely absent and cannot be verified. In their response to submissions, the Applicant states that "*Potential impacts on bats, including bat roosts are fully appraised in Section 7.5 of the EIS. With the implementation of mitigation measures as specified in Section 7.6 of the EIS, residual impacts on bats (including roosts) are considered to be minor negative.*"

The Applicant's conclusions lack adequate supporting data or discussion and evidence; it is a qualitative view which cannot be verified. No evidence or commentary is provided regarding whether a precautionary principle was applied where uncertainty exists, such as through lack of research data on Irish bats or lack of survey evidence. Subsequently there are clear deficiencies in the EIS process and based on the information provided it is not possible to determine the scale of likely effects on bats or their significance in terms of local populations. The difficulty in quantifying impacts on bat populations is acknowledged and this is a common issue with wind energy applications. As a result, it is often left to the implementation of robust and precautionary mitigation to ensure that the overall effects do not impact bats to a population level.

Further submissions by the Applicant have improved clarity with regards to mitigation with regards to curtailment and this ultimately appears reasonable. The proposed habitat mitigation and reinstatement measures remain unclear as no design is included with the application. With the full implementation of the proposed mitigation, including further turbine curtailment (should monitoring identify agreed high levels of bat mortality) and delivery of an overall habitat gain through the final HSMP/CEMP, it is reasonable to conclude that adequate mitigation could be achieved, but this is not adequately demonstrated in the EIS or through their further submissions.

In summary, regardless of the ultimate mitigation strategy adopted, the EIS and subsequent submissions do not provide a transparent and coherent assessment of the potential for significant impacts on bats and in this respect the submission is clearly deficient as fundamental information is omitted.

2 INTRODUCTION

2.1.1 Element Power Ireland Ltd. (the “Applicant”) has submitted an application to An Bord Pleanála (ABP) for a Strategic Infrastructure Development² (SID): Case Ref 09.PA0041 – Maighne Windfarm Co. Kildare/Co. Meath.

2.1.2 The proposed development includes:

- Erection of up to 47 no. wind turbines with an overall tip height of up to 169m
- Construction of foundations and hardstanding areas in respect of each turbine
- Construction/upgrade of 9 no. site entrances from public roads
- Construction of approximately 31km of new site tracks and associated drainage
- Upgrade of approximately 10km of existing tracks and, where required, upgrade of associated drainage
- Excavation of 3 no. borrow pits
- Establishment of 4 no. temporary construction site compounds and associated parking areas
- Construction of drainage and sediment control systems
- Construction of 1 no. electricity substation (which will operate at a voltage up to 110kV) including:
 - 2 no. control buildings containing welfare facilities
 - electrical infrastructure
 - parking
 - fencing
 - appropriate landscaping
- Installation of approximately 75km of medium voltage (MV) underground cabling (which will operate at a voltage up to 33kV) between the proposed turbines and proposed on-site substation. Approximately 36km will be laid within the public roadway
- Installation of Joint bays along the cable route
- Installation of Underground communication cables
- Installation of A permanent meteorological mast up to 100m in height
- Temporary alterations to the public road at identified locations to accommodate the delivery of turbines
- Associated site works including landscaping
- Tree felling
- Peat excavation.

2.1.3 The application is supported by an Environmental Impact Statement (EIS) and a Natura Impact Statement (NIS), with additional Addenda and Errata to these, which have been prepared by experts in the relevant fields on behalf of the Applicant.

2.1.4 Responses to submissions from organisations listed have also been submitted by the Applicant. The Board has received submissions from the two planning authorities, (Kildare Co. Council and Meath Co. Council), a number of prescribed bodies including the Department of Arts, Heritage and the Gaeltacht (DAHG) (parent body for the National Parks and Wildlife Service (NPWS)), Inland Fisheries Ireland (IFI) and several environmental organisations including the Irish Peatland Conservation

² In accordance with the provisions of Section 37 of the Planning and Development Acts 2000-2010. The proposed development represents a SID as defined in Schedule 7 of the Planning and Development Acts 2000-2010.

Council (IPCC), Birdwatch Ireland (BWI) as well as submissions from various angling groups, residents groups, representatives of the equine industry and the local community. Over 800 submissions have been received by the Board. Some of the submissions from the general public include independently commissioned reports from Ecologists in which evidence is provided that challenges the information contained in the NIS and EIS.

2.2 Brief and Objectives

2.2.1 The author has been commissioned to prepare a report to the ABP planning inspector, to provide clarity on issues regarding the consideration of ecology and nature conservation by the Applicant by way of:

- A critical review and assessment of the adequacy of the NIS for the purposes of Appropriate Assessment.
- A critical review and assessment of the adequacy of the Ecology chapter (7) in the EIS for the purposes of Environmental Impact Assessment, (with cross referencing as necessary with other chapters and relevant appendices).
- Examination of the risks posed by the proposed development to Annex 1 and Red listed birds.
- Examination of the risks posed by the proposed development to bat species.
- Review of documentation on file with reference to Ecological issues raised in submissions from Prescribed Bodies (statutory consultees) and third parties.
- Advise on the appropriateness of mitigation measures on ecological matters.

3 METHODOLOGY

3.1.1 The author has reviewed the following documents to prepare this report:

- Maighne Wind Farm – Environmental Impact Statement (EIS). Volume 2 (Chapters 7, 9, 10, 17).
- Maighne Wind Farm - Natura Impact Statement for the Proposed Maighne Wind Farm, Co. Kildare and Co. Meath (March, 2015).
- Maighne Wind Farm – Appendices to Natura Impact Statement for the Proposed Maighne Wind Farm, Co. Kildare and Co. Meath (March, 2015).
- Maighne Wind Farm - Response to Submissions Received by An Bord Pleanála (September, 2015).
- Maighne Wind Farm – Appendices to Response to Submissions Received by An Bord Pleanála (September, 2015).
- Further Submissions to An Bord Pleanála, including statutory consultees, prescribed bodies and third parties.

3.1.2 The assessment of implications for European sites has been undertaken with due consideration of:

- An Bord Pleanála - Advice Note 1: Appropriate Assessment (March, 2015).
- European Commission (2001) - Assessment of Plans and Projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC
- European Commission (2000) - Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC.
- Department of the Environment, Heritage and Local Government, National Parks and Wildlife Service (2009, revised 2010) - Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities.

3.1.3 The review of the assessment of potential effects of the proposed development upon the conservation objectives and integrity of the European Sites was undertaken following key guidance:

- An Bord Pleanála - Advice Note 1: Appropriate Assessment (March, 2015);
- The Department of Environment, Heritage and Local Government (2009); and,
- The European Commission (2000ⁱⁱ and 2002ⁱⁱⁱ).

Statement of Expertise

3.1.4 The author of the report is Howard Fearn MSc MCIEEM, Director of Avian Ecology Ltd. Mr Fearn holds a Master's degree in Ecology and Environmental Management and is a full member of the Chartered Institute for Ecology and Environmental Management (CIEEM). He has worked as an ecological consultant specialising primarily in wind farm developments for over ten years. His main area of expertise is ornithology; however he is proficient in other areas of ecology and possesses a strong understanding of the potential ecological impacts associated with wind energy developments. Whilst not an aquatic specialist or hydrologist, he understands the strong association between these disciplines and habitats, and the potential risks associated with such developments. As such, Mr Fearn is capable of a clear and objective assessment of the Maighne wind farm project and submissions with regards to impacts on ecology.

3.1.5 The reviews undertaken by Una Maginn MSc MCIEEM (Technical Director) and Nicole Robinson MSc BSc (Hons) ACIEEM (Senior Ornithologist), also of AEL, involved only proof-reading the report.

3.1.6 The author completed a site visit between 10th and 15th November 2015. The purpose of this visit was to allow the author to place the EIS and NIS in context of the landscape.

3.2 Description of the Project

3.2.1 The proposed Maighne Wind Farm (the site) encloses an area of approximately 1,200ha, as illustrated in Figure 2.1 of the EIS. The proposed development consists of the erection of up to 47 no. wind turbines with a tip height of up to 169m, access tracks, a sub-station, a permanent metrological mast, borrow pits and associated works, temporary compounds as well as temporary minor alterations to the public road for the delivery of turbines to the site. The turbines are arranged in five wind farm clusters; Ballynakill (10 turbines), Windmill (3 turbines), Drehid-Hortland (21 turbines), Derrybrennan (2 turbines) and Cloncumber (11 turbines). Installation of approximately 75km of medium voltage (MV) underground cabling will be required (which will operate at a voltage up to 33kV) between the proposed turbines and proposed on-site substation. The development will also require installation of high voltage (110kV) underground cabling between the proposed on-site substation located at Drehid to the existing ESB substation at Dunfirth near Johnstown Bridge, Co. Kildare.

- 3.2.2 Subsequent to submission of the application and in response to submissions received, the Applicant is not now seeking permission for either of the two grid connection options set out in the application documentation (i.e. from the proposed on-site substation in Drehid, County Kildare to either the Woodland or Maynooth substations). The Applicant is now seeking to modify the application so as to seek permission to connect the proposed onsite substation at Drehid to the national electricity transmission network via the existing ESB 110kV substation in Dunfirth, near Johnstown Bridge, County Kildare. This will require the Dunfirth Substation to be extended in area.

3.3 The Receiving Environment

Terrestrial Environment

- 3.3.1 The site is contained within a study area of c. 1,200 ha. The site is dispersed over a wide area which stretches North-South for a distance of almost 30km and East-West for a similar distance.
- 3.3.2 The five wind farm clusters are generally located around the edge of the Bog of Allen and include areas of farmland, broadleaf forests, coniferous plantations, cut-away bog and raised bog, including several examples of the Priority 1 Habitat Active Raised Bog. Some of the roads along which the cables are to be laid are bog rampart roads. There are two canals which immediately adjoin two of the clusters and a number of rivers and streams, several of which are designated salmonid waters, criss-cross the area.
- 3.3.3 The Applicant's EIS states there are in the order of 36 nature conservation sites, including 10 European (Natura) sites within 15km of the site, although the development site is not within any of these as delineated.
- 3.3.4 Habitats on and around the site are described in Chapter 7 of the EIS and supporting Appendices. Fourteen sensitive habitat receptors are described, including 'Raised Bog', classified as Internationally Important and 'PB4/GS1 Mosaic' classified as of County Importance.
- 3.3.5 Other sensitive receptors identified as present or potentially present include a range of bird species (most notably whooper swan), bats, terrestrial mammals, marsh fritillary butterfly, common lizard, common frog and smooth newt.

Water Environment

- 3.3.6 The current nature of the receiving water environment is described within the EIS through the collation of both field and desk-based baseline assessment. This review has also given regard to the EIS chapters on hydrology (Chapter 9) and water quality (Chapter 10) where these are considered relevant to ecology.
- 3.3.7 Sensitive receptors within the receiving water environment include aquifers, protected areas under the Water Framework Directive (WFD), fish, molluscs, flora, macroinvertebrates, mammals and birds.

4 REVIEW OF THE ADEQUACY OF THE NIS FOR THE PURPOSES OF APPROPRIATE ASSESSMENT.

4.1.1 The requirement for Appropriate Assessment (AA) arises from Article 6(3) of the Habitats Directive (92/43/EEC), where a project or plan may give rise to significant effects upon a Natura 2000 site, either alone or in combination with other plans or projects.

4.1.2 Natura 2000 sites in Ireland are 'European sites', including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs). The Article 6(3) provisions in Part XAB of the Planning and Development Acts 2000-2006 (as amended) and in Regulation 42 of the EC (Birds and Natural Habitats) Regulations 2011 relate to European sites.

4.1.3 A European site is defined as:

- candidate site of Community importance;
- site of Community importance;
- candidate Special Areas of Conservation (cSAC); and,
- Special Area of Conservation (SAC).
- Or
- candidate/proposed Special Protection Areas (c/pSPA); and,
- Special Protection Areas (SPA).

4.1.4 AA relates solely to consideration of the effects upon European sites and their qualifying features, in view of the sites conservation objectives. These are published by the National Parks & Wildlife Service (NPWS) and available via the <http://www.npws.ie/protected-sites>.

4.1.5 Guidance on the AA process is published in ABP guidance 'Advice Note 1, Appropriate Assessment (2015).

4.2 Overall Comments on the Applicant's Submissions

4.2.1 The potential impacts upon European sites as a result of the proposed development during construction, operation and decommissioning are assessed by the Applicant within a Natura Impact Statement (NIS) prepared for the competent authority, and within relevant Chapters of the EIS.

4.2.2 There is no prescribed form or template for the preparation of a NIS; however, it is reasonable to state that all relevant data and information on the project and European sites and an analysis of potential effects on these sites should be obtained and presented within. The NIS should include information on the plan or project, its location, extent and receiving environment, the European sites, their conservation objectives and ecological and environmental sensitivities, and the likely or potential effects of the plan or project either alone or in combination with other projects.

4.2.3 The content and structure of the Applicant's NIS follows a logical approach, however the NIS does not clearly set out the AA process followed or explain how this relates to relevant guidance. The presentation and focus of the document is poorly presented and so is unclear.

4.2.4 Overall, a large amount of information has been presented within the NIS to support an assessment of the potential for impacts upon European sites as a result of the proposed development. The content of the NIS and its conclusions have however, been diluted and to an extent, obscured by the

inclusion of and reference to information which is derived from the Applicant's EIS and is wholly irrelevant to the NIS or AA process.

- 4.2.5 There is a lack of quantitative reasoning required to robustly demonstrate the potential or otherwise for effects upon European sites and their qualifying habitat and species interests. Much of the information presented does not relate to the qualifying interests of the European Sites and so is not relevant. Examples of such non-applicable information presented within the NIS include information presented for bats and terrestrial mammals (with the exception of otter), which are not qualifying features and hence irrelevant to the AA process. Information is also presented for non-European designated sites for nature conservation, where such sites are not linked to European sites and therefore not relevant to AA. This suggests a fundamental lack of understanding of the Appropriate Assessment process, as required under Article 6(3) of Habitats Directive (92/43/EEC).
- 4.2.6 The NIS submitted in support of the application, specifically Section 5 and Section 6 of the NIS which this review focuses, follows worked examples of a 'screening matrix' and 'appropriate assessment' presented as Figures 1 and 4 of EC guidance (2001) and is generally suitable.

4.3 Stage 1: Screening

- 4.3.1 The test and methodology to be followed for Stage 1 Screening are presented in ABP guidance 'Advice Note 1, Appropriate Assessment' (2015) as:

TEST	Is the project likely to have a significant effect , either individually or in combination with other plans and project, on the European site(s) in view of the site's conservation objectives ?
STEPS	
1	Identify all the European site(s) which could potentially be affected using the Source-Pathway-Receptor model.
2	Identify the Conservation Objectives for these sites.
3	Identify the potential (a) likely and (b) significant effects (direct or indirect) of the project alone on the European site(s) solely within the context of the site's conservation objectives in light of best scientific knowledge in the field .
4	Identify the potential (a) likely and (b) significant effects (direct or indirect) of the project in combination with other plans or projects on the European site(s) solely within the context of the site's conservation objectives in light of best scientific knowledge in the field.
5	Evaluate the potential effects identified above using the source-pathway-receptor model.
6	Determine whether or not likely significant effects, either individually or in combination with other plans or projects, on the European site(s) can be reasonably ruled out on the basis of objective scientific information.

- 4.3.2 Each Step is outlined below,

Step 1: Identify all the European site(s) which could potentially be affected using the Source-Pathway-Receptor model

4.3.3 The application site is not located within or directly adjacent to any European site.

4.3.4 The Applicant's NIS correctly identifies the following European sites within 15km of the proposed development:

- River Boyne and River Blackwater cSAC (Site Code: 002299);
- River Boyne and River Blackwater SPA (Site Code: 004232);
- Ballynafagh Bog cSAC (Site Code: 000391);
- Pollardstown Fen cSAC (Site Code: 001396);
- Ballynafagh Lake cSAC (Site Code: 001387);
- Rye Water Valley/Carton cSAC (Site Code: 001398);
- The River Barrow and River Nore cSAC (Site Code: 002162);
- Mount Hevey Bog cSAC (Site Code: 002342);
- The Long Derries cSAC (Site Code: 000925); and,
- Mouds Bog cSAC (Site Code: 002331).

4.3.5 Figure 7.1 of Appendix 6 of the NIS shows the location and extent of the above listed sites within 15km of the application site boundary. The list of European sites identified within the NIS may be verified with accuracy by use of the red-line boundary digital shapefile provided by the applicant, as requested by ABP on 11th November 2015³, and in review of NPWS designated area spatial data⁴.

4.3.6 Whilst a list of European sites upon which there may be potential for significant effects has been provided within this 15km zone, the Applicant does not sufficiently demonstrate beyond reasonable scientific doubt whether 'Screening out' of European sites beyond 15km is justified, or allow a third party to objectively reach this conclusion. In accordance with relevant guidance (NPWS 2009, 2010):

"In the case of sites with water dependent habitats or species, and a plan or project that could affect water quality or quantity, for example, it may be necessary to consider the full extent of the upstream and/or downstream catchment."

4.3.7 It is not clarified by the Applicant whether the identification of European sites which could be affected has been undertaken in consideration of the maximum extent of the hydrological 'pathways' to/from the development site to/from the wider water environment. Chapter 9 of the EIS (Hydrology) does in part explain the water catchment areas relevant to the application and these are illustrated on Figure 9.1; however whilst acknowledging that 15km may be a suitable buffer for the identification of European Sites, the link between this buffer and hydrological connectivity is unexplained and unclear.

4.3.8 The screening in or out of designated sites was noted by NPWS in their submission dated 8th June 2015, which states that *"The appropriate assessment (AA) screening section to the NIS screens out a number of sites on the basis of being unconnected hydrologically. It is unclear whether this included a*

³ As Available: <http://maighnewindfarm.ie/spatial-data>

⁴ As Available: <http://www.npws.ie/maps-and-data/designated-site-data/download-boundary-data>

consideration of groundwater connections". The Applicant's response of September 2015 states that groundwater hydrological connectivity has been considered, however no further evidence to support this is provided.

- 4.3.9 Despite this, on review of the information presented within the NIS, Chapter 7 Ecology of the NIS, Chapter 9 Hydrology and Chapter 10 Water Quality, and from the assessment of impacts of projects of a similar nature, it is likely a 15km buffer zone is sufficient with regards to hydrological connectivity. The Applicant provides a coherent consideration of the nature of impacts, dilution via spatial separation from European sites and prevention based on an illustrated and quantitative maximum extent of the hydrological connectivity with the development site. Subsequently it may be concluded the identification of European sites upon which there is potential for significant effects is sound, despite the lack of a clear scoping process for sites beyond 15km.
- 4.3.10 A 15km search buffer is also satisfactory for any European site without hydrologically connectivity. It is reasonable to conclude that any mobile qualifying features of European designated sites beyond this distance (such as birds or bats) are unlikely to be regularly present on or around the application site and so populations are unlikely to be affected directly or indirectly. It is relevant that neither NPWS nor BWI have raised the possibility of effects on SPAs beyond 15km from the application site, and so the potential for impacts upon such SPAs is unlikely.
- 4.3.11 Whooper swan is considered in detail within the Applicant's NIS as areas along the Boyne and Blackwater are used by a nationally important winter flock. However this species is not a qualifying interest feature of any European site located within 15km of the proposed development and so consideration is not required within the AA process. The potential for impacts on whooper swans has been raised in a number of submissions, most comprehensively in that by David Mulachy Planning Consultants (3rd June 2015) on behalf of the 'Donadea Against Turbines' group, which provides information on migration routes for this species. The submission contends that that whooper swans present around the application site are likely to move much further afield than 15km, leading to a suggestion that the 15km European site buffer used by the Applicant is not appropriate. Of note are the Lough Derravaragh, Lough Iron and Glen Lough SPAs located approximately 28-45km to the northwest of the development, which are notified for whooper swans. In the absence of further clarity being provided to discount the species connectivity with European sites, potential impacts along fly-ways for the species or commuting corridors including barrier effects, could have potential to results in likely significant effects upon European sites beyond 15km of the application site which have not been considered. It is therefore necessary to determine any potential for linkage. It is relevant that the Applicant refers to various guidance documents published by Scottish Natural Heritage (SNH) during their submissions with regards to ornithology and this is considered to be appropriate; SNH have published a series of scientifically robust guidance notes and information on the interactions between birds and wind turbines, particularly in respect to species which form qualifying features of SPAs. Although not specifically referenced by the Applicant, the suite of SNH guidance published includes a 2013 document entitled 'Assessing Connectivity with Special Protection Areas (SPAs)'^{iv}. This provides species-specific distances which may reasonable be considered to connect bird populations to SPAs. For whooper swans, the SNH guidance states that less than 5km is the 'core range' where birds could reasonably expected to regularly commute from roost sites to foraging areas. As such, it is highly unlikely that any whooper swans present in the vicinity of the application site regularly commute to the Lough Derravaragh, Lough Iron and Glen Lough SPAs. This is relevant to the consideration of whooper swans in the submission as it demonstrates that SPAs beyond 15km need not be considered further for this species. Subsequently it is clear that whooper swans should not be considered within the AA and the species is not discussed further.
- 4.3.12 This same SNH 2013 guidance provides similar information for other Annex II Birds Directive listed species recorded locally during ornithology surveys and/or detailed in third party submissions. These are hen harrier; SNH guidance details a maximum foraging range from nest site during breeding season as 10km; and golden plover which is assigned a maximum foraging range of 11km during the

breeding season. It is acknowledged that neither of these species breeds in the area and therefore the guidance is less relevant; however it is reasonable to conclude that any SPAs more distant from the application site than 15km are unlikely to be pertinent outside the breeding season when these species are more migratory.

4.3.13 Given the Applicant has referred to connected SNH guidance, it is perhaps surprising that they have not referred specifically to the SNH 2013 SPA connectivity guidance to comprehensively scope out effects on SPAs beyond 15km.

4.3.14 In summary, the Applicant has adequately identified the European designated sites which may be affected by the proposed development.

Step 2: Identify the Conservation Objectives for these sites.

4.3.15 An Appropriate Assessment of the implications for a European site, as a result of a project or plan, must be undertaken solely in view of the European site's conservation objectives. The conservation objectives of identified European sites must therefore be accurately identified.

4.3.16 In review of the NPWS protected sites information, the conservation objectives for the following European sites listed and considered within the NIS have been correctly identified as presented within Table 6.1:

- River Boyne and River Blackwater cSAC (Site Code: 002299) – dated 13/02/2015
- River Boyne and River Blackwater SPA (Site Code: 004232) – dated 13/02/2015
- The River Barrow and River Nore cSAC (Site Code: 002162) – 19/07/2011
- Rye Water Valley/Carton cSAC (Site Code: 001398) – 13/02/2015
- Ballynafagh Lake cSAC (Site Code: 001387) – 13/02/2015

4.3.17 For avoidance of doubt, where quoting conservation objectives the version and date of those used should be provided. This information is absent from the NIS and the EIS, but is clarified for the above sites by the Applicant within their September 2015 response to the DHALG submission.

4.3.18 The NIS does not identify the conservation objectives for the following European sites listed in Table 5.1 of the NIS:

- Ballynafagh Bog cSAC (Site Code: 000391) – current revision dated 10/11/2015;
- Pollardstown Fen cSAC (Site Code: 000396) – current revision dated 13/02/2015;
- Mount Hevey Bog cSAC (Site Code: 002342 – current revision dated 21/03/2016);
- The Long Derries cSAC (Site Code: 000925) – current revision dated 13/02/2015; and,
- Mouds Bog cSAC (Site Code: 002331) – current revision dated 20/11/2015.

4.3.19 It is therefore not demonstrated within the NIS or subsequently by the Applicant that the identification of likely significant effects has been undertaken on these sites in the context of the sites most up-to-date conservation objectives. Relevant concerns raised in the DHALG submission "*It is unclear whether the most up to date conservation objectives were used in the assessment*" have therefore not been addressed by the Applicant. Whilst a clear deficiency in the content of the NIS/EIS to allow an objective appropriate assessment screening of the project to take place, it is not

considered a material limitation. It is therefore concluded that the NIS recognises the correct qualifying features of each European site.

Step 3: *Identify the potential (a) likely and (b) significant effects (direct or indirect) of the project alone on the European site(s) solely within the context of the site's conservation objectives in light of best scientific knowledge in the field.*

4.3.20 In general, the NIS sufficiently identifies the potential direct and indirect impacts of the proposed development on the identified European sites in qualitative terms.

4.3.21 Section 5.3 of the NIS details the potential effects on European sites arising from the proposed development. The NIS assesses the potential for direct and indirect impacts upon European sites during the construction, operational and decommissioning phase of the development without the inclusion of mitigation measures.

4.3.22 The NIS dispels the potential for direct impacts to European sites, on the basis of the development components not being located within any such site. This is appropriate.

4.3.23 The Applicant considers that the likely effects arising from the project (as detailed in Table 5.2 of the NIS) will comprise:

Construction Phase

- Potential for siltation of the River Blackwater and tributaries due to construction works.

In the absence of mitigation, this effect is considered likely and potentially significant.

- Potential for siltation of tributaries of the River Barrow such as the Figile, Slate Rivers due to construction works.

In the absence of mitigation, this effect is considered likely and potentially significant.

- Potential for siltation of the Rye Water River upstream from the Rye Water cSAC due to construction works.

In the absence of mitigation, this effect is considered likely and potentially significant.

- Potential for eutrophication due to contaminated run-off entering the River Blackwater and tributaries, the tributaries of the River Barrow within the 15km buffer and the Rye Water River during construction works.

In the absence of mitigation, this effect is considered likely and potentially significant.

- Potential pollution of the River Blackwater and tributaries, River Barrow and tributaries and Rye Water River resulting from wet concrete operations, fuel spillages/leaks or leaking of foul effluent.

In the absence of mitigation, this effect is considered likely and potentially significant.

Operational Phase

4.3.24 Potential for changes to water due to a (low) increase in run-off from a storm event, resulting from the change in land use and an increase in impermeable ground conditions.

In the absence of mitigation, this effect is considered to be likely and potentially significant.

Decommissioning Phase

4.3.25 Potential impacts similar to construction phase.

In the absence of mitigation, these effects are considered likely and potentially significant.

4.3.26 Embedded elements in the scheme design (e.g. with regards cable routing along roads), drainage design of the proposed development, including the drainage of hard standing areas associated with turbine construction, proposed site access tracks, and associated infrastructure, have been included such that potential impacts to the hydrological regime, water quality and aquatic habitats are inherently minimised (Chapter 10, Section 10.4.2 of the EIS). As such, there is some embedded mitigation within the design of the scheme which can be considered at the AA screening stage. Whilst such measure will reduce the potential for adverse impacts to some degree, this cannot be quantified and such design measures clearly do not negate a requirement for further mitigation and which cannot be considered at the AA screening stage.

4.3.27 Overall the characterisation of likely indirect impacts which have been identified within the NIS upon European sites within 15km of the development provided in Section 5.3.2 is largely qualitative rather than quantitative; however this is generally acceptable given the unknown scale and unlikely potential for pollution events which are the primary risk during the construction phase.

4.3.28 Subsequently the Applicant's list of indirect likely and potential effects identified (and concerning downstream effects upon qualifying aquatic habitat and associated species interests), is generally adequate, but omits the following additional considerations:

- 1) With reference to Chapter 10 of the EIS (Section 10.4.4) in regards operational impacts as a result of increased impermeable ground conditions, an overall increase in run-off of 0.17% could be expected in the River Boyne catchment and an overall increase in run-off of 0.03% could be expected in the River Barrow catchment. These estimated increases in run-off are predicted to reduce over time as vegetation is re-established on the site. The NIS states that the estimated increases will not give rise to any significant impacts as a result of the proposed development in isolation, which is a reasonable conclusion. The potential for impacts on hydrology as a result of tree felling, have however not been adequately considered. A detailed investigation into the impacts on hydrology as a result of tree felling does not appear to have been presented within either the EIS or NIS. Chapters 9 and 10 of the EIS conclude that no significant increase in the rate of run-off is anticipated as a result of felling nor is the risk of downstream flooding or sedimentation due to erosion will occur. This qualitative conclusion is ascertained simply on the basis of the area of proposed felling being small relative to the overall planted area and which is expected to develop a vegetation ground cover relatively quickly. These conclusions do not adequately consider the extent of tree felling which has not been ascertained, nor are they supported by literature or any other data.

In the absence of mitigation, this effect is considered to be likely and potentially significant.

- 2) Similarly, the potential for impacts upon hydrology as a result of tree replanting, a provision of any Felling Licence issued by Forest Service and required for the development to proceed, has not been considered within either the EIS or NIS. The extent of replanting area required has not been stated or its likely location detailed within the EIS or subsequent response to submissions. The Applicant has not identified or explored the full extent of the potential for hydrological impacts to occur as a result of tree felling and replanting. It is unclear as to whether the replanting may occur on areas with hydrological connectivity to European sites inducing potential effects upon levels of runoff and water quality. There may also be potential for additional impacts upon European site qualifying species interests should as displacement or disturbance, which have not been explored.

Sufficient information has therefore not been provided to allow the identification of likely effects upon European sites to take place nor to adequately address concerns raised within submissions.

In the absence of mitigation, this effect is considered to be likely and potentially significant.

- 3) The identification of likely impacts upon European sites does also not sufficiently consider the potential for spread of alien invasive species. Chapter 7 and Appendix F of the EIS report identify only one species occurs within the study area (Rhododendron). The deficiencies in the undertaking of terrestrial habitat surveys in particular, at the locations of proposed water crossings and within areas of land take at junctions along the proposed turbine delivery route, to explore the potential for additional invasive species, such as Japanese knotweed, are highlighted within the EIS. It is ascertained from the EIS that a total of 55 structures were surveyed in November and December 2014 for evidence of otter, with additional target notes on other ecological items of note such as invasive species also recorded. Such constrained effort, outside the growing season is however insufficient to draw conclusions on the absence of such species absence from the development area. The presence and introduction of this species to the aquatic environment linked to European sites would be considered a significant threat. Japanese Knotweed and Himalayan Balsam in particular may out-compete native flora and dominate the banks of watercourses, leading to bank erosion outside of the growing season (e.g. Environment Agency guidance, 2014⁵). This may result in sedimentation concerns for qualifying interest of freshwater systems of European sites.

In the absence of mitigation, this effect is considered to be likely and potentially significant.

- 4.3.29 The risks to changes in downstream habitat features of the European sites as a result of the introduction of invasive species have not been properly considered by the Applicant.

In the absence of mitigation, these effects are considered to be likely and potentially significant.

- 4.3.30 One SPA is located within 15km search zone (the River Boyne and River Blackwater SPA), notified for its population of kingfishers. This species is aquatic species and behaviourally tied to riparian corridors. Subsequently there is no pathway for direct effects from the application (e.g. disturbance or collision) and this is supported by research referenced by NPWS (Drewitt and Langston, 2006)⁵ in their 12th December 2014 correspondence with the Applicant. As such, the River Boyne and River Blackwater SPA is considered to be relevant only in the context of water quality and the potential for indirect effects on kingfisher populations.

- 4.3.31 Similarly, otters are highly mobile and so individual animals associated with the identified European sites may at times be present on or adjacent to the application and could potentially be subject to disturbance; however given the lack of suitable habitat across the majority of the application site and the limited direct riparian linkage between the application site and European sites then regular presence is highly unlikely and potential effects are likely to be inconsequential. As such, otters are considered further in the context of indirect effects arising from changes to water quality only.

- 4.3.32 In summary, the likely and potentially significant effects on European sites arising from the proposed development alone in the absence of mitigation are those arising from:

1. Increased pollution, siltation or for eutrophication, primarily during the construction and decommissioning phases, but also during the operational lifetime of the wind farm. These may lead to adverse effects on populations on qualifying interest species downstream.
2. Hydrological changes and/or increased pollution as a result of tree felling and replanting. This may lead to adverse effects on European site qualifying habitats downstream.

⁵ Environment Agency (2014) Aquatic and riparian plant management: controls for vegetation in watercourses Technical Guide. Accessed May 2016 at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/327574/SC120008-R2_Technical_guide.pdf

3. The spread of alien invasive species along riparian corridors which may lead to adverse effects on water quality, and subsequently habitats and populations of qualifying interest features.

Step 4: *Identify the potential (a) likely and (b) significant effects (direct or indirect) of the project in combination with other plans or projects on the European site(s) solely within the context of the site's conservation objectives in light of best scientific knowledge in the field.*

- 4.3.33 The Applicant has presented information obtained through searches of the planning authority webpages, although no date for these searches is presented and it is unclear as to whether the search data was current at the time of submission. The Applicant further states that planning searches and a review of the IWEA webpage were also utilised to search for other wind farm developments in the area.
- 4.3.34 The NIS identifies five other wind farm projects within 15km of the application site, concluding that combined effects of water quality or hydrology would not occur as all of these are located in other water catchment areas. Evidence to support this is not provided, however.
- 4.3.35 The NIS outlines potential cumulative effects by way of land use, infrastructure, businesses and recreational use. The Applicant provides some information on existing or proposed projects, but the search area used is not clarified and information is primarily presented as a narrative. It is subsequently not possible to examine the appropriateness of the extent of cumulative data presented.
- 4.3.36 For each of the projects discussed, the NIS concludes that cumulative effects will be nil or negligible. This is largely on the basis of qualitative discussion of pollution control measures already in place. Whilst reasonably demonstrated for factories and other businesses which operate under licence, and where EPA monitoring points are located downstream, no attempt is made to present EPA data which would have assisted in identification of baseline pollution levels and increased confidence in the Applicant's conclusions. For other forms of land use cumulative effects are inadequately addressed; for example the presence of a peat milling operation at Windmill (Clairstone Ltd.) is acknowledged, but no attempt is made to determine or discuss any existing effects arising from mill operations. Similarly, turbury rights are acknowledged yet the potential effects of these are not discussed. For infrastructure, the NIS states that there are no pipelines planned or under construction within the application site boundary; it is unknown if there are any others in close proximity which may lead to cumulative effects.
- 4.3.37 The Applicant makes no attempt to determine the in combination effects arising from the five proposed wind turbine clusters. This is noted in the Kildare County Council Submission dated 22nd June 2015. The Applicant's September 2015 response states there is "*no requirement to appraise impacts on a cluster scale*". Whilst this is acknowledged, the fragmentation of a wind farm development at this scale is unconventional and such an approach would have enabled better understanding of the likely effects arising from the development. This is, however, not considered a material deficiency.
- 4.3.38 Neither the NIS nor the EIS include clear consideration to the potential for cumulative impacts arising from relevant plans; Kildare County Development Plan 2011-2017 and the Meath County Development Plan 2013-2019, which is a requirement of the AA process. As such, this is a clear deficiency.
- 4.3.39 It is acknowledged that quantitative assessment of cumulative effects may not be accurately possible and typically there are substantial areas of uncertainty; however where uncertainty exists this should be clearly stated and a precautionary approach adopted. The Applicant has not adequately demonstrated this approach.

4.3.40 In the absence of mitigation, cumulative effects are considered to be likely and potentially significant.

4.3.41 Overall, the Applicant does not satisfactorily identify other likely and potentially significant effects in combination with other plans or projects.

Step 5: Evaluate the potential effects identified above using the source-pathway-receptor model.

4.3.42 The NIS concludes that by virtue of no identified pathways for direct and/or indirect effects, and without the inclusion of mitigation measures, the following European sites located within 15km of the development site have been “screened out” of the Appropriate Assessment process:

- Ballnafagh Bog cSAC;
- Mount Hevey Bog cSAC;
- Mouds Bog cSAC;
- Pollardstown Fen cSAC; and,
- Long Derries cSAC.

4.3.43 The reasons for screening out the above European sites are not clearly stated in the NIS, although Section 9.3.2 of the EIS (Chapter 9, Hydrology) does provide a general description of the water catchment areas for each cluster and the wider area. From this it is presumed that the above European sites can be screened out on the basis of no hydrological connectivity, although this is not clearly stated by the Applicant. This is raised by NPWS their submission dated 22nd June 2015, which states *“The appropriate assessment (AA) screening section of the NIS screens out a number of sites on the basis of being unconnected hydrologically. It is unclear whether this included a consideration of groundwater connections. An Bord Pleanála may wish to seek confirmation on this matter.”* In their response dated September 2015, that Applicant states that *“we confirm that full consideration of groundwater connections was undertaken. Chapter 10, Water Quality, of the EIS, provides an appraisal of the expected groundwater flow within each cluster of the proposed development. In each case, groundwater at the site is expected to flow in the general direction of the topography and surface water courses (see Section 10.3.3.3 of the EIS), therefore the appraisal in the NIS is based on the understanding that, in the absence of a surface water hydrological connection, there is also an absence of groundwater connectivity. This is based on best scientific knowledge, following examination and analysis, carried out by a water quality expert”.*

4.3.44 The NIS also states, in Section 5.3.2. that the *“River Boyne and River Blackwater cSAC and the River Boyne and Blackwater SPA are both within 1km of the proposed development and therefore most likely to be impacted by virtue of proximity. All other Natura sites under consideration are a minimum of 3km from the proposed development thus reducing potential impacts by virtue of distance. Those Natura sites with hydrological links to the proposed development occur up to 13km from the proposed development; on a precautionary basis indirect impacts on these sites are assumed as possible given the scale of any sediment release or runoff likely to affect water quality cannot be determined”.*

4.3.45 On the basis of the evidence provided on behalf of the Applicant by a water quality expert, it is considered that the justification for screening out the above European sites is demonstrated and that a precautionary approach has been adopted. No further consideration for these European sites (as detailed in paragraph 3.3.42) is required.

4.3.46 The NIS Stage 1 Screening adequately concludes that, in the absence of mitigation, there remains a possibility of effects upon the following five European sites:

- River Boyne and River Blackwater cSAC;
- The River Boyne and River Blackwater SPA;
- The River Barrow and River Nore cSAC;
- The Rye Water/Carton cSAC; and,
- Ballynafagh Lake cSAC.

4.3.47 Likely significant effects with regards to the above European sites are accurately summarised by the Applicant in the NIS as follows:

- Reduction in water quality (key element of site) and foraging potential for aquatic species such as river lamprey, Atlantic salmon and otter in the River Boyne and River Blackwater cSAC;
- Reduction in prey densities for kingfisher as a result of changes in water quality (a key element of site) in the River Boyne and River Blackwater SPA;
- Reduction in water quality (key element of site) and foraging potential for mobile aquatic species such as river lamprey, Atlantic salmon and otter in the River Barrow and River Nore cSAC
- Reduction in water quality (a key element of site) and consequent impacts on vertigo snails within the Rye Water/Carton cSAC.
- Reduction in water quality (a key element of site) and consequent reduction in area or petrifying springs habitat in Rye Water/Carton cSAC.
- Reduction in water quality (a key element of site) within portion of Ballynafagh Lake which overlaps The Grand Canal.

4.3.48 The NIS also includes collision of whooper swans as a likely significant effect; however this is not required, as detailed in paragraph 3.3.11, and so not considered further within this review.

4.3.49 The NIS does not consider the full magnitude and pathways for hydrological effects, particularly in relation to those potentially arising from forestry clearance and replanting, and the possible spread of alien plant species. Whilst mitigation at a later stage may be implemented (as contended by the Applicant in September 2015), due process with the AA process has however, not been followed and this potential pathway for effect is not adequately explored.

4.3.50 Aside from the omissions regarding forestry and alien species, the NIS describes key identified effects upon European sites, in terms of impact type, in an adequate level of detail for the potential impacts predicted, supported by relevant evidence applicable to the relevant qualifying interest habitats and species.

Step 6: *Determine whether or not likely significant effects, either individually or in combination with other plans or projects, on the European site(s) can be reasonably ruled out on the basis of objective scientific information.*

4.3.51 On the basis of information provided by the Applicant, and in view of the clear need for mitigation, likely significant effects on the identified European sites cannot be objectively or reasonably ruled out and Stage 2 (Appropriate Assessment) is required.

4.4 Stage 2: Appropriate Assessment

4.4.1 The test and methodology to be followed for Stage 2 Appropriate Assessment (AA) are presented in ABP guidance 'Advice Note 1, Appropriate Assessment '(2015) as:

TEST	Will the project adversely affect the integrity of the European site(s) , either individually or in combination with other plans and projects, in view of the site's conservation objectives?
STEPS	
1	Repeat Steps 1-4 from Stage 1 Screening.
2	Consider mitigation measures (where appropriate), both those proposed by the Applicant and those that may be considered to be necessary to be required by the Board.
3	Examine and evaluate the potential effects of the project on the conservation objectives of the site(s) taking account of mitigation. This evaluation should use the source-pathway-receptor model and be based on best scientific knowledge in the field . It should include direct and indirect effects of the project, either individually or in combination with other plans or projects.
4	Determine whether or not the project would adversely affect the integrity of the European site(s), either individually or in combination with other plans or projects, in view of the site's conservation objectives.

Integrity of European Sites

4.4.2 The integrity of a European Site relates to the characteristics for which the site is designated (i.e. habitats or species), and the associated Conservation Objectives that have been established in order to protect those characteristics. Discussion on whether site integrity is adversely affected is therefore limited to the Conservation Objectives of the European site.

4.4.3 The NIS adequately states how the integrity of three out of the five listed European sites, with regards to their species interests, may be impacted by the construction phase of the proposed development :

- River Boyne and River Blackwater cSAC

The integrity of the River Boyne and River Blackwater cSAC could be indirectly affected by the proposed development through a potential reduction in water quality and foraging potential for aquatic species such as river lamprey, Atlantic salmon and otter. This could in turn lead to reduced numbers or reduced breeding success of river lamprey, Atlantic salmon or otter which are qualifying interests of the cSAC.

- River Boyne and River Blackwater SPA

Changes to water quality could also lead to a reduction in prey densities for kingfisher in the River Boyne and River Blackwater SPA. This could then lead to a decline in breeding numbers or lower reproductive success of breeding kingfisher which is the qualifying interest of the SPA.

- River Barrow and River Nore cSAC

The integrity of the River Barrow and River Nore cSAC could be indirectly affected by the proposed development through a potential reduction in water quality and foraging potential for species such as white-clawed crayfish river lamprey, Atlantic salmon and otter. This could lead to reduced numbers or reduced breeding success of these species, which are qualifying interests of the cSAC and which may occur within 15km of the proposed development.

4.4.4 Section 6.4 of the NIS, 'Potential Impacts on the Integrity of the Sites' does not discuss how the integrity of the remaining two sites, Rye Water/Carton cSAC and Ballynafagh Lake cSAC, may be affected and there is no reference in the NIS as to how such effects have been screened out. The NIS is deficient in this respect.

4.4.5 The NIS considers that only construction works associated with the proposed development have the potential to result in a decline in water quality. Whilst this may be reasonable, consideration has not been given to the potential for aquatic habitat deterioration as a result of invasive species spread, nor the true extent of hydrological effects following felling and replanting.

Step 1: Repeat Steps 1-4 from Stage 1 Screening.

4.4.6 These are presented in Section 4.3.

Step 2: Consider mitigation measures (where appropriate), both those proposed by the Applicant and those that may be considered to be necessary to be required by the Board.

4.4.7 Under Section 6.5 and within Table 6.8 the NIS details mitigation measures to be implemented to avoid or reduce adverse effects upon the integrity of European sites. Additional Information has been provided by the Applicant in their response to submissions dated September 2015.

4.4.8 In general the outline measures serving to avoid and minimise siltation, erosion, surface water runoff and accidental pollution events during the construction phase and included within the Applicant's outline Construction Environmental Management Plan (CEMP) and updated CEMP are in accordance with standard best practice measures and so likely to be adequate when fully developed. However, these are based on generic measures and approaches and are not informed by site specific investigation. Subsequently full details of the mitigation implemented are not yet determined and it is possible that mitigation measures would require additional works themselves, such as the creation of settlement lagoons. Without detailed design, not only is the effectiveness of the measures proposed unclear, but the extent of any additional effects arising from the mitigation measures implemented is also not understood. Subsequently this lack of detailed design leads to doubt regarding the appropriateness of measures required and their effectiveness to mitigate adequately.

4.4.9 Table 6.8 of the NIS states that *"In advance of any works taking place, a method statement for protecting watercourses and waterbodies on the site, will be prepared following further consultation with the IFI and NPWS and detailed in the final Construction Environmental Management Plan (CEMP). An outline Construction Environmental Management Plan (CEMP) has been prepared and is included as an appendix to this NIS"*. However, in their submission dated 8th June 2015, NPWS stated that ABP *"should satisfy itself that the measures in the outline CEMP will protect water quality, particularly in Natura 2000 sites, to ensure that the conservation objectives of the water dependent qualifying interests of these sites are met, and that there will therefore be no need for further consultation as outlined in Table 6.8"*.

4.4.10 This is further clarified by the Applicant in their response of September 2015, which states that the measures proposed;

"All mitigation measures presented in the NIS in Table 6.8 have been devised from best practice, with due consideration given to all relevant guidelines as noted in section 6.6 Efficacy of the Proposed Mitigation Measures of the NIS. No further mitigation measures are envisaged.

Accordingly, given the provenance of the mitigation measures as set out in the NIS, those mitigation measures (when properly implemented) will be successful in ensuring that the European sites are preserved at a favourable conservation status by ensuring the lasting preservation of the constitutive characteristics of those sites.

In circumstances where the mitigation measures have been developed in the light of the best scientific knowledge, no reasonable scientific doubt remains to the absence of any adverse effects caused by the proposed development on the integrity of the sites under consideration in circumstances where those mitigation measures are implemented".

- 4.4.11 According to the Applicant, the NIS and the Outline CEMP (and associated Addendum) state that the final CEMP will be developed further at the post-planning and construction stages by the Applicant and on the appointment of the main contractor to the project. Any adjustments to the CEMP will however, be carried out on the basis that they do not increase the impacts as addressed within the EIS. Therefore it is not clearly demonstrated that the mitigation measures have been '*developed in light of best scientific knowledge*' as the measures have not been fully developed or designed, leaving a level of uncertainty regarding the effectiveness of measures proposed.
- 4.4.12 As such, whilst it is acknowledged that adequate mitigation may be achievable contamination of the receiving water environment as a result of the proposed development leading to significant adverse impact on biota could be avoided, it is unclear as to how this will be fully achieved. As such, doubt remains as to whether there would be a likely significant effect on the integrity of a European site.
- 4.4.13 Preventative measures to ensure that non-native/riparian species are not introduced into the site, providing these are detailed for all relevant species, would also be considered sufficient. Due process has however, not been followed and a coherent conclusion upon the requirement for such measures has not been provided.
- 4.4.14 The NIS also outlines the installation of bird diverters upon guy wires of met masts within the site. Whilst a relatively standard mitigation measure, the Applicant provides no scientific certainty as to whether such mitigation may be effective, or whether alternative measures such as the relocation of masts away from areas of high flight activity or the use of alternative mast designs may be more appropriate. Regardless, given the lack of anticipated direct impacts on SPA qualifying interest bird species, such measures are not considered relevant to the AA.

Step 3: *Examine and evaluate the potential effects of the project on the conservation objectives of the site(s) taking account of mitigation. This evaluation should use the source-pathway-receptor model and be based on best scientific knowledge in the field. It should include direct and indirect effects of the project, either individually or in combination with other plans or projects.*

- 4.4.15 For clarity, the Conservation objectives of the pertinent European sites (as detailed in the NIS) are summarised as:

River Boyne and River Blackwater cSAC (published 13/02/2015)

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- 7230 Alkaline fens
- 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*
- 1099 River Lamprey *Lampetra fluviatilis*

- 1106 Salmon *Salmo salar*
- 1355 Otter *Lutra lutra*

The River Boyne and River Blackwater SPA (published 13/02/2015)

To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

- Kingfisher *Alcedo atthis*

The River Barrow and River Nore cSAC (published 19/07/2011)

Conservation objectives are not expressly defined, however noted that a site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site. Qualifying features are:

- 1016 Desmoulin's whorl snail *Vertigo moulinsiana*
- 1029 Freshwater pearl mussel *Margaritifera margaritifera*
- 1092 White-clawed crayfish *Austropotamobius pallipes*
- 1095 Sea lamprey *Petromyzon marinus*
- 1096 Brook lamprey *Lampetra planeri*
- 1099 River lamprey *Lampetra fluviatilis*
- 1103 Twaite shad *Alosa fallax*
- 1106 Atlantic salmon (*Salmo salar*) (only in fresh water)
- 1130 Estuaries
- 1140 Mudflats and sandflats not covered by seawater at low tide
- 1310 *Salicornia* and other annuals colonizing mud and sand
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritima*)
- 1355 Otter *Lutra lutra*
- 1410 Mediterranean salt meadows (*Juncetalia maritimi*)
- 1421 Killarney fern *Trichomanes speciosum*
- 1990 Nore freshwater pearl mussel *Margaritifera durrovensis*
- 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation
- 4030 European dry heaths
- 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
- 7220 * Petrifying springs with tufa formation (*Cratoneurion*)
- 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

The Rye Water/Carton cSAC (published 13/02/2015)

To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

- 7220 Petrifying springs with tufa formation (*Cratoneurion*)
- 1014 Narrow-mouthed Whorl Snail *Vertigo angustior*
- 1016 Desmoulin's Whorl Snail *Vertigo moulinsiana*

Ballynafagh Lake cSAC (published 13/02/2015)

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- 7230 Alkaline fens
- 1016 Desmoulin's whorl snail *Vertigo moulinsiana*
- 1065 Marsh fritillary *Euphydryas aurinia*

4.4.16 The potential effects identified with regards to the above European sites and as stated in the NIS are:

- Reduction in water quality (key element of site) and foraging potential for aquatic species such as river lamprey, Atlantic salmon and otter in the River Boyne and River Blackwater cSAC
- Reduction in prey densities for kingfisher as a result of changes in water quality (a key element of site) in the River Boyne and River Blackwater SPA;
- Reduction in water quality (key element of site) and foraging potential for mobile aquatic species such as river lamprey, Atlantic salmon and otter in the River Barrow and River Nore cSAC
- Reduction in water quality (a key element of site) and consequent impacts on *Vertigo* snails within the Rye Water/Carton cSAC.
- Reduction in water quality (a key element of site) and consequent reduction in area or petrifying springs habitat in Rye Water/Carton cSAC.
- Reduction in water quality (a key element of site) within portion of Ballynafagh Lake which overlaps The Grand Canal.

4.4.17 As previously detailed, the NIS does not adequately consider the full magnitude and pathways for hydrological effects in relation to those potentially arising from forestry clearance and replanting, and the possible spread of alien invasive species. Whilst mitigation at a later stage may be implemented (as contended by the Applicant in September 2015), the effectiveness of this has not been adequately demonstrated and this potential pathway for effect is not adequately explored in the NIS.

4.4.18 Whilst extensive mitigation is proposed which may adequately mitigate those potential adverse effects identified in the NIS, sufficient detail is not presented. The measures proposed do not provide appropriate levels of mitigation with respect to impacts arising from forestry clearance, forestry replanting and the possible spread of alien invasive species.

4.4.19 Impacts arising in combination with other plans or projects have not been adequately assessed in the NIS.

4.4.20 It cannot therefore be ascertained that the potential direct and indirect effects of the project on the conservation objectives of the European sites, taking account of mitigation, has been adequately evaluated in the NIS based on best scientific knowledge, either individually or in combination with other plans or projects.

Step 4: Determine whether or not the project would adversely affect the integrity of the European site(s), either individually or in combination with other plans or projects, in view of the site's conservation objectives.

4.4.21 On the basis of the information provided with the NIS and with consideration to subsequent clarifications provided by the Applicant, it is not adequately demonstrated that the proposed development individually, or in combination with other plans or projects, would not adversely affect the integrity of the identified European sites in view of these sites' conservation objectives.

4.5 The Veracity of the NIS Conclusions

4.5.1 The conclusions of the NIS are flawed, owing to a number of clear deficiencies. Whilst some of these are minor and subsequently immaterial, critically consideration has not been given to key elements, namely:

1. Lack of Stage 2 (AA) inclusion of Rye Water/Carton cSAC and Ballynafagh Lake cSAC
2. Failure to adequately address all potentially significant effects, namely those arising from removal and replanting of forestry and the spread of alien invasive species;
3. Insufficient detail in the mitigation design based on best scientific knowledge and robust baseline site investigations; and,
4. Failure to consider development plans, namely the Kildare County Development Plan 2011-2017 and the Meath County Development Plan 2013-2019, which is a requirement of the AA process.

4.5.2 Based on the information presented in the NIS, along with subsequent clarifications, it cannot be stated with any degree of scientific precision or accuracy that the proposed development will not significantly negatively impact upon the conservation objectives and ecological integrity of the identified European sites.

4.5.3 It is further relevant that the information, analysis and conclusions presented in the NIS are diluted by the inclusion of extensive unrelated information and a lack of clarity between pathways and receptors. A large amount of environmental data and information has been included to support the conclusions presented within the NIS. The irrelevant baseline datasets and methodologies (pertaining to bats and badgers for example, which have no bearing on the qualifying interests of the European Sites) makes it difficult to follow the discussion and justification put forward in the NIS and potentially serves to undermine the conclusions on relevant impacts.

4.5.4 Whilst the development may not result in likely significant effects upon European sites, the information presented and the format within which it is presented, including clarifications provided by the Applicant, does not allow ABP to undertake a robust and transparent Appropriate Assessment.

4.5.5 Based on the information presented in the NIS, it cannot be stated with adequate certainty that the proposed development will not significantly negatively impact on the conservation objectives and overall ecological integrity of the European sites identified, by virtue of possible indirect impacts on the habitats and species which form qualifying interest features of the sites.

5 REVIEW OF THE ADEQUACY OF THE EIS

5.1.1 Note this section does not discuss Birds (see Section 5) or Bats (Section 6).

5.2 Assessment Methodology

5.2.1 The EIS was prepared by Fehily Timoney & Company on behalf of the Applicant. Contributing personnel are listed in Chapter 1 of the EIS (Table 1.3) and comprise suitably qualified ecologists.

5.2.2 The EIS states that the methodology for assessment was devised with reference to guidance published by the Environmental Protection Agency (EPA), the European Union (EU), the Chartered Institute of Ecology and Environmental Management (CIEEM), the Heritage Council and National Roads Authority (NRA). Documentation and guidance from Meath County Council (MCC) and Kildare County Council were utilised, along with specialist bird and bat documents (not relevant to this section). Whilst the Applicant has made reference to appropriate guidance, no clear assessment methodology is set out in the EIS. The terminology used throughout is often undefined and confused. Although a series of definitions are presented in Appendix F8 to the EIS it is unclear how these have been considered or applied. Subsequently the assessment process cannot be easily followed or verified and in this respect the EIS fails to provide an open and transparent assessment of the predicted effects and subsequent impacts.

5.2.3 The EIS further states that the scope of the evaluation has been informed by consultation with ABP, statutory consultees, bodies with environmental responsibility and other interested parties as summarised in Chapter 4. This is reported to include a series of meetings with statutory consultees, however details of these meetings are not presented and so it is not possible to determine stakeholder engagement or how any comments or advice provided were considered by the Applicant.

5.2.4 The value of identified ecological resources/receptors presented in the EIS was determined using guidance published by the NRA^{vi}. This guidance is appropriate and the valuations afforded to ecological resources by the Applicant follow a verifiable methodology.

5.2.5 Reference to national and European legislation is included in the EIS. Overall this is reported in an appropriate manner; however for some species (such as Irish hare) there is no recognition of the potential for legislative offences arising from development impacts, for example inadvertent killing of protected species during works. Similarly, although national and local Biodiversity Action Plans (BAPs) are presented as 'Ecological Resource Evaluation Criteria' (Table 7.8 of the EIS), they are not subsequently considered further in terms of the potential for the development to affect their conservation objectives.

5.2.6 While potential impacts have been identified and broadly described in the EIS, the necessary impact assessment process relating to likely magnitude, scale, duration etc. as referred to in standard guidance documents including *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment Department of the Environment, Community and Local Government (March 2013)*^{vii} and *Guidelines on the information to be contained in Environmental Impact Statements, Environmental Protection Agency (2002)*^{viii} has not been completed, nor has a significance rating of each potential impact been consistently assigned. As a result the EIS chapter is difficult to follow and does not provide an objective and transparent assessment of impacts.

5.3 Collection of Baseline Data

5.3.1 The Applicant states that the EIS was informed through the collation of field data and desk study, including consultation with relevant recording organisations. Other information sources referred to

includes the National Parks and Wildlife Service (NPWS) webpage, metadata available online from the NPWS mapping system and the National Biodiversity Data Centre (NBDC) mapping system.

- 5.3.2 The ecological surveys were mostly undertaken by Fehily Timoney & Company personnel which includes suitably qualified ecologists. Bat surveys were carried out by Mr. Conor Kelleher, a recognised bat expert. In addition, Ecofact Environmental Consultants Ltd. carried out surveys of aquatic ecology. Subsequently the personnel engaged to undertake the baseline surveys are adjudged to be competent.
- 5.3.3 A commentary on the level and appropriateness of each survey methodology and baseline data collection is provided below. Overall, the baseline data collected during field surveys and through desk study is considered to provide a broad overview of the range of habitats and species likely to be present across the application site and study areas, but is consistently insufficient to underpin an accurate assessment of impacts. Survey methods are not fully described and/or incomplete, with little or no justification for the scope, duration or extent of survey work in relation to the proposed development. Baseline information is generally provided in a qualitative manner, informed by professional judgement rather than as a quantitative assessment. This lack of robust baseline data substantially limits the credibility of the EIS and undermines confidence in any mitigation measures proposed and subsequent conclusions on residual impacts.
- 5.3.4 A number of minor errors have been identified by statutory consultees. An erratum was provided by the Applicant in their response to submissions of September 2015. These are not considered to materially affect the EIS, but suggest the EIS has not been collated with due care and consideration.

5.4 Impact Assessment

- 5.4.1 The potential impacts arising from the proposed wind farm are outlined in the EIS and are considered through the construction, operational and decommissioning phases of the development, along with the 'do nothing' scenario. Both direct and indirect impacts for each phase are considered, as are cumulative impacts. Subsequently the overall phases and nature of potential impacts identified in the EIS are satisfactory.
- 5.4.2 The EIS outlines ecological mitigation to be achieved through embedded design measures. These include reference to avoidance of sensitive habitats or sites and "*established locations*" of protected or notable species, along with the minimisation of the infrastructure. Whilst avoidance through design is appropriate, the lack of baseline data means that it cannot be demonstrated that the incorporated design measures properly address locations of protected species or particularly sensitive habitats. Established locations for pertinent species have not been identified through survey, so it is unclear how the Applicant's stated avoidance through design has been achieved.
- 5.4.3 The EIS and subsequent responses to submissions state that works in or around watercourses will adhere to best practice as per NRA guidance "*where possible*"; however it is unclear why or where variations from NRA guidance may be implemented. This again substantially limits the accuracy of the impact assessment and undermines confidence in the mitigation measures proposed.
- 5.4.4 The overall identified potential pathways for impacts included in the EIS are reasonable; however data is presented, assessed and discussed in an inconsistent manner throughout. Assessments of likely impacts, where these are made, are largely qualitative and supported by limited evidence both in terms of baseline data and peer reviewed research. Although the ecological survey data has been provided by suitably qualified ecologists, the scope of the surveys has been limited and does not provide a robust baseline in relation to the geographic extent or nature of the proposed development. The scale and magnitude of effects is not discussed and a clear assessment methodology has not been consistently followed. Terminology is variable, and the residual significance of impacts is often omitted altogether. As such, the assessment of effects presented in

the EIS is unclear, inconsistently described and deficient, further undermining confidence in the conclusions reached.

- 5.4.5 A short summary of the identified impacts presented in the EIS for each 'key ecological receptor' is presented below, taking into account mitigation achieved through design (as presented in Section 7.5.2 of the EIS) and subsequent clarifications provided by the Applicant (September 2015).

Designated Sites

- 5.4.6 The EIS recognises a total of 34 designated sites or proposed designated sites within a 15km radius of the application site. Figure 7.1, Volume 2a of the EIS, shows the location and extent of the identified designated nature conservation sites and Section 7.3.2 provides a summary of the ecological features of each included site. Whilst likely to be reasonable, no supporting rationale for the use of a 15km buffer is presented within the EIS or further submissions.
- 5.4.7 The potential for impacts on European (Natura) statutory designated sites is discussed separately in Section 3.
- 5.4.8 The main pathways to impacts on Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) have been adequately identified by the Applicant as:

Construction Phase

- Direct effects through pollution and proximity; and,
- Indirect effects on downstream pNHAs through pollution, or on the Royal and Grand canals through vibration caused by trenchless operations.

Operational Phase

- Indirect effects on downstream pNHAs through pollution.

Decommissioning Phase

- Indirect effects on downstream pNHAs through pollution.

- 5.4.9 In their response to submissions (September, 2015), the Applicant states that hydrological connectivity including both surface and groundwater was considered in the identification of hydrological linkage to designated sites; however little information is provided to support this position and detailed investigative works have not been undertaken. Of the NHAs and pNHAs identified in the EIS, four are stated to be "*within close proximity and/or connected hydrologically and therefore potentially directly affected*". However hydrological connectivity considered by the Applicant appears to be based on a 500m buffer only, with limited further support through EPA groundwater monitoring data from the Longwood Aquifer in Meath (approximately 1.5km from the Ballynakil proposed turbine cluster). No detailed site investigations on hydrological connectivity have been completed. It therefore cannot be verified whether the consideration of these four designated sites is sufficient.
- 5.4.10 Indirect impacts on NHAs and pNHAs with hydrological links to the proposed development site were also considered by the Applicant in the EIS, which states these may include hydrological changes and impacts such as increased siltation, nutrient release and/or contaminated run-off through drainage channels and watercourses. The pathway for effects is adequately identified, but again hydrological connectivity is not clearly established and so the number of designated sites which may be affected is unknown.

- 5.4.11 The potential for indirect impacts on NHAs and pNHAs arising from compensatory planting is not discussed; it is possible that inappropriately planted areas will alter local hydrology and subsequently lead to an adverse impact on associated water dependent habitats or species.
- 5.4.12 Whilst acknowledged to be a potentially significant effect, no attempt to quantify likely pollution levels is included in the EIS. In addition to the substantial earthworks required across the application site, at least 63ha of woodland will be felled. It is likely this will lead to high levels of runoff and pollution which would be expected to have an adverse effect on statutory designated sites in the absence of mitigation.
- 5.4.13 In repose to the application, the County Kildare Heritage Officer raised concerns about indirect hydrological effects on the Hortland Bog cNHA, classified as nationally important. This cNHA site is not listed in Chapter 7 of the EIS, although consideration of Hortland Bog is included. The Applicant has responded (September 2015) and provides adequate evidence that there will be no impact on the raised bog at Hortland (or Haggard/Windmill, also discussed), regardless of whether there is a groundwater connection.
- 5.4.14 The EIS report identifies only one alien invasive species within the study area (Rhododendron), then further states that a total of 55 structures were surveyed in November and December 2014 for evidence of otter, with additional target notes on other ecological items of note such as invasive species also recorded. Such constrained effort, outside the growing season is insufficient to draw conclusions on the absence of further alien invasive species from the development area. The presence and introduction of this species to the aquatic environment linked to European sites would be considered a significant threat. Japanese Knotweed and Himalayan Balsam in particular may out-compete native flora and dominate the banks of watercourses, leading to bank erosion outside of the growing season. This may result in sedimentation concerns for qualifying interest of freshwater systems of designated sites.

Mitigation for Statutory Designated Sites

- 5.4.15 Mitigation of impacts on aquatic habitats (and therefore designated sites) is discussed in paragraph 5.4.61.

Residual Designated Site Impacts

- 5.4.16 The EIS concludes that, with the implemented mitigation measures, residual impacts as a result of the proposed development are assessed as '*negligible*' and '*adverse effects on the integrity of designated sites are not predicted*'. No statement of significance is included. In this respect the EIS is unclear, does not follow its stated methodology, and does not provide a transparent or coherent assessment of the potential for significant effects in line with the referenced guidance presented.
- 5.4.17 Subsequently the potential for harm to nationally important designated sites is not adequately presented.

Habitats

- 5.4.18 The EIS states that a walkover survey to identify habitats was carried out at the study sites during July 2013. No further details are presented and so the overall survey effort and comprehensiveness cannot be verified. Habitats were classified according to standard guidance (Smith *et al.*, 2011), which is appropriate; however the scale of habitat data presented visually (e.g. Figures 7.13.7 and 7.14.7) does not allow detailed scrutiny. The surveys identified a range of widespread habitats considered by the Applicant to be of Local Importance, with two of increased value: 'Raised Bog' (classified as Internationally Important) and 'PB4/GS1 Mosaic' (of County Importance). The survey methodology followed is generally appropriate for lower value habitats (local importance).

Appropriate levels of more detailed habitat survey have been completed at Hortland Bog and Windmill Bog.

5.4.19 The main potential pathways to impacts have been identified by the Applicant as:

Construction Phase

- Loss of habitats (temporary and permanent);
- Pollution or changes to hydrology (water courses and bog habitats); and,
- Facilitating spread of invasive species (rhododendron).

Decommissioning Phase

- Possible temporary loss of habitat, primarily to hedgerows at access points which may require partial removal to facilitate exiting of turbine parts; and,
- Pollution or increased siltation, nutrient release and/or contaminated run-off through drainage channels and watercourses.

5.4.20 These are considered to be adequate.

5.4.21 The EIS states that construction of the wind farm will lead to both temporary and permanent loss of habitat. The habitat loss will be the total area covered by the roads plus the footprint of each of the proposed turbines and all other wind farm infrastructure. Additionally, tree or hedgerow trimming will be required along cable routes and turbine delivery routes. Further habitat will be removed or reduced around 19 of the wind turbines to mitigate for operational impacts on bats (Table 7.83 of the EIS).

5.4.22 The Applicant has calculated total habitat loss as a result of the development to be 97.94ha (8% of the total area of the site). Of this, 85% of the land-take is from habitats classified as of low ecological value. No land take is predicted for Raised Bog (classified as of International Importance) or of PB4/GS1 Mosaic habitat (of County Importance). Of the other habitat types (all of local importance) which were assessed, total areas lost range from 1.3ha of scrub to 5.73ha of bog woodland. It is unclear whether the area (ha) calculations presented in the EIS (pages 138 and 139) include habitat scheduled for removal to provide bat mitigation. The Applicant considers that direct impacts on habitats could be significant in the absence of mitigation and this is appropriate.

5.4.23 Areas of Raised Bog, a priority habitat listed under Annex 1 of the EC Habitats Directive, were identified on or close to the Windmill and Drehid-Hortland turbine clusters. The Applicant commissioned an independent peat specialist to assess the quality and condition of these raised bogs. The survey results are summarised in Chapter 7 of the EIS and further details presented in Appendix F5. These areas have been avoided through project design and subsequently no direct impacts will occur. Chapter 7 of the EIS also outlines the potential for indirect impacts from marginal drainage (which could lower the groundwater table) and drawdown from open ditches. The Applicant considers that the former is unlikely to occur and also that impacts arising from proposed drainage ditches will not be significant. However this view is not supported by evidential studies, nor is it detailed in the Applicant's peat specialist report.

5.4.24 Habitat fragmentation has been raised as a concern in a number of submissions received. The Applicant has subsequently further responded (September 2015) and states that no continuous habitat exists which currently connects one or more of the five individual wind turbine clusters and that the existing landscape is fragmented due to the presence of features such as roads, railways, canals, discontinuous urban fabric as well as individual mosaics of peatland and complex cultivation patterns. Whilst the EIS does not assess the possible effects of habitat fragmentation, the Applicant

is correct in this regard and it is reasonable to conclude that the proposed development would not cause significant additional fragmentation leading to significant adverse impacts on habitats.

Habitat Mitigation

- 5.4.25 Mitigation of impacts on aquatic habitats is discussed in paragraph 5.4.61.
- 5.4.26 Measures are proposed to remove and prevent further spread of invasive rhododendron and, where required, giant hogweed. This is satisfactory.
- 5.4.27 Habitat mitigation measures proposed by the Applicant include hedgerow creation and landscaping, although no details are presented in the EIS. The Applicant's response dated September 2015 states that "*Final, confirmatory detail on re-instatement of habitats and specific enhancement measures will be provided in the Habitat and Species Management Plan (HSMP) to be included in the final CEMP. Where possible, all removed habitat will be re-instated, with re-instated habitats being enhanced for wildlife through the planting of native species of trees*". Whilst the full details of the HSMP/CEMP are outstanding, it is not possible to determine the effectiveness of these measures as mitigation, or to accurately quantify overall losses and gains. In addition to 63ha of commercial plantation, at least 8.2ha of locally important woodland (mixed broadleaved and bog woodland) will be permanently lost, along with areas of scrub, hedgerow and treelines. It would be reasonable to expect an overall vegetative habitat gain using native species; however the Applicant has neglected to adequately demonstrate how losses will be mitigated or whether any habitat gains will be achieved. Subsequently the efficacy of the proposed habitat mitigation (and enhancement measures) cannot be verified.

Residual Habitat Impacts

- 5.4.28 The Applicant considers that the impacts of the proposed development will be minimised to an "*acceptable level*", resulting in "*slight residual*" impacts (defined by the Applicant as "*noticeable changes in the character of the environment without affecting its sensitivities*"). No statement of residual significance is included in the EIS and in this respect the EIS does not provide a coherent assessment of the potential for significant effects and does not follow its stated methodology for assessment. On consideration of the EIS and subsequent submissions from statutory parties, third parties and the Applicant, it is reasonable to conclude that impacts on habitats would be not be significant with the implementation of robust mitigation. However, the information presented in the CEMP and HSMP is currently insufficient to substantiate this conclusion.

Mammals (excluding bats)

- 5.4.29 The Applicant has adequately identified the range of mammal species likely to be present on or around the Application site, although limited evidence is presented to support this and survey effort or methodologies are unclear.
- 5.4.30 No clear methodology for terrestrial mammal surveys (excluding bats) is provided in the EIS. It is relevant that the EIS refers to and includes NRA guidance *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (2009 revision), which includes a clear methodology for mammal surveys, yet there is no evidence that the methodologies referred in the guidance have been followed. The EIS reports that surveys were completed in tandem with winter walk-over ornithology surveys over the winter of 2012-13. Further details are not presented and the completeness of the surveys cannot be checked as the searched areas are not clearly mapped. It appears that surveys were restricted to visual checks for tracks or other evidence of presence during bird walk-over surveys and this method of incidental observation is highly likely to have missed evidence of mammals; it is highly unlikely that all suitable habitat within each study area (Figure 2.1 of the EIS) was systematically searched whilst the observer also looked for birds.

5.4.31 The EIS states that additional surveys for otters were completed where new water crossings are proposed, although very limited detail is presented in the EIS and no clear methodology is presented. Terrestrial mammal surveys completed (excluding bats discussed separately) were therefore not comprehensive. Surveys identified the presence of badger setts and evidence of otters. The Applicant's desk study indicated the likely presence of a range of protected species including red squirrel, pine marten, Irish hare, hedgehog and red deer, all of which are protected under the Wildlife Acts (1976-2012). Whilst the EIS chapter provides a reasonable representation of the suite of mammal species likely to be present on and around the application site, the evidence presented to confirm this and to identify species distributions in relation to the development area is inadequate.

5.4.32 The main potential pathways to impacts have been identified by the Applicant as:

Construction Phase

- Direct impacts on places of rest and loss of habitat;
- Increased disturbance or road casualties due to site traffic; and,
- Reduced habitat quality (watercourses).

Operational Phase

- Increased potential for road fatalities due to site traffic.

Decommissioning Phase

- Increased disturbance or road casualties due to site traffic.

5.4.33 These are considered to be adequate.

5.4.34 Harm or damage to protected mammals may occur through tree felling or other construction operations.

5.4.35 Disturbance to protected or notable species is most likely to occur during the construction phase due to habitat removal and/or increased activity. The Applicant considers that fatalities are likely to be rare events as most mammal species are active at night, whereas site traffic will be largely in daylight hours. Whilst this is true, fatalities or injuring of protected mammal species could be considered more likely to occur for resting animals as a result of construction works such as tree felling or earthworks and the EIS does not make sufficient reference to this possibility. Nor is there full consideration of the timings of works and potential to harm species during their inactive phase or in winter when they more vulnerable to the effects of displacement and disturbance. Despite these omissions, it is acknowledged as unlikely that disturbance would occur at a significant level for protected mammal species.

5.4.36 Effects on other mammal receptor species (Irish hare and hedgehog) are not considered in detail and the Applicant considers any impacts would be restricted to localised displacement which will not affect populations. This is a reasonable conclusion.

Mammal Mitigation

5.4.37 The EIS states that, prior to construction, a qualified ecologist will re-survey the hedgerow/woodland areas earmarked for development for badger setts, pine marten dens or red squirrel dreys no more than 10–12 months prior to construction, with a further check immediately prior to vegetation clearance. In the event that a badger sett is found, the NRA (2006) guidelines for the treatment of badgers^{ix} will be followed. All locations where river crossings are proposed and where work is

required on existing bridges will be surveyed for otters by a qualified ecologist no more than 12-14 months prior to construction, again as per published guidance from the NRA^x. Should otter breeding or resting sites be present then best practice guidance detailed in the NRA guidance will be followed, under the terms of the obtained derogation license. The Applicant states that screening will be placed along the banks of the Cloncumber Stream to prevent disturbance to otters during the construction period and that all works will be overseen by the project ecologist. These measures are considered to be satisfactory and allow for changes to mammal distribution between the initial (limited) baseline surveys and the commencement of construction.

- 5.4.38 The Applicant states that where possible, tree felling in forestry areas will be limited to periods outside when pine martens may have young in dens (March and April). If this is unavoidable then areas to be clear felled will be surveyed in advance by a suitable qualified ecologist to determine whether any occupied pine marten dens are present. A licence under the Wildlife Act (1976-2012) will be applied for should any sites have to be disturbed. This is considered to be a satisfactory approach.
- 5.4.39 The Applicant states that similar measures will be implemented during decommissioning and this is also considered to be adequate.
- 5.4.40 Adequate mitigation is proposed for badger, pine marten, otter and red squirrel, whereby pre-construction checks will be made and a mitigation strategy implemented in accordance with relevant best practice guidance (including derogation licences, where required) should any evidence of presence be found. The approach is in-keeping with standard protocols for large-scale developments and is therefore precautionary and adequate.
- 5.4.41 The EIS is less clear with regards to Irish hare and hedgehog, both of which are afforded legislative protection under The Wildlife Act and its amendments. Whilst specific licensing for these species is unnecessary, the Applicant has not demonstrated how the potential for legislative offences will be minimised; however this is a relatively minor inadequacy to the EIS.

Residual Mammal Impacts

- 5.4.42 With the application of the proposed mitigation measures, the Applicant considers that the impacts of the proposed development will be minimised to an “*acceptable level*”, resulting in “*slight residual impacts*”. These terms are not adequately defined in the methodology for the EIS, and again there is no statement of significance included in the EIS.
- 5.4.43 Given the limited baseline data and failure to complete accurate surveys, the conclusions of the EIS with respect to terrestrial mammals are not clearly proven or supported by evidence. However, acknowledging the timeline involved and the commitment to pre-construction surveys and derogation licences where required, the potential for adverse impacts on mammal populations is acknowledged to be low. As such the EIS adequately describes residual impacts on terrestrial mammals (excluding bats).

Aquatic Ecology

- 5.4.44 The consultant’s report (Appendix F7 of the EIS) states that their assessment was prepared taking account of relevant guidance published by the EPA, including ‘*Guidelines on the Information to be contained in Environmental Impact Statements*’ (EPA, 2002) and ‘*Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)*’ (EPA, 2003). In addition the Applicant’s impact assessment is stated to takes account of the ‘*Guidelines for Ecological Impact Assessment*’ (Institute of Ecology and Environmental Management, 2006) and that the Heritage Council publication ‘*Best Practice Guidance for Habitat Survey & Mapping*’ (Smith *et al.*,2011) is also referenced. It is unclear how this guidance has been applied in terms of the aquatic ecology assessment.

- 5.4.45 Aquatic ecology surveys were completed in the period August to October 2013 by specialist qualified consultants (Ecofact Environmental Consultants Ltd.) on behalf of the Applicant. Water courses/bodies within 500m of the site boundary were considered, although some sites assessed were at greater distance. Habitat appraisal was carried out at the rivers/streams on, and in the vicinity of, the site using the methodology given in the Environment Agency's '*River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003*'^{xi} and the Irish Heritage Council's '*A Guide to Habitats in Ireland*'^{xii}. The Applicant considered that a 500m buffer would allow for direct and indirect effects to be addressed, however no evidence is presented that a 500m buffer is appropriate or in accordance with the guidance. As previously detailed (5.4.9), no detailed site investigations on hydrological connectivity have been completed and this appears to be reliant on professional judgement with limited information through desk study (EPA groundwater monitoring data from the Longwood Aquifer). As such, it is not adequately demonstrated that the selection of baseline watercourses is appropriate or sufficient.
- 5.4.46 A total of ten water course sites were selected by the Applicant's consultant for detailed evaluation in the EIS, falling in two main catchment areas (Hydrometric Area 07 Boyne and Hydrometric Area 14 Barrow). The Applicant considered that surveys completed at each site "*were at a level required to make an evaluation of biological water quality, fisheries value, aquatic habitat value, and presence of rare/protected/notable aquatic species at each site*". This is not demonstrated in the EIS as the survey effort completed was extremely limited.
- 5.4.47 It is unclear how the guidance referred by the Applicant was applied, and whether these documents justify the study areas considered or limited effort undertaken: Only main watercourses (i.e. those shown on the 1:50,000 discovery Maps) were included. No clear justification is presented for this approach, which is highly likely to be restrictive for some species including river lamprey, which is known to use smaller tributaries. This view is supported by the IFI in their submission of 3rd June which states that "*stream size can be misleading in regard to fish presence. A significant amount of fish rearing occurs in very small channels and seasonal streams. These streams may not be recognised as fish or macroinvertebrate habitat and their importance to fisheries is sometimes overlooked*". In response (September 2015), the Applicant states that "*A full description of waterbody types and their respective potential for fisheries value is presented in section 7.3.8.4 of the EIS. Waterbody types classified as drains were evaluated as being of Local Importance (lower Value) and shows [sic] evidence of being highly modified and generally not of any significant aquatic ecological importance, and rarely of any fisheries importance. Most of the drains appraised during the current study were physically degraded and organically enriched. In relation to larger watercourses, again, all show evidence of modification to one degree or another, with many channels subject to severe modification. It is acknowledged that these have potential for fisheries*". Whilst this offers some explanation, no attempt is made to qualify the importance of lesser watercourses. The Applicant states that 'most' of the drains were in poor condition without any quantitative assessment and further acknowledges these lesser watercourses have potential for fisheries.
- 5.4.48 Only a single river (the Figile) was surveyed using electrofishing, which again is an extremely small sample size given the extent and complexity of the aquatic environment on and around the application site. The baseline fisheries data is therefore extremely limited and inadequate for the purposes of a robust and objective assessment.
- 5.4.49 The Applicant's surveys included searches for freshwater pearl-mussel and white clawed crayfish, yet no detail on the survey method or effort (other than 'visual') is presented. Survey methodologies for these species are included in the NRA guidance '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*' (2009 revision), which is referenced in the EIS, yet there is no evidence that the methodologies referred in this guidance have been followed. Again, it cannot be determined from the information provided whether the surveys completed were in accordance with the applicable methodologies and guidance. Freshwater pearl-mussel was considered in the EIS to be locally absent, based largely on low resolution NPWS data^{xiii},

rather than adequate local survey effort. As such a precautionary approach has not been adopted for this Annex II Habitats Directive listed species.

- 5.4.50 Furthermore, the Applicant has considered only main watercourses (as shown on the 1:50,000 discovery Maps) which are located within 500m of the site. As hydrological connectivity has been established solely through desk study (i.e. no site investigative works), then the validity of this approach is not adequately justified based on best scientific knowledge and is over reliant on the opinion of the Applicant's consultant. Given the extent and potentially connected nature of the aquatic environment in the region, this approach is considered unjustified and deficient.
- 5.4.51 In the EIS, the Applicant states that due to land access restrictions, sampling could only be undertaken at sites within the land option areas, although watercourses downslope of the proposed development were observed from public roads. The extent of the land option areas is not presented in the EIS, so the extent of this limitation cannot be determined. This substantially constrains the effectiveness of the (already limited) surveys and undermines the results presented. It is unknown whether the Applicant attempted to gain access permissions to areas outside the land options; evidence of such an attempt may have provided a reasonable justification for inadequate survey effort, but this has not been included. As such, the survey effort completed must be considered insufficient.
- 5.4.52 The EIS states that Atlantic salmon and white-clawed crayfish were considered likely to occur across the development in suitable watercourses. Brook and river lamprey were considered likely to occur around two wind turbine clusters. Despite the inadequacy of the survey effort completed, an assumption of presence is a suitably precautionary approach for species afforded protection under Annex II of the Habitats Directive. However, the importance of the local aquatic environment for these species at a population level is unknown and so it is not possible to accurately assess impacts at any population level.
- 5.4.53 The aquatic macroinvertebrate communities found were considered to be typical of slow flowing watercourses and dominated by pollution intolerant species, which is a reasonable assumption based on water quality information gathered from the Environmental Protection Agency (EPA) and presented in the EIS.
- 5.4.54 The main potential pathways to impacts have been identified by the Applicant as:

Construction Phase

- Direct impacts on watercourses through new crossings or upgrades of existing crossings required for access tracks;
- Trenching of cables;
- Potential for increased pollution through, e.g. increased siltation, substance release and run-off;
- Obstruction of watercourses;
- Increased erosion;
- Alteration to drainage; and,
- Cumulative increase in pollution with other operations, e.g. peat extraction or agricultural activities.

Operational Phase

- Low possibility of leakage of oils or lubricants used on the wind farm site; and,
- Increased unauthorised access, allowing for example illegal rubbish dumping, poaching and off-road vehicles.

Decommissioning Phase

- Potential impacts similar to construction phase, although considered to be reduced.

5.4.55 These are considered to be adequate.

5.4.56 The Applicant correctly identifies the primary pathways for potential impacts on aquatic ecology as through increased pollution or changes to hydrology, which are more likely to occur during the construction phase. This is reasonable statement, but the EIS makes no attempt to quantify levels of pollution or changes to hydrology and so the assessment is based solely on a qualitative opinion which is not supported by a sound baseline or justified through reference to current research and guidance. In this respect the EIS is deficient.

5.4.57 As detailed previously, the potential for impacts upon hydrology as a result of tree replanting, a provision of any Felling Licence issued by Forest Service and required for the development to proceed, has not been considered within the EIS. The extent of replanting area required has not been stated or its likely location detailed within the EIS or response to submissions. The EIS does not identify or explore the full extent of the potential for hydrological impacts to occur as a result of tree felling and replanting. It is unclear as to whether the replanting may occur on areas with hydrological connectivity to statutory designated sites inducing potential effects upon levels of runoff and water quality.

5.4.58 Also as previously outlined, the potential for spread of alien species, in addition to Rhododendron, has also not been adequately addressed owed to deficiencies in ecological information derived from areas of riparian engineering works.

5.4.59 The potential for cumulative effects with other operational works is also noted in the EIS; however these are not quantified and no clear assessment is provided.

5.4.60 It is stated in the EIS that existing neighbouring wind farms considered within the in-combination assessment are not located within any of the same waterbody (Boyne and Barrow) catchments as the proposed development. The potential cumulative impact on water quality is therefore assessed by the Applicant as negligible (or nil). The IFI have also noted (5th June 2015) that the application is located within the Boyne and Barrow catchments and so this is accurately assessed.

Aquatic Ecology Mitigation

5.4.61 In addition to avoidance through design previously outlined, the Applicant proposes mitigation measures to avoid or minimise the potential for impacts on watercourses. These are summarised in the EIS and further details are presented in the outline CEMP (Appendix D to the EIS) which has subsequently been updated (September 2015 Applicant's response). Comments by IFI (submission dated 3rd June 2015) have also been considered by the Applicant in their September response, however the Applicant states that a method statement for water crossings will be finalised following guidelines set out in Murphy (2004)^{xiv} and 2008 NRA Guidelines for the '*Crossing of Watercourse during the Construction of National Road Schemes*'^{xv}. The Applicant also considers that localised water quality impacts during the construction phase will be reduced by undertaking the most sensitive elements of the works outside the salmonid close season and through the protection of water quality following the implementation of the water management measures detailed in Chapter 9 'Hydrology' and Chapter 10 'Water Quality'.

- 5.4.62 It is reasonable to assume that the potential for impacts on watercourses, and therefore aquatic ecology, could be adequately mitigated with sufficient measures in place; however the very limited survey effort brings into question the adequacy of the baseline used for assessment and mitigation design is not presented in detail. Given the complex aquatic environment within and around the application site, which includes a series of statutory designated sites known to support sensitive and protected species, the baseline should be clearly established prior to the design of mitigation to ensure that measures proposed will be effective. Furthermore, detailed design of mitigation which shows the full nature and extent of works proposed should also be presented so as to determine the extent and nature of the mitigation works proposed as this may lead to additional effects; for example the locations of and scale of settlement lagoons is not presented. Poorly located lagoons could lead to further impacts on habitats or aquatic habitat and species which have not been addressed in the EIS. As the efficacy of the mitigation strategy is not adequately demonstrated.
- 5.4.63 The EIS and outline CEMP provide insufficient detail on the treatment of alien invasive species. The applicant has however, provided clarity on mitigation measures to be implemented for all invasive flora and providing a suitable condition for an Invasive Species Control Plan (or similar) to be in place prior to the commencement of construction works, this matter may be adequately addressed.
- 5.4.64 Overall, it is likely that adequate mitigation for aquatic ecology is achievable; however the effectiveness of this has not been adequately demonstrated as insufficient detail is provided both in terms of baseline data and mitigation measures proposed.

Aquatic Ecology Residual Impacts

- 5.4.65 The EIS states that there will be a '*slight negative*' impact on aquatic ecology (and fisheries) during the construction phase, but this will be reduced to an '*imperceptible negative*' impact with the mitigation measures proposed. Given the uncertainties outlined above, this cannot be verified without additional baseline information and full details of the proposed mitigation measures.
- 5.4.66 No definition of the terms '*slight negative*' or '*imperceptible negative*' is presented in the EIS Chapter 7, which lacks an adequate impact assessment methodology for aquatic ecology. This conclusion is a qualitative view which cannot be verified, particularly given the limited baseline data presented. No evidence or commentary is provided regarding whether a precautionary principle was applied where uncertainty exists. Subsequently there are clear deficiencies in the EIS and, based on the information provided, it is not possible determine the scale of likely impacts on the aquatic environment and associated habitats and species.

Other Taxa

- 5.4.67 Other protected species likely to be present locally and identified in the EIS through desk study included smooth newt, common frog and common lizard. Specific surveys were not undertaken, yet survey methodologies for these species are included in the NRA guidance '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*' (2009 revision), which is referenced in the EIS. These species were considered likely to be present where suitable habitat exists and so a precautionary approach has been adopted, however the assessment of impacts is limited in the absence of accurate baseline data. Given that these species are afforded legislative protection and valued as '*Nationally Important*' in the EIS, an assumption of presence is inadequate for assessment purposes and the EIS is deficient in this respect.
- 5.4.68 The EIS states that a habitat appraisal methodology was designed for marsh fritillary butterflies following consultation and training with Butterfly Conservation Ireland (BCI). Full details of the methodology or survey effort are not presented, although a recording form is presented in Appendix F8 of the EIS and this appears to be appropriate. No marsh fritillary were recorded and limited suitable habitat was identified. This species was nevertheless '*scoped-in*' for assessment, which is considered an appropriately precautionary approach.

5.4.69 The main potential pathways to impacts have been adequately identified in the EIS as:

Construction Phase

- Direct habitat loss;
- Increased disturbance; and,
- Reduced habitat quality.

Decommissioning Phase

- Small-scale habitat loss.

5.4.70 Table 7.73 of the EIS identifies 'Key Ecological receptors' which are then taken forward for assessment. This table includes smooth newt (valued as nationally important), common frog (nationally important), common lizard (nationally important), hedgehog (locally important, higher value) and Irish hare (nationally important). Despite this, none of these species are considered or assessed thereafter in more than a cursory fashion and in this respect the EIS is inadequate.

5.4.71 The EIS acknowledges that common frog and common lizard (along with small mammals) may be directly affected through habitat loss which may occur during construction, though this is considered unlikely to be significant due to "*most of the habitats on site being unsuitable*". This cannot be verified as many of the habitats identified on the site appear to be suitable for amphibians and/or reptiles. These species are afforded protection under Irish legislation, yet the possibility of killing or injuring animals is not addressed.

5.4.72 The EIS acknowledges potential impacts on marsh fritillary butterfly as loss of or damage to habitat, although it is unclear where this habitat is located or the possible extent of damage as the EIS (page 151) also states that there is an "*absence of suitable habitat in close proximity to construction locations no significant impacts are predicted*". The potential for impacts on marsh fritillary habitats and therefore populations is subsequently unclear in the EIS.

Mitigation of Other Taxa

5.4.73 The Applicant states that areas of potentially suitable habitat will be examined by a suitably qualified ecologist for the presence of marsh fritillary butterfly larvae prior to the commencement of works, and that a translocation programme will be undertaken if found. Although the EIS states there are no suitable habitats nearby, it also states that works around sensitive butterfly habitats will be fenced and so is contradictory in this respect. The Applicant proposes that monitoring for the presence of marsh fritillary and control of the contractor's works on site within any identified fritillary sites will be managed by an appointed site ecologist, in direct consultation with the NPWS. This is an appropriate approach.

5.4.74 Landscaping works post-construction are proposed to include the provision of suitable habitats for butterflies in general, including marsh fritillary; however no details are presented by the Applicant and so the extent or likely effectiveness of these measures, compared to the potential for adverse effects, cannot be determined.

5.4.75 Aside from measures embedded within the proposed habitat and pollution control mitigation, mitigation for other taxa classified as key ecological receptors is not detailed in the EIS or subsequent submissions. No measures are included in the EIS or subsequent submission which will mitigate or reduce the potential for impacts on the other taxa identified (e.g. reptiles or amphibians), even where these species are afforded legislative protection.

5.4.76 Overall, the mitigation measures proposed for other taxa are unclear and inadequate.

Residual Effects (Other Taxa)

- 5.4.77 Residual effects are assessed in the EIS as ‘*not significant*’. Too little supporting evidence is presented to objectively verify this. The EIS and subsequent submissions fail to provide a transparent and coherent assessment of the potential for significant effects on other taxa identified earlier in the EIS as *key ecological receptors* and in this respect the submission is deficient.

5.5 Cumulative Effects

- 5.5.1 In Chapter 7 of the EIS, the Applicant correctly defines cumulative effects as cases where “*collectively effects may be significant and potentially greater than the sum of the individual parts acting alone*”. It is acknowledged that assessment of cumulative effects is difficult and typically there are substantial areas of uncertainty; however these should be clearly stated and a precautionary approach adopted.
- 5.5.2 The EIS considers cumulative effects during the construction, operation and decommissioning phases. The Applicant has listed other types of plans or projects within the vicinity of the Maighne wind farm which could, cumulatively, lead to significant effects on the identified ecological receptors. These include mineral extraction, built development, telecommunications masts, forestry, road schemes, recreational pressure and existing land pressures. The EIS states that planning searches were carried out on the relevant planning authority webpages, but the only results presented are from other wind farms within 15km of the Maighne site. It is subsequently unclear whether other developments were identified and considered or not, and so it is not possible to determine whether the EIS fully considered cumulative effects beyond other wind farms.
- 5.5.3 The EIS states that the listed wind farms will not lead to significant cumulative effects in terms of statutory designated sites given that they are located within different water catchment areas to the Maighne wind farm; this is a reasonable conclusion supported by consultee responses.
- 5.5.4 For other ecological receptors, cumulative effects are discussed in broad terms, rather than with specific reference to other plans or projects. Subsequently the potential for cumulative effects has not been quantified and it is not possible to determine where impacts may be significant or otherwise. In this respect the EIS is lacking detail and is deficient.
- 5.5.5 The EIS does not consider the ‘in-combination’ effects of the 5 clusters which together comprise the proposed development. Whilst it is acknowledged there is no planning requirement to do so, it is reasonable to expect the EIS to include an in-combination assessment of these physically separate development areas. This approach would have allowed a comparison between individual locations and provided a more accurate and comprehensive assessment.

5.6 Summary on the Adequacy of the EIS

- 5.6.1 The EIS concludes that the residual impacts upon the identified ecological receptors, with implemented mitigation measures, will be low (or negligible) and not significant; however in many areas the EIS does not provide a transparent and reasoned pathway which allows this conclusion to be independently tested or verified. The impact assessment process outlined in the methodology has not been accurately followed and inconsistent or undefined terminology is used throughout. In this respect the EIS is deficient.
- 5.6.2 Whilst the Applicant has undertaken desk studies and some baseline surveys, these are not comprehensive and generally lack detail, providing a broad qualitative overview rather than a detailed understanding of the application site and surrounding environs. Baseline information detailed in the EIS and Appendices is limited and lacks clarity in presentation. These deficiencies undermine the impact assessment process and the conclusions of the Applicant’s EIS.

- 5.6.3 The EIS fails to provide a clear and transparent assessment of the likely impacts arising from the development and frequently does not follow its own or referenced methodologies. Whilst the identified pathways for impact are appropriate, the extent or magnitude of impacts has not been considered or presented in a consistent and verifiable manner. It is acknowledged that uncertainty often exists and this is an acceptable part of the EIA process; however such uncertainties should be acknowledged and a precautionary approach applied. In this respect the ES is deficient.
- 5.6.4 The Applicant's proposed mitigation measures include inherent design, pollution controls and habitat creation / re-instatement. These are probably reasonable; however the assessment again fails to quantify or accurately detail potential impacts and there is limited detail provided on the mitigation measures proposed. Subsequently it is not sufficiently demonstrated that the proposed mitigation and habitat management measures are appropriate, or will be effective, in relation to the possible nature, scale or duration of effects on habitat and species.
- 5.6.5 A number of minor inadequacies have been identified which do not materially undermine the conclusions drawn in the EIS. However key potential adverse impacts which are inadequately assessed and therefore of most concern relate to: populations and individuals European and Nationally Protected Species, and direct and indirect effects on the aquatic environment during construction.
- 5.6.6 No indication is given as to the level of certainty that exists around the assessment conclusions (confidence levels), yet in a number of instances, the supporting evidence is very limited. The EIS does not acknowledge uncertainty in its conclusions, which is potentially misleading and deficient in this respect.
- 5.6.7 For the EIS to conform to EIA, as set out in the EIA Directives, national regulations and relevant guidance, it should include:
- A clearly defined assessment methodology which is followed consistently throughout.
 - A clear audit trail of consultation and how this was considered in the assessment process.
 - Clarification of survey methods and effort. This should include clear definitions of study areas and demonstrate how relevant guidance has been followed. Justification for the scope any deviations from standard methodologies should be provided, along with details of any limitations.
 - Impacts should be quantified wherever possible. Qualitative assessments should be underpinned as far as possible by the most recently available scientific research and literature as well as by professional judgement and reasoned argument.
 - The EIS should demonstrate how the application conforms to relevant national and local policy and how corresponding legislation has been considered.
 - Full details of all mitigation, compensation and enhancement measures should be quantified and presented in the EIS.
 - Residual significance should be described for all receptors, including clear description of the confidence levels assigned to any conclusions.
 - The cumulative assessment should clearly present information on other plans or projects within a specified zone of influence and quantify likely impacts as far as possible.

6 RISKS TO ANNEX 1 AND RED LISTED BIRDS

6.1.1 Species considered relevant to this assessment are defined as those listed on:

- Annex I of EC Directive 2009/147/EC on the Conservation of Wild Birds ('the Birds Directive'); or,
- '*Birds of Conservation Concern in Ireland 2014–2019*^{xvi}

6.2 Potential Impacts

6.2.1 Wind farms present three main potential risks to birds, which are broadly identified within the EIS:

- Direct habitat loss – through construction of wind farm infrastructure;
- Disturbance/displacement (indirect habitat loss) – as a result of increased disturbance and/or decreased suitability of habitats, or if the wind farm results in a barrier to flightpaths; and,
- Collision risk – resulting in death or injury through collision or interaction with turbine blades and other infrastructure.

6.2.2 Displacement is likely to occur in three phases – construction, operation and decommissioning phase. The first and last occur over a relatively short period, whilst the operational phase is likely to occur over the lifetime of the development.

6.3 Assessment Methodology

6.3.1 The EIS details an assessment methodology for avifauna with consideration to relevant industry guidelines citing SNH (2010^{xvii}, 2012^{xviii} and 2014^{xix}) Percival (2007^{xx}) and additional literature concerning the impacts of wind farms upon birds, in order to identify and evaluate sensitive ornithological features.

6.3.2 The variation in terminology used in the EIS such as 'in consideration', 'been considered', 'takes account of', 'followed', 'has also been utilised' is noted with reference to the use of various guidance documents listed within the EIS. In this respect the EIS is unclear as to the precise methodology followed. In their response to submissions (September 2015), the Applicant clarifies that the methods used to inform the appraisal "are fully compliant with guidance as set out in Section 7.2.1 of the EIS and follow pre-defined methodologies".

6.3.3 Whilst overall the assessment methodology outlined within Sections 7.2.1 and 7.2.5.2 is acceptable, the approach to baseline gathering and presentation of information within the EIS and Appendices undermines the robustness and transparency of the assessment process. This is discussed further below.

6.4 Baseline Information

6.4.1 In order to assess the risks of a proposed wind farm development, detailed knowledge of the distribution and flight activity of extant ornithological features is necessary in order to quantify potential effects upon avifauna. To this end, the avifauna baseline has been informed by a combination of desk study (including consultation with relevant advisory bodies) and field surveys, which comprised the following:

- Winter Walkover Surveys;

- Flight Activity Surveys;
- Countryside Bird Survey;
- Breeding Wader Survey;
- Barn Owl Survey;
- Breeding Merlin Survey;
- Hen Harrier Winter Roost Survey; and,
- Breeding Red Grouse Survey.

6.4.2 The EIS is unclear in that it does not provide a clear presentation of the method used for gathering baseline data. Subsequently there is no clear pathway provided for the identification of target or key species and no justification for the survey effort completed is presented.

Desk Study

6.4.3 The extent of the desk study is poorly detailed and explained within the EIS. Critically, an audit trail of consultation with relevant bodies with regards the rationale for the scope and level of survey effort undertaken, has not been provided.

6.4.4 Effort to obtain existing ornithological records for the site and immediate surrounds appears limited. Whilst some records have been collated (e.g. raptor records), and which may be confidential, such records can still be detailed to an extent within publicly available documents and can be supplied in further detail to the planning inspector via the use of confidential annexes.

6.4.5 Existing ornithological records are inherent in identifying the bird assemblage likely to be present within any study area. In the absence of any existing ornithological records, as is sometimes the case, preliminary walkovers of the study area can be used to provide an overview of the site and hinterland to support sensitive ornithological receptors. The EIS does not clearly present how key species for study were selected.

6.4.6 Efforts to obtain existing quantifiable information on the distribution of whooper swans within the study area; for example in proximity to the Ballynakill Cluster (nearest the River Blackwater and River Boyne, where the species is often present in internationally important numbers⁶) and in proximity to the Derrybrennan and Cloncumber clusters (nearest the Lullymore Heritage Park), may have been undertaken consultation with relevant groups such as the Irish Whooper Swan Study Group and BirdWatch Ireland (for the purposes of obtaining Wetland Bird Survey data). However no evidence of this is presented in the EIS.

6.4.7 Therefore whilst, the identification of “Target Species” for the study area appears to have been undertaken with reference to appropriate guidance from SNH (as referred by the Applicant), updated to reflect the Irish avifauna assemblage (Colhoun & Cummins, 2014), Table 7.1 within the EIS “Target Species identified for Avifauna Surveys” is largely unfounded.

6.4.8 Subsequently significant doubt arises on the suitability of the range and extent of surveys undertaken to allow for a robust assessment to take place.

⁶ As per River Boyne and River Blackwater SAC Site Synopsis: <http://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002299.pdf>

Field Assessment

- 6.4.9 Field assessments to inform wind turbine developments broadly comprise two main survey types:
- Distribution and Abundance Surveys – to quantify the numbers of breeding, wintering and passage birds using a wind farm site and immediate hinterland.
 - Vantage Point (VP) Surveys – to quantify the flight activity of birds at a wind farm site in order to estimate potential collision risk.
- 6.4.10 To this end, the EIS outlines a range of field surveys undertaken, with methodologies detailed within Section 7.2.4.1 of the EIS:
- “Winter season surveys were carried out from December 2012 to March 2014 inclusive. The main components were a winter walkover survey, a flight activity survey and dedicated Hen Harrier and Red Grouse surveys. Breeding season surveys were carried out from April 2013 to August 2013, with additional surveys in April 2014 to June 2014. In addition to best practice methods for surveying birds such as the Countryside Bird Survey (CBS) and breeding wader surveys following established guidance, surveys to address target species such as breeding Barn Owl and Merlin were also implemented following recent best practice guidance in Ireland. All surveys were carried out by competent field ornithologists.”*
- 6.4.11 Whilst the EIS details the methodologies used, the survey effort completed is not clearly presented and it is therefore difficult to accurately understand the scope of surveys or their findings, and thus their reliability to inform the assessment of potential impacts upon ornithological features. Critically the rationale for such a limited geographical and temporal coverage for relevant survey types is absent.
- 6.4.12 The EIS states that the rationale was agreed in consultation with NPWS and Birdwatch Ireland, however full records or a detailed summary of consultations have not been provided to demonstrate this.
- 6.4.13 In the absence of a clear pathway and audit trail to determine target species and the scope of surveys undertaken, field surveys therefore appear disjointed and are not adequately justified.
- 6.4.14 The reliability of baseline information and subsequent assessment is also dependent on the use of appropriate field surveyors. No information is provided on the skills and experience of surveyors used for ornithological surveys within the EIS or within the Applicants Response to Submissions.

Distribution and Abundance Surveys

- 6.4.15 Distribution and abundance surveys undertaken to inform the EIS have comprised:
- Winter Walkover Surveys;
 - Countryside Bird Survey;
 - Breeding Wader Survey;
 - Barn Owl Survey;
 - Breeding Merlin Survey;
 - Hen Harrier Winter Roost Survey; and,
 - Breeding Red Grouse Survey.

Winter Walkover Surveys

- 6.4.16 Winter walkover surveys were undertaken to sample the general winter bird numbers and activity on site. A total of three walked survey visits were made during the core 2012/2013 wintering period defined within the EIS as October to March inclusive.
- 6.4.17 Vantage Point (VP) watches were also incorporated into winter walkover surveys in order to sample levels of flight activity. Whilst this provides useful context, it is not appropriate to use the methodology to quantify flight activity and therefore collision risk (SNH, 2014⁷):
- “Observation time during a distribution survey does not count towards observation time conducted under VP watches: the two methods are not consistent in design or objectives.”*
- 6.4.18 Table 1 of Appendix F provides a list of survey dates and Tables 2 to 8 of the same Appendix provides information on the times of survey visits, weather conditions and the species recorded. Overall survey effort appears limited, but has been appropriately staggered to account for diurnal variation and has included dusk and dawn visits.
- 6.4.19 As such, the methodology used is acceptable in terms of bird usage of the site, but not to assess flight activity (and therefore collision risks).
- 6.4.20 The presentation of information within the associated technical appendix (Appendix F) is difficult to decipher. Sunrise and sunset times have not been included. The presentation of species observations, in its current format, is also difficult to comprehend and provides little statistical representation or quantifiable context of the importance of the study area for the species recorded.
- 6.4.21 The study area is defined within the EIS as the “proposed land folio footprint”. Clarity on the extent of this and whether this conforms to the “Wind Farm Cluster Boundary” is not provided. It is not possible to identify the extent of “subsections” listed within Tables 2 to 8 to identify where species observations were made.
- 6.4.22 The species targeted by this survey are not well-defined and thus comment on the appropriate timing and frequency of surveys cannot be provided. Such surveys would generally target non-breeding raptors and waterbirds, including aggregations of waders and waterfowl, and in accordance with SNH guidance, would be undertaken to identify any important foraging and or roosting sites within at least 500m of the development footprint.
- 6.4.23 As outlined within the EIS *“Some of the grassland areas along the Boyne and Blackwater are used by a nationally important winter flock of whooper swan”*, which lie close to the Ballynakill cluster. Lullymore Heritage Park and its immediate hinterland, which lie close to the clusters of Cloncumber and Derrybrennan is also outlined within the EIS as possibly of some importance to whooper swans.
- 6.4.24 The use and importance of foraging and / or roosting sites can vary substantially over the wintering period and thus a common standard of survey visits includes twice monthly October to March for non-breeding birds in accordance with SNH guidance (2014), as referenced by the Applicant. The level of effort undertaken therefore falls well below this requirement.
- 6.4.25 In the absence of any existing data and habitat screening to clarify the potential for pertinent species such as Annex 1 (whooper swans, hen harrier) to be present within the study area, it is not demonstrated that a precautionary approach to baseline data gathering was adopted.

⁷ SNH (2014) – VP survey must not take place simultaneously with any other fieldwork on the site that may cause disturbance and invalidate the VP survey results.

Flight Activity Surveys

- 6.4.26 Flight activity (or VP) surveys are designed to quantify the level of flight activity by target species, considered susceptible to collision risk with wind farm infrastructure. Its primary purpose is to provide input data for Collision Risk Models, which predict mortalities from collision with wind turbine developments.
- 6.4.27 In accordance with SNH guidance (2014 and previously 2010 applicable at the time of survey and referenced within the EIS), the VP study area should encompass the proposed turbine envelope (if known) or the maximum extent of potential turbine layouts, extended to 500m beyond the outermost turbines. The number and location of vantage points from which to gather flight activity should be chosen with the aim of no point within the study area is greater than 2km from a VP. A recommended forward viewing arc of 180° is also outlined within SNH guidance.
- 6.4.28 The study area for Flight Activity (VP) surveys detailed within the EIS comprised the turbine clusters of Cloncumber and Derrybrennan only, as well as ponds to the south of Derrybrennan including Lullymore Heritage Park (identified as a possible roost for swans). No clear illustration of the extent of the study area for flight activity surveys is provided in the EIS, which makes it difficult to understand the context of the study area in relation to the development. As it is proposed to underground MV and HV cable routes, consideration of the potential collision risk along these components of the development can reasonably be omitted.
- 6.4.29 No justification is provided for the lack of flight activity surveys at the remaining three clusters. It is therefore not possible to fully assess the collision risks to target species resulting from the proposed development as a whole, which substantially undermines subsequent discussions on the likelihood of impacts.
- 6.4.30 The Applicant does outline flight activity information gathered from other surveys, e.g. Winter Walkovers. Whilst this can provide useful context, it is not appropriate to attempt to quantify flight activity levels based on any other method than VP surveys.
- 6.4.31 Flight activity (VP) surveys were restricted to the winter of 2013/2014 and spring passage in April 2014. The Applicant does not define the wintering or spring passage periods, which differ for target species. Surveys during the autumn passage, broadly September to October and coinciding with the arrival of whooper swans into Ireland, have not been undertaken. Whilst this may be reasonable, no justification is presented.
- 6.4.32 For clarity the following survey effort detailed in **Table 6.1** appears to have been completed. Although it should be noted that such information is not easy to extract from the EIS and technical appendix.

Table 6.1: Flight activity survey effort summary

Vantage Point	Winter					Total	Spring Passage	Total
	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14		Apr-14	
Derrybrennan	6 hrs 25 min	10hrs 10 min	6 hrs	6 hrs	12 hrs	40 hrs 35 min	6 hrs	6 hrs
Cloncumber	7hrs 20 min	6 hrs	6hrs 25 min	6 hrs	12 hrs	37 hrs 45 min	6 hrs	6 hrs

- 6.4.33 It is unclear why breeding season flight activity surveys have not been undertaken given the potential for and evidence of sensitive breeding raptors and waders to be present within the study area e.g. merlin and peregrine, which are understood to be present locally.

- 6.4.34 Whilst it is acknowledged that flight heights of wader species such as lapwing are in general below the rotor swept area of most turbine specifications (including that specified), this must still be demonstrated and quantified in order to determine collision risks.
- 6.4.35 The location of VPs and the area of visibility from each VP has not been presented in map form, to show the arc ('viewshed') within which observations were conducted i.e. to demonstrate they are in accordance with SNH guidance to which the Applicant refers. Viewshed figures should also include details of altitudinal cut-off levels to allow the reader to ascertain the coverage of the study area by each VP and whether any lower level flight activity may have been missed.
- 6.4.36 The VP location used to observe the Derrybrennan cluster (N69680 29664) is likely to be sufficient to cover the turbine envelope and 500m buffer for this cluster with regards all likely target species. Whilst it has also been used to provide flight activity of swans in proximity to ponds at Lullymore Heritage Park, extending just over 3km, is in conflict with SNH guidance referred by the Applicant, it is considered reasonable as skilled observer would be able to detect swans at this distance.
- 6.4.37 In contrast, the single VP location used to observe the Cloncumber Cluster (N71545 21732), is likely to be deficient in its ability to cover the turbine envelope and 500m buffer for this cluster with regards detecting all target species. The wind farm cluster alone is approximately 5km in diameter stretching northwest from a point to the southwest of Glenaree to a point north of Ballyteige North. The viewing arc within the rotor swept height band is also likely to be constrained by features including woodland and hedgerows and it is unclear why only a single VP location has been used. If this was agreed through consultation then no evidence is presented in the EIS.
- 6.4.38 For the surveys undertaken, an acceptable level of diurnal distribution has been provided for and this appears to include sunrise and sunset times, however these are not presented in the EIS for verification.
- 6.4.39 The limitations on surveyors being accurately able to determine the precise flight height of flying species in the field without use of specialist equipment is acknowledged within the EIS. The use of specialist equipment is impractical, and hence the use of height bands, within which skilled surveyors should be able to place birds recorded, is standard. Information on the observers' field capabilities and experience is not been provided in the EIS.

Countryside Bird Survey

- 6.4.40 The methodology outlined within the EIS is based on the British Trust for Ornithology (BTO) 'Breeding Bird Survey' (BBS) technique, a suitable technique for characterising the general breeding bird assemblage within a pre-defined study area.
- 6.4.41 Two visits were made to the study area at appropriate times, consistent with the methodology followed. The study area defined within the EIS comprised a total of seven no. 1km squares which were selected and centred on different habitats present within the survey areas, as illustrated in Figure 7.5 of the EIS. From this it appears only a sample of the Application site was surveyed, introducing the possibility of key species being missed and with the rationale not explained.
- 6.4.42 Whilst surveys of farmland passerines (small perching birds) are generally not required to inform an impact assessment on onshore wind farms (again in accordance with the SNH guidance referred by the Applicant), there is no rationale presented as to how sample areas were selected.

Breeding Wader Survey

- 6.4.43 The methodology outlined within the EIS is based on a combination of methodologies from recognised published literature and best practice guidance, in order to estimate numbers of target species within a defined study area.

- 6.4.44 The Brown and Shepherd methodology (1993) followed is generally the recommended survey methodology for surveying breeding moorland and open country species including waders, red grouse and wildfowl species and is also in accordance with the SNH 2014 guidance, as referred. The methodology followed is broadly applicable to the study area and likely target species. Target species for survey are defined by the Applicant as: lapwing, snipe, redshank, curlew, common sandpiper, woodcock and ringed plover.
- 6.4.45 The study area defined within the EIS comprised a 500m envelope around each proposed turbine location, for all clusters. This does not include MV and HV routes (subsequently amended) and does not include full coverage of proposed access tracks.

Barn Owl Survey

- 6.4.46 The methodology outlined within the EIS was designed in conjunction with Dr. John Lusby of Birdwatch Ireland, a recognised expert in the field. Copies of consultations are however, not provided for context.
- 6.4.47 The survey was undertaken to record the species presence/absence within the site and surrounding area and to provide a comparable baseline on the relative percentage occupancy of suitable sites in order to allow a comparison with known densities in other areas.
- 6.4.48 The study area is defined within the EIS as 1.5km around the proposed turbine locations, which is considered sufficient in the context of meeting the objectives for which the study was proposed. With the exception of the potential for disturbance and low levels of habitat loss, barn owls are generally not considered sensitive to wind turbine developments in terms of collision risk (e.g. Barn Owl Trust, 2015⁸).

Breeding Merlin Survey

- 6.4.49 The methodology outlined within the EIS was designed in conjunction with NPWS and Dr. John Lusby of Birdwatch Ireland, a recognised expert in the field. Copies of consultations are however, not provided for context.
- 6.4.50 The study area centred on suitable habitats, which were identified from the results of national surveys. No information is provided on the presence and/or lack of suitable habitats elsewhere within the site or hinterlands and the local status of breeding merlin is therefore unclear.

Hen Harrier Winter Roost Survey

- 6.4.51 The methodology outlined within the EIS is based on locally applicable and best practice guidance for undertaking Hen Harrier Winter Roost Surveys in Ireland. The survey focussed on two known roost locations (Roost A and Roost B) within the hinterland of the Derrybrennan Cluster as provided by Dr Barry O'Donnoghue (NPWS), a recognised expert in the field. Copies of consultations are again not provided. The roost locations presented in the EIS are:
- Roost A is located c.5km from the Derrybrennan cluster; and,
 - Roost B located 6-10km from the Derrybrennan cluster.
- 6.4.52 A considerable amount of effort appears to have been undertaken with regards identifying the use of these known roosts by the Annex I species however, little information is provided on the potential for cluster sites, or MV and HV routes, to support suitable roosting habitats for the hen harriers.

⁸ Barn Owl Trust (2015) Wind Turbine Position Statement. Barn Owl Trust.

- 6.4.53 Flight activity recorded for the species during winter VP watches at Derrybrennan is summarised in Table 7.36 of the ES, with all flight activity recorded below 50m as is typical for the species low level quartering habit. There is however some confusion within the EIS at page 69, with regards flight activity being recorded below <20m – it is unclear from the data presented where this is confirmed. Flight bands used comprise <50m, 50-170m, >170m which correspond to the likely turbine parameters: rotor diameter of 120m, hub height of 109m, tip height of 169m.
- 6.4.54 Flight activity recorded during Hen Harrier Roost Watches (roosts A and B) is summarised in Table 7.37. Whilst suitable for validation purposes of the species typical flight height, such data should not be used to quantify potential collision risks for the species as a result of the proposed development, particularly as this was not recorded within the Application site itself.
- 6.4.55 Without clarity on the location of the roost locations and the study area covered in the context of the development, it is unclear how information obtained is applicable to the assessment of potential effects upon this species.

Breeding Red Grouse Survey

- 6.4.56 The methodology outlined within the EIS is based on locally applicable and best practice guidance with regards to red grouse surveys in Ireland. Surveys utilising tape luring were undertaken under licence.
- 6.4.57 Surveys were undertaken at only two of the turbine clusters: Windmill and Drehid-Hortland. The study area is not further defined and no context is provided on the suitability of habitats elsewhere within the development site, although it is acknowledged that these are likely to be unsuitable for red grouse, this has not been demonstrated.

6.5 Use of Baseline Data for Assessment Purposes

- 6.5.1 The EIS presents the avifauna baseline separately for each cluster. Whilst this approach does provide some clarity in terms of the difference of ornithological sensitivities across the site, it does not provide a clear overview of the importance of the site and its immediate hinterland for avifauna as a whole.
- 6.5.2 In their response to submissions (September 2015, page 113) the Applicant outlines that “*No additional bird surveys are required to complete the impact appraisal*”. However, in the absence of a clear rationale for the range and extent of baseline gathering, there remains considerable doubt over the adequacy of such data derived from those surveys undertaken to enable a robust assessment of the potential for effects upon ornithological features.
- 6.5.3 Whilst the list of target species identified is likely to be reasonable (but not exhaustive), the level and coverage of baseline surveys and desk study falls below that recommended in key guidance, and does not allow the importance of ornithological features, upon which effects may occur, to be accurately evaluated.
- 6.5.4 Table 7.7.4 of the EIS evaluates key ornithological features identified during baseline studies and provides a rationale for their evaluation, based on NRA guidance and Percival (2007). The rationale provided does not explain the evaluation methodology presented, which requires the population likely to be affected to be firstly established and then its importance quantified through contextual information about its distribution and abundance e.g. at an international, regional, county level.
- 6.5.5 In the absence of such information being presented, evaluations provided appear to have been based on professional judgment. These may be precautionary in the absence of available information, but cannot be verified.

6.5.6 It is therefore not possible to assess the veracity of the EIS conclusions of species activity levels and abundance across the potential zone of influence, given the survey effort and limitations.

6.6 Evaluation Process

6.6.1 Despite the limitations presented, Table 7.7.4 of the EIS does outline a species-specific evaluation, with all species scoped in for assessment.

6.6.2 The EIS presents the key potential impacts as;

Construction Phase

- Direct Habitat Loss/Change;
- Indirect Disturbance Displacement

Operational Phase

- Direct Collision Risk.
- Indirect Disturbance.
- Indirect Barrier Effect.

6.6.3 These are considered to be reasonable.

6.6.4 The EIS also considers each impact phase cumulatively with other wind farm projects, but does not adequately consider other cumulative effects or the in-combination effects of the five wind turbine clusters together (i.e. the overall effects).

Construction Phase

Direct Habitat Loss/Change

6.6.5 The EIS identifies direct breeding and foraging habitat loss resulting from the construction of the development. Whilst the EIS considers the impact of habitat loss for each species separately, and a level of magnitude and overall impact significance is stated for each species separately, the rationale for the assignment of magnitude in accordance with the assessment methodology presented is poorly demonstrated and is inconsistent between species.

6.6.6 The EIS does not provide any clear distinction between those habitat losses likely to be temporary, short-term or long term, as required under the assessment methodology. Whilst much direct habitat loss resulting from disturbance during the construction phase would reasonably be expected to be no more than short term, providing reinstatement of temporary construction compounds and MV and HV line trenches is included, no consideration is given to long-term habitat losses as the wind farm infrastructure remains in place nor that arising from replanting areas should these be located in areas of notable importance for ground nesting species or species sensitive to afforestation in particular. Overall, whilst long term habitat loss is likely to be small, no quantification of this is directly provided for avifauna or impacts upon individual species afforded sufficient consideration.

6.6.7 Magnitudes of habitat loss are stated within the EIS in relation to key species as follows:

- Negligible - whooper swan, golden plover, kingfisher, peregrine, curlew.
- Low - hen harrier.

- Medium - merlin, lapwing, woodcock, yellowhammer.
- High - snipe, woodcock (if birds are breeding at substation location), barn owl (if birds are nesting in mature trees that require removal), buzzard, kestrel (should nest site loss occur), whinchat.

6.6.8 The assignment of habitat loss magnitude in all cases is poorly justified, being limited to discussion on the availability of comparable habitats within the surrounding area and upon which no context is provided. No quantifiable habitat loss is presented for any species in terms of their dependency or use of affected habitats.

Indirect Disturbance Displacement

6.6.9 The EIS identifies sources of disturbance and displacement resulting from the construction of the development and provides an appropriate level of context as to how they may arise.

6.6.10 The EIS again considers the effects for each species separately, with a level of magnitude and overall impact significance assigned.

6.6.11 The rationale presented within Table 7.77 for the assignment of magnitude is again qualitative and not quantitative. Whilst a range of supportive literature has been referenced, the EIS fails to assess magnitude against relevant baseline conditions which have not been robustly identified.

6.6.12 Whilst it is reasonable to conclude that such impacts would result only for the duration of the construction period and therefore be temporary, this is not explained.

6.6.13 Magnitudes of disturbance displacement are stated within the EIS as follows:

- Negligible - whooper swan, golden plover, peregrine.
- Low – lapwing, barn owl (should birds be nesting in e.g. a mature tree adjacent to works) hen harrier.
- Medium - kingfisher, merlin, lapwing, yellowhammer, whinchat.
- High – snipe (based on literature), curlew (should disturbance occur), woodcock (if birds are breeding at turbine locations), buzzard (should a nest site be located close to works), kestrel (should nest site loss occur).

6.6.14 The assignment of disturbance magnitude in all cases is poorly justified, being limited to qualitative discussion on the habituation of birds to disturbance, providing no quantifiable extent of the scale (e.g. time of year) of disturbance likely to result for any species.

Potential Cumulative Impacts

6.6.15 The EIS considers cumulative impacts primarily as a result of habitat loss for key species. It is acknowledged that the quantification of cumulative disturbance (effectively indirect habitat loss) is difficult to quantify; however some explanation of the variability of effects depending upon timing of works could be expected.

Operational Phase

Direct Collision Risk

6.6.16 Overall the EIS demonstrates a reasonable understanding of the context of collision risks to avifauna during the operational phase, broadly identifying the range of factors which can contribute to an

increase or decrease in a species' potential for collision including flight heights, vision and manoeuvrability. Relevant literature is cited to support this.

- 6.6.17 The EIS also provides an appropriate level of species-specific information on the potential for collision risk, obtained from peer-reviewed literature but, due to the limitations of baseline surveys, cannot apply an adequate level of transferable information on target species flight activity across the development to support its conclusions of 'no significance'.
- 6.6.18 Baseline surveys have not allowed for the identification of the perceived collision risk across the development site as a whole, nor attempted to clearly quantify collision risk in any way, in order to underpin professional judgement.
- 6.6.19 Magnitudes of disturbance displacement are stated within the EIS as follows:
- Negligible – whooper swan, kingfisher, yellowhammer, whinchat.
 - Low – golden plover (based on numbers recorded from site), peregrine, merlin, snipe, kestrel (should occur).
 - Medium - lapwing, curlew, barn owl (on a precautionary basis), buzzard (assessed as medium to high), kestrel.
 - High – woodcock (should collision occur).
- 6.6.20 In the absence of sufficient baseline information on flight activity for these target species, the assignment of magnitude has been primarily based on cited evidence for species collisions and typical flight heights available from literature, along with observations made during Flight Activity and distribution surveys (not VP surveys). Critically, the EIS fails to adequately determine magnitude of collision risk, based on the level of flight activity likely to occur within the rotor swept envelope of each turbine cluster.

Indirect Disturbance

- 6.6.21 Disturbance during the operational phase may reasonably be concluded as being restricted to the potential avoidance of the operational turbines, for which habituation of certain species has been documented and exemplified within the EIS.
- 6.6.22 The EIS considers the potential for effects upon each species separately, and provides relevant supporting literature to demonstrate the extent of likely effects. However, the lack of survey coverage (geographically and temporally) for some survey techniques does not allow for a robust assessment of the numbers of birds likely to be displaced.

Indirect Barrier Effect

- 6.6.23 In the absence of sufficient baseline information on flight activity for target species (whilst unlikely to be significant in the context of cluster size and spread), the EIS does not allow for a robust conclusion on the potential magnitude of barrier effects.

Potential Cumulative Impacts

- 6.6.24 The EIS considers cumulative impacts primarily as a result of collision risk mortality, disturbance/displacement and barrier effects.
- 6.6.25 The EIS only considers the potential for cumulative collision risk effects for whooper swans. Although the potential for collision risks have been considered for additional species, no explanation is provided as to why other species have not been considered in terms of cumulative collision risks.

- 6.6.26 The EIS screens out potential in-combination collision risk effects for whooper swans based on the low levels of numbers of birds using the study area and the high avoidance rates of wind farms by the species. Given the limitations of the baseline data set, this conclusion is unsubstantiated.
- 6.6.27 The EIS considers cumulative barrier effects in relation to migrating swans and geese, with whooper swans used as an example. Given the nature of barrier effects and the proximity of the development to other wind turbine developments considered, this assumption is reasonable. The conclusion of negligible cumulative barrier effects has not however been substantiated by clarity on discussion of flight activity at the wind farms considered or by baseline survey data.
- 6.6.28 The EIS considers cumulative disturbance/displacement effects in relation to swans and golden plover only, and concludes there will be negligible long term cumulative disturbance impacts for other species. This is unsupported and no discussion on the predicted for displacement of key species at the other wind turbine developments considered is given. Whilst it is acknowledged that habituation for some species may occur over time, it is unclear why a precautionary approach has not been adopted.
- 6.6.29 It is acknowledged that the extent of cumulative disturbance (effectively indirect habitat loss) is difficult to quantify fully, however a precautionary approach could have been presented based on literature cited by the Applicant (e.g. for curlew and golden plover).

Decommissioning

- 6.6.30 Potential impacts to avifauna during the decommissioning phase of the development are detailed within Section 7.5.5 of the EIS.
- 6.6.31 The EIS predicts that there will be no direct impacts upon the majority of key receptors identified, Exceptions include for kestrel, yellowhammer, buzzard and barn owl where the loss of nest sites may arise through tree and hedgerow removal to facilitate decommissioning works.
- 6.6.32 Indirect impacts as a result of disturbance/displacement and pollution are also considered for all identified receptors within Section 7.5.5.2 of the EIS. In consideration of the likely scale of the proposed works the assessment concluding no significant effects appears reasonable.
- 6.6.33 Section 7.5.5 of the EIS does not account for the potential change in the abundance or distribution of species over the lifetime of the development. Whilst difficult to predict, this limitation to the assessment should be highlighted and a precautionary approach adopted based on a most likely scenario as the EIA Directive does require consideration of the future baseline.
- 6.6.34 Similarly, the EIS states that the magnitude, and therefore significance of decommissioning phase impacts, would not be expected to equate to anything above those during the construction phase of the development and are unlikely to be significant. This is reasonable; however any limitations on this prediction are not identified.

Cumulative

- 6.6.35 Cumulative decommissioning impacts are acknowledged as difficult to predict. However given the nature of expected works, it would however be reasonable to conclude and agree with the EIS that these would not be significant.

Overall

- 6.6.36 The level of baseline data collated to inform an assessment of effects upon ornithological features falls significantly below that recommended in key guidance referenced by the Applicant (e.g. SNH, 2014). In addition, whilst it is acknowledged there is no standard for the way in which baseline data is presented within an ecological report, guidance such as Annex 2 of SNH (2014) and CIEEM

(updated December 2015⁹) being open to interpretation, the presentation of baseline data within this EIS does not allow the reader to readily understand the information presented.

6.6.37 Subsequently it is not possible to assess the veracity of the EIS conclusions of the abundance and activity level of ornithological features which may vary across the site, given the limitations of the survey effort and geographical coverage.

6.6.38 If a more precautionary approach to data gathering had been used, this would have allowed a more quantified and transparent baseline assessment, allowing comparisons between turbines, turbine clusters and other developments to take place.

6.7 Efficacy of Bird Mitigation Measures Proposed

6.7.1 Specific mitigation measures for avifauna are detailed within Section 7.6 of the EIS for the Construction (Section 7.6.1.5), Operational (Section 7.6.2.4) and Decommissioning Phase (Section 7.6.3).

6.7.2 Mitigation by Avoidance and Design (i.e. inherent or intrinsic measures) has also been outlined for avifauna in Section 7.5.2 and broadly includes the following:

- Larger turbines have been utilised to minimise the total rotor envelope of the proposed development.
- Internal road design has avoided hedgerow removal wherever possible.
- All cabling for the project is to be placed underground.
- The movement of a road at Ballynakill to avoid a sand martin colony.
- The dropping of two turbines at Derrybrennan to avoid impacts on breeding lapwing
- The movement of a turbine at Derrybrennan to avoid the possibility of flight risk to whooper swans potentially roosting at Lullymore
- The movement of a turbine at Drehid Hortland to avoid impacts on breeding merlin.

6.7.3 In general measures to avoid habitat losses, where possible, for faunal species should always be considered in line with local policy. The principal of measures included would therefore appear reasonable however, the impacts avoided and so effectiveness of these measures is not fully quantified.

6.7.4 It is unclear what the level of collision risk to target species and extent of breeding territory displacement the development will pose, and therefore the efficacy of these measures cannot be determined. Because the EIS has not adequately addressed potential collision or displacement risks, it cannot be determined whether or not the proposed mitigation is adequate or proportionate to the likely effects.

Construction

6.7.5 The EIS states that removal and clearance of any vegetation likely to hold high numbers of nesting birds to take place outside of the bird breeding season (i.e. not during the period of March to August inclusive), where possible. Whilst the potential for ground nesting lapwing and snipe has been

⁹ CIEEM (2015) Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester

considered to some extent, the EIS in large restricts mitigation measures to hedgerow and scrub removal and trimming, and neglects reference to additional ground nesting species which have the potential to occur within habitats of the wider development footprint (including access tracks and other infrastructure).

- 6.7.6 Although this measure is presented as best practice, it is mandatory to avoid offences under national legislation and ensure the construction of the development is lawful. With the exception of those species listed on the Third Schedule - all wild birds, nest, eggs and nestlings are fully protected under law in Ireland under the Wildlife Act (1976) as amended 2000. It is also an offence under the Act to wilfully disturb a wild bird on or near a nest containing eggs or unflown young.
- 6.7.7 It is therefore unclear how the Applicant intends to fully address legal compliance with regards the presence of nesting birds within the entire development footprint, should clearance and construction works be undertaken during the nesting bird season. It should also be noted that the nesting season for yellowhammer (Red-listed), recorded within the study area and for which habitat loss is predicted to occur, continues into September and consideration of this has not been given within the EIS, but could be readily addressed in the CEMP.
- 6.7.8 Whilst the presence of nesting birds need not prevent construction works from taking place during the breeding season, sufficient clarity is required on how an offence and therefore impacts upon breeding birds will be avoided.
- 6.7.9 Pollution prevention measures are outlined to protect the wider terrestrial and water environment. Where implemented correctly these would serve to minimise any pollution related impacts to bird species (including kingfisher).

Operation

- 6.7.10 Operational mitigation measures detailed within the EIS include the installation of bird diverters on the proposed meteorological mast guy wires (i.e. line marking), which is in line with recommended best practice guidance to minimise collision risks for avifauna with the structure.
- 6.7.11 The requirement for line marking is generally assessed on a site-by-site basis, and need not be undertaken where there are no 'at risk' species on the site concerned. Survey work is normally used to determine the bird populations on site and their likely sensitivity. In this case the inclusion of such mitigation on the meteorological mast proposed at the Drehid Hortland cluster (at which no flight activity surveys were undertaken) has not been justified but is considered to be a suitable precautionary approach.
- 6.7.12 Whilst the mitigation will likely be effective in minimising any likely collision risks associated with the structures, no consideration has been given to the suitability of alternative mitigation strategies. Monitoring of the efficacy of the measure, as proposed within the EIS, should not be undertaken for the purposes of overcoming inadequate justification of its requirement e.g. through baseline surveys.
- 6.7.13 The EIS proposed monitoring of the operational effects of the development including:
- Fatality Monitoring;
 - Flight Activity Survey;
 - Monthly Wildfowl Census; and,
 - Breeding Wader Survey.

- 6.7.14 However, there is little information presented on how the monitoring data will be reported or subsequently utilised if adverse impacts are identified.
- 6.7.15 Whilst appearing broadly in line with similar programmes implemented elsewhere, it is unclear which parts of the development the monitoring programme will cover and how it will robustly assess the efficacy of the EIS predictions. For example it is unclear how the findings of flight activity monitoring can be compared to baseline levels of flight activity, when this is absent for much of the development site.
- 6.7.16 Overall, however, monitoring of this type is typical for a wind farm and the Applicant has outlined standard methods; however the precise scope of works and their value for improving mitigation (where required) or for use in future decisions is unclear. Subsequently the monitoring objectives have not been defined by the Applicant.

Decommissioning

- 6.7.17 Decommissioning measures detailed within the EIS lack substance and coherency, and again appear to be an afterthought.
- 6.7.18 No consideration has been provided for the potential for effects upon nesting birds with regards offences under national legislation.

6.8 Conclusions in Relation to Risks to Annex 1 and Red-listed Bird Species

- 6.8.1 The EIS concludes that the residual impacts upon whooper swan and general bird assemblage, with implemented mitigation measures, will be negligible; however the EIS does not provide a transparent and reasoned pathway which allows this conclusion to be independently tested or verified.
- 6.8.2 Most importantly, the value of the development site and surrounding areas for ornithological features has not been adequately surveyed or quantified to allow a confident evaluation of impacts to be completed. Baseline information on the number and distribution of sensitive ornithological features and the level of flight activity within the development site is deficient and so the full extent of potential impacts posed by the development as a whole cannot be robustly determined.
- 6.8.3 The outline of mitigation measures presented within the EIS and subsequent clarifications for avifauna including inherent design, pre-construction surveys for nesting birds and an operational monitoring strategy is acknowledged. Additional mitigation measures, which shall be considered in the event that monitoring results, contradict the conclusions of the EIS also presented by the Applicant. No clear mechanism for enforcement or independent verification is proposed by the Applicant and so it remains unclear as to how and when any additional measures would be triggered and applied. Such surveys and monitoring should not be used to supplement inadequate baseline information within the initial assessment, as appears to be the case here.
- 6.8.4 The deficiencies within the EIS, particularly with regards to data gathering cannot easily be overcome without the need for further and more extensive survey work by the Applicant in clear accordance with applicable guidance.

7 RISKS TO BATS

7.1.1 Bats are protected under the Wildlife Act 1976 and subsequent amendments and the EU Habitats Directive (92/43/EEC). The lesser horseshoe bat which is found in the Republic of Ireland only is listed in Annex II of the EU Habitats Directive, while all bat species are listed in Annex IV of the same Directive.

7.2 Potential Impacts

7.2.1 It is generally agreed that potential impacts on bats from wind farms can arise from:

- Loss of habitat, including roosting and foraging sites, or through fragmentation.
- Death through interaction with the wind turbines, either through collision or barotrauma (injuries caused by rapid changes in air pressure around the rotating turbine blades).

7.2.2 The EIS correctly identifies these potential impacts. The EIS also identified additional construction-related impacts may occur due to offsite widening of road carriageways to allow access, which will involve tree and hedgerow removal and so may affect bats. Existing bridges and culverts, which may be in use by bats, may also require strengthening to cope with increased loads during turbine delivery.

7.3 Assessment Methodology

7.3.1 The EIS presents a methodology for assessment (as previously outlined in Section 4), however this process was not consistently followed for bats and no information on the magnitude of effects or statement of significance are provided. The bat baseline was informed by a combination of desk study (records search) and field surveys, which comprised seasonal activity surveys, a habitat appraisal and inspection of possible bat roost structures.

7.4 Baseline Information

7.4.1 Baseline data was collected on behalf of the Applicant by Mr. Conor Kelleher, a recognised bat expert. Details are presented in Mr Kelleher's report (Appendix F6 of the EIS). A total of 21 nights of activity survey were completed using automated recording of bat calls, although it is unclear how this time was distributed between seasons and whether a full 21 nights of recording was completed at each of the 47 proposed turbine locations. A bat habitat appraisal was also completed. The study areas used are not clearly defined or illustrated.

7.4.2 Walked 'transects' through bat favourable habitats were completed in each of the proposed wind farm clusters, recording bat calls on standard bat recording equipment. Additional surveys of the wider area were completed using driven transects. These surveys are outlined in Appendix F6, however this does not include details of transect locations or of the survey effort completed, and no results are presented. In this respect the Appendix and EIS lack sufficient detail for the reader to comprehend the scope of surveys, or the findings; information on dates/times of surveys, locations of detectors or transect routes or raw survey data (sonograms) is lacking. Subsequently the data cannot be verified or tested. Instead we are reliant solely on the conclusions of the author as to levels and distribution of bat species and activity.

7.4.3 Appendix F6 states that the surveys followed Bat Conservation Trust (BCT) guidance (Hundt, 2012^{xxi}). This is not the case with respect to level of survey effort; the BCT guidance advocates monthly surveys (April to October), walked transects and additional bat detectors placed away from the proposed turbine locations (to determine bat activity in the wider area). Chapter 7 of the EIS and Appendix F6 do not contain details of the walked transects. No bat detectors were placed away from

the proposed turbine locations and surveys were completed on a seasonal (not monthly) basis. Subsequently survey effort appears to be below that recommended in the BCT guidance. Bat Conservation Ireland guidance (2nd edition, 2012^{xxii}) advocates a similar approach to the BCT guidance, although allows increased flexibility in survey design:

“Bat activity surveys should be carried out over several months from March/April to October/November inclusive, during optimum weather conditions... The number of survey nights required per visit will depend on the size of the site, number of proposed turbines etc. It is recommended that a minimum of five months across the active bat season are surveyed.”

On-site bat activity surveys should include a combination of both post emergence activity surveys (from approximately thirty minutes before sunset for a minimum of 120 minutes) and dawn surveys (from a minimum of 90 minutes prior to sunrise). These surveys should determine the approximate numbers and species of bats present within the site, areas used for foraging, commuting routes to and from roosts and any changes in mid to late summer activity levels. The approximate flying height and direction taken by bats should be estimated and detailed if possible”.

- 7.4.4 Whilst Appendix F6 states that walked and driven transects were completed, it is not possible to determine whether the method and effort completed conformed to guidance documents. It therefore appears that the survey effort completed is well below that recommended in key guidance documents. Bat Conservation Ireland guidelines set out the information to be included in a bat report, including date and time of surveys, number of surveyors, weather conditions, etc. Appendix F6 does not include all of these elements. This leads to uncertainty over levels and distribution of bat activity and potentially undermines the subsequent discussion of bat receptors, likelihood of impacts and appropriateness of mitigation.
- 7.4.5 It is pertinent to note there is now increasing evidence that bats may be attracted to wind turbines (e.g. Cryan *et al.*, 2013^{xxiii}) and so activity (or lack of) recorded at the proposed turbine locations cannot be considered as representative of bat activity following installation or to establish the need for mitigation. Bat Conservation Trust Ireland guidance acknowledges this, stating *“There is some evidence that Pipistrelle species have been observed to investigate new landscape structures such as turbine masts and may also be at risk”*.
- 7.4.6 All surveys were completed at ground level. In the EIS and Appendix 6, the Applicant acknowledges that some species (in particular Leisler’s bat) fly above a height which can be detected by recording equipment. No attempt to record bat activity at height was made, although the Appendix 6 states that most flight activity for Leisler’s bats *“can be expected to occur in the mid-region of the species hunting altitude i.e. 40m”*. This statement is not referenced and cannot be verified; it is relevant here as detection distances decrease over distance and so it is likely that bats above approximately 40m would not be recorded using equipment placed on the ground. It is therefore not possible to quantify activity levels for this species within the ‘rotor swept area’ of the turbines using ground-based bat detectors, and Chapter 7 of the EIS is misleading in this respect.
- 7.4.7 Whilst surveys were completed in optimal conditions in 2013, the prolonged preceding winter and high levels of rainfall in 2012 may have suppressed bat populations or activity during that period, as acknowledged in Appendix F6. Hence, the surveys may represent an underestimate of bat activity under more typical conditions. No attempt to factor this into the discussions is included in the Applicant’s submissions and so the EIS is not precautionary in this respect.
- 7.4.8 The habitats in the area of the turbine clusters were evaluated for bats by Mr Kellher. The principal habitats of interest present on or near the (undefined) study areas were considered to be deciduous woodlands, coniferous woodlands and The Boyne, Slate and Blackwater Rivers and their tributaries. Bat interest was considered likely to be concentrated around linear features such as woodlands and rivers. Deciduous woodland was considered to be of higher value than non-native coniferous plantation. Turbine locations, generally in open areas, were considered to be of low value to bats.

This is reasonable and in accordance with typical wind farm application protocols, although species ecology varies and so can only be considered as a broad indication rather than absolute.

- 7.4.9 Activity surveys recorded five species of bat; common pipistrelle, soprano pipistrelle, brown long-eared bat, Leisler's bat and Daubenton's bat. The desk study identified a number of other species present in the wider area around each proposed wind turbine cluster. Subsequently, it is possible that more species occur around the application site than were recorded during field surveys, particularly taking into account the limitations to the surveys described above. The EIS considers all bat species together and in this respect is precautionary.
- 7.4.10 A single bat roost was identified outside the study areas. Information presented in the EIS with regards to bat roost potential of structures along the previously proposed HV and MV cable routes is not considered, as these are no longer included in the application. The EIS does not include an assessment of bat roost potential for features, such as bridges, which may require works to facilitate access along the delivery route (outside the application site), nor is a clear methodology presented for roost inspections. Hence, the potential impacts on bat roosts associated with the ancillary works are not adequately assessed in the EIS.

7.5 Adequacy of Bat Baseline Data for Assessment Purposes

- 7.5.1 It is not possible to assess the veracity of the EIS conclusions of species activity levels, and therefore abundance, given the survey effort and limitations. Activity levels presented cannot be verified and may be misleading. Levels of activity at each of the 47 proposed turbines have been evaluated in the EIS as either 'Low' or 'High' (Table 7.69), however no definitions of these valuations is provided, i.e. what constitutes 'high' or 'low'. This is presumably a professional judgement. The BCT guidance (Hundt, 2012) includes a quantitative 'Bat Activity Index' (BAI), which is calculated by the number of bat 'passes' per hour and allows a consistent appraisal of high and low activity levels, however there is no reference in Appendix F6 to this approach being used. If used, this approach would have provided a more quantified and transparent basis for the analysis and comparison between turbine locations and/or other developments.
- 7.5.2 As such, the bat baseline presented by the Applicant is insufficient for assessment purposes when considered against relevant key guidance.

7.6 Evaluation Process

- 7.6.1 For the purposes of assessment in the EIS, bats were assigned a receptor value of 'National Importance' and, this is appropriate. All species were scoped in for detailed assessment as sensitive ecological receptors. Whilst Chapter 7 of the EIS does not attempt to differentiate likely impacts between bat species, Appendix F6 states that "*only Leisler's bat is of concern as it is a high flier and hence may come into conflict with turbines*". Leisler's bat is a key species due to its behaviour (flying at height over open spaces) which could place it at increased risk of collisions and/or barotraumas; however this is not investigated further in Chapter 7 of the EIS. In this respect the EIS is deficient, particularly as both Chapter 7 and Appendix F6 reference Natural England guidance (Carlin and Mitchell-Jones 2012^{xxiv}), which clearly distinguishes varying risks between bat species (at individual and population levels in the UK).
- 7.6.2 The EIS presents the main potential impacts as;

Construction Phase

- Loss of commuting and foraging habitats;
- Loss of roosts in trees;

- Loss of roosts in bridges/culverts;
- Disturbance from increased human activity; and,
- Potential cumulative impacts through displacement of populations; abandonment of young and, mortality.

Operational Phase

- Death through collision or barotrauma; and,
- Potential cumulative impacts are identified as mortality and a reduction of local populations.

Decommissioning Phase

- Potential impacts similar to construction phase.

7.6.3 The list of potential impacts identified is reasonable.

7.6.4 Direct habitat loss and fragmentation is not adequately considered, although Chapter 2 of the EIS states in Section 2.4.10 that 63ha of tree felling is required for turbines and access tracks, some of which may support bat roosts. It is acknowledged that the majority of clearance will be of non-native plantation forestry; however this is a substantial area of trees which must have at least some value to bats as a foraging and/or roosting resource.

7.6.5 The EIS does not assess the in-combination effects on bats of the five proposed wind turbine clusters, or cumulative effects in combination with other wind farms in the region (as presented in Table 7.80 of the EIS).

7.6.6 Whilst potential impacts and bat receptors have been identified and described, the impact assessment description, relating to likely magnitude, scale, duration etc. as referred to in standard guidance documents including *'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment Department of the Environment, Community and Local Government'* (March 2013) and *'Guidelines on the information to be contained in Environmental Impact Statements, Environmental Protection Agency'* (2002) has not been completed, nor has significance to each potential impact been assigned, and hence the chapter is inadequate in this respect.

7.6.7 Although bats are evaluated as a nationally important receptor, no expression of the magnitude or significance of any construction or operational related effects is presented within the EIS Chapter 7. The EIS identifies collisions and barotrauma as a key impact (Chapter 7, page 159) and cites a lack of relevant Irish research, but this is not evaluated further. Subsequently, with regards to bats, the EIS does not follow its own assessment methodology as set out and the conclusions cannot be verified. The survey scope, methodology and analysis are not sufficiently presented or described to allow any independent review in relation to the conclusions reached.

7.7 Efficacy of Bat Mitigation Measures Proposed

7.7.1 It is likely that the greatest risk to bat individuals or populations arising from the development will be through deaths caused by interaction with the operational wind turbines. The EIS states that inclusion of a 50m bat habitat buffer zone will substantially reduce this risk and this is generally accepted practice. Accurate prediction of collision risk or population-level effects on bats from wind turbines is often not possible as bat populations are poorly understood, however in the EIS considerable uncertainty is created as no attempt to quantify the predicted effects is made and limited field survey information is presented.

- 7.7.2 Mitigation for construction related impacts is considered for each turbine location, based on the proximity to the nearest habitat feature potentially of value to bats, and the adjudged level of bat activity recorded during surveys (Table 7.83, Chapter 7). The Applicant proposes the removal of vegetation nearest to the turbines to ensure a buffer zone of at least 50m (following best practice guidance Carlin and Mitchell-Jones (2012), as referred in the EIS), or survey of veteran trees with bat roost potential (turbines 1, 4, 6 and 10). No mitigation is considered necessary for 22 of the 47 turbines, presumably on the basis that a 50m buffer is already achieved although this is not explicitly set out in the EIS. Individual turbine buffer calculations are not presented and so cannot be checked. As such it cannot be verified the Applicant has correctly applied the 50m best practice buffer guide.
- 7.7.3 The EIS states that any mature broadleaved trees that are to be removed will first be surveyed for bat presence by a suitably experienced specialist. If bats are found, an application for a derogation licence will be made to the National Parks and Wildlife Service to allow its legal removal. This in itself could be said to constitute a potential impact and no attempt to identify possible bat tree roosts has been made. Nevertheless, this approach is widely adopted and considered adequate with regards to tree removal.
- 7.7.4 Other mitigation measures proposed include the retention of mature trees, “where possible” and compensatory measures including hedgerow creation and landscaping, although specific details are not presented. The Applicant’s response dated September 2015 states that “*Final, confirmatory detail on re-instatement of habitats and specific enhancement measures will be provided in the Habitat and Species Management Plan (HSMP) to be included in the final CEMP. Where possible, all removed habitat will be re-instated, with re-instated habitats being enhanced for wildlife through the planting of native species of trees*”. Although it is reasonable to assume that habitat restoration and even increases in extent and/or quality are achievable (aside from the loss of any mature trees), whilst details of the HSMP/CEMP are outstanding it is not possible to determine the effectiveness of the Applicant’s proposed mitigation measures. On that basis of information presented, it is impossible to determine whether the planned habitat restoration can adequately compensate for the loss of 63 ha of forestry and further loss of habitats of local value, as defined by the Applicant.
- 7.7.5 The EIS also includes reference to mitigation for the loss of commuting routes through severance of habitat features, proposed by re-instating linkage ‘where possible’. These are included as recommendations rather than a firm or verifiable commitment and, as such, undermine any value to the impact assessment process.
- 7.7.6 Directional lighting is also recommended, although again details are not presented and no firm commitment has been included by the Applicant.
- 7.7.7 Operational mitigation will comprise maintenance of the buffer zone around each turbine (ensuring vegetation does not establish). No other operational mitigation measures were considered necessary in the EIS, however the Applicant states that should any turbine be relocated so that its blade tip is less than 50m from any hedgerow or treeline, the recommended mitigation measure is to increase the turbine’s ‘cut-in speed’ during the active bat period from April to September in accordance with Arnett et al. (2010). This process is known as ‘curtailment’ and is widely acknowledged to substantially reduce bat fatalities around operational wind turbines.
- 7.7.8 In response to the submission from Kildare County Council, the Applicant subsequently included curtailment of turbines where (undefined) ‘high’ levels of bat activity were recorded. Turbines T11, T34, T42 and T43 will now be curtailed during the hours of darkness for the duration of the months of June and July. Turbine 12 also recorded ‘high’ levels bat activity but has not been included in the reviewed curtailment plan and no explanation for the omission is provided. The cut in speed of these turbines will be adjusted so that the turbine begins turning when the wind is at a higher speed when bats are less likely to be on the wing. Increasing the cut-in speed to 5.5m/s from 30 minutes prior to dusk to 30 minutes after dawn has been shown in studies to protect bats. This further mitigation will reduce the potential risk to bats within 4 of the 5 areas considered to have high levels of bat activity.

- 7.7.9 It should be noted that Leisler's bat activity is not tied to vegetative habitat features as other species generally are; Leisler's frequently over-fly open areas^{xxv}. As such, the inclusion of a 50m bat habitat buffer may not provide adequate mitigation for this species and it could be argued that curtailment of other turbines is required where Leisler's bats are likely to be present. Given the low level of survey effort completed and the resulting uncertainty on activity levels, it is not clearly demonstrated that the proposed mitigation is adequate for this species.
- 7.7.10 Three years of operational fatality monitoring is proposed by the Applicant, to be undertaken in conjunction with bird fatality monitoring. The EIS does not include provision for a change in mitigation strategy should the monitoring identify bat fatalities, however this has subsequently been clarified by the Applicant in their response to submission (September 2015), stating: *"Mitigation measures in respect of the monitoring of Birds and Bats, as outlined in Section 7.6 Mitigation, of the EIS will be implemented in full. If, in the unlikely event that, contrary to the predicted impacts in the EIS, monitoring results show a significant mortality of birds and/or bats, suitable mitigation measures shall be considered for implementation"*. This includes *"curtailment or feathering of turbine blades at specific time periods"*. This provides an appropriate link between monitoring and adjustment of the proposed mitigation, although it is unclear what would constitute 'significant' levels of collision and what would trigger increased mitigation.
- 7.7.11 Checks on newly established planting, bat boxes and bat tubes are also included (although the installation of boxes and tubes is not mentioned in the Chapter or Outline CEMP and subsequent Addendum).
- 7.7.12 Overall the mitigation measures proposed for bats are considered to be weak and deficient. Habitat management and enhancement measures are not accurately described by the Applicant and commitments are limited. This substantially reduces any confidence in the EIS conclusions with regards to impacts on bat species or populations.

7.8 Conclusions in Relation to Risks to Bat Species

- 7.8.1 The EIS states that the residual impact of the proposed development on local bat populations, with implemented mitigation measures, is considered to be 'minor negative' with the favourable conservation status (FCS) of bat species *"unaffected and all species confirmed or expected on or near the study areas are anticipated to persist"*. This conclusion is not supported by the impact assessment process outlined in the EIS, which is largely absent and cannot be verified. In their response to submissions, the Applicant states that *"Potential impacts on bats, including bat roosts are fully appraised in Section 7.5 of the EIS. With the implementation of mitigation measures as specified in Section 7.6 of the EIS, residual impacts on bats (including roosts) are considered to be minor negative."*
- 7.8.2 No definition of the term 'Minor negative' is presented in the Chapter, and the bats section does not follow the process set out in the EIS. This conclusion, lacking adequate supporting data or discussion and evidence, is a qualitative view and again cannot be verified. No evidence or commentary is provided regarding whether a precautionary principle was applied where uncertainty exists, such as through lack of research data on Irish bats or lack of survey evidence. Subsequently there are clear deficiencies in the EIS process and based on the information provided it is not possible to determine the scale of likely effects on bats or their significance in terms of local populations. The difficulty in quantifying impacts on bat populations is acknowledged and this is a common issue with wind energy applications. As a result, it is often left to the implementation of robust and precautionary mitigation to ensure that the overall effects of collisions and barotraumas do not impact bats to a population level.
- 7.8.3 Further submissions by the Applicant have improved clarity with regards to mitigation with regards to curtailment and this now appears reasonable. However habitat mitigation measures remain unclear. With the full implementation of the proposed mitigation, including further turbine

curtailment (should monitoring identify agreed high levels of bat mortality) and delivery of an overall habitat gain through the final HSMP/CEMP, it is reasonable to conclude that adequate mitigation could be achieved, but this is not adequately demonstrated in the EIS or through their further submissions.

7.8.4 In summary, regardless of the ultimate mitigation strategy adopted, the EIS and subsequent submissions do not provide a transparent and coherent assessment of the potential for significant impacts on bats and in this respect the submission is clearly deficient as fundamental information is omitted.

ENDNOTES

ⁱ Birds of Conservation Concern in Ireland 2014–2019 (2013) Irish Birds 9 (2013). <http://www.birdwatchireland.ie/LinkClick.aspx?fileticket=EjODk32LNcU%3D&tabid=178>

ⁱⁱ European Commission (2001) Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE. ISBN 92-828-9048-1

ⁱⁱⁱ European Commission (2002) Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC ISBN 92-828-1818-7

^{iv} Scottish Natural Heritage (2013) 'Assessing Connectivity with Special Protection Areas' (SPAs). Available at <http://www.snh.gov.uk/docs/A994842.pdf> [accessed May 2016]

^v Drewitt, Allan L. and Longston Rowena H. W. (2006) 'Assessing the impacts of wind farms on birds'. Ibis 148, 29-42.

^{vi} National Roads Authority. Guidelines for Assessment of Ecological Impacts of National Road Schemes. Dublin: National Roads Authority, 2009

^{vii} Department of the Environment, Community and Local Government (2013) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.

^{viii} Environmental Protection Agency (2002) Guidelines on the information to be contained in Environmental Impact Statements.

^{ix} National Roads Authority Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes.

^x National Roads Authority Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes.

^{xi} Environment Agency (2003) River Habitat Survey in Britain and Ireland Field Survey Guidance Manual: 2003 Version'. s.l. : Environment Agency., 2003.

^{xii} Fossitt, J. A Guide to Habitats in Ireland. s.l. : The Heritage Council, 2000.

^{xiii} NPWS (2013). [www.NPWS.ie. http://www.npws.ie/publications/archive/1106_Atlantic_Salmon_assessment.pdf](http://www.npws.ie/publications/archive/1106_Atlantic_Salmon_assessment.pdf).

^{xiv} Murphy, D.F. Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. s.l. : Eastern Regional Fisheries Board., 2004.

^{xv} National Roads Authority. NRA (2008) (142) 'Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. s.l. : NRA, 2008.

^{xvi} Birds of Conservation Concern in Ireland 2014–2019 (2013) Irish Birds 9 (2013). <http://www.birdwatchireland.ie/LinkClick.aspx?fileticket=EjODk32LNcU%3D&tabid=178>

^{xvii} Survey methods for use in assessing the impacts of onshore windfarms on bird communities. Battleby : SNH, 2005, revised 2010. SNH Guidance

^{xviii} Heritage, Scottish Natural. Assessing the cumulative impact of onshore wind energy developments. s.l. : Scottish Natural Heritage, 2012.

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- ^{xix} SNH (2014) Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage: Battleby
- ^{xx} Percival, S.M. Predicting the effects of wind farms on birds in the UK: the development of an objective assessment method. [ed.] M., Janss, F.E., Ferrer, M. De Lucas. Madrid : Quercus, 7, pp. 137-152.
- ^{xxi} Hundt, L. Bat Survey Guidelines: Best Practice Guidance- 2nd Edition. s.l. : Bat Conservation Trust, 2012.
- ^{xxii} Bat Conservation Ireland. Wind Turbine / Wind Farm Development Bat Survey Guidelines version 2.8. s.l. : Bat Conservation Ireland, 2012.
- ^{xxiii} Cryan (*et al*)., 2014 Behaviour of Bats at Wind Turbines. Proceedings of The National Academy of Sciences of the United States of America.
- ^{xxiv} Carlin, C. and Mitchell-Jones, T. Bats and onshore wind turbines - Interim Guidance (2nd edition). s.l. :Technical Information Note TIN051, 2012.
- ^{xxv} <http://www.batconservationireland.org/irish-bats/species/leislars-bat>