Appendix 2

Cumulative Impact Assessment Report



Orsted Onshore Ireland Midco Limited

Response to Request for Further Information: Cumulative Impact Assessment Report

Proposed Oatfield Wind Farm, Co. Clare

An Board Pleanála Case No. ABP-318782-24

MAY 2025

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ABBREVIATIONS

AQSs	Air Quality Standards
BEMP	Biodiversity Enhancement Management Plan
BMP	Biodiversity Management Plan
CEMP	Construction and Environmental Management Plan
CIA	Cumulative Impact Assessment
CTMP	Construction Traffic Management Plan
ECoW	Ecological Clerk of Works
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
GCR	Grid Connection Route
GHG	Greenhouse Gas
GIS	Geographic Information System
HDD	Horizontal Directional Drilling
HGV	Heavy Goods Vehicle
IEMA	Institute for Environmental Management and Assessment
IPP	Independent Power Producer
ISMP	Invasive Species Management Plan
KEF	Key Ecological Feature
MW	Megawatt
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
RFI	Request for Further Information
SAC	Special Area of Conservation

SEAI	Sustainable Energy Authority of Ireland
SSR	Secondary Surveillance Radar
SHMP	Species and Habitat Management Plan
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SuDs	Sustainable Urban Drainage System
TDR	Turbine Delivery Route
TII	Transport Infrastructure Ireland
ZTV	Zone of Theoretical Visibility

1 INTRODUCTION

This Cumulative Impact Assessment (CIA) Report has been prepared to address the Request for Further Information (RFI) received from An Bord Pleanála (Item Number 2 in the RFI) in respect of the submitted Oatfield Wind Farm Project (**hereafter referred to as the 'Proposed Oatfield Development'**). The planning application for the aforementioned Proposed Oatfield Development was submitted to An Board Pleanála on 22nd December 2023 and the RFI document was received by post on 20th January 2025.

The details of the request received from An Bord Pleanála in respective of cumulative impacts is extracted and presented below:

"*Several other planning applications have been received by the Board for separate wind farms that are in proximity to or adjoining Oatfield Wind Farm, in particular Knockshanvo Wind Farm (ABP-320705-24). The applicant is requested to submit revised/updated information, if any, addressing cumulative and in combination considerations in the Environmental Impact Assessment Report and Natura Impact Statement respectively, that may arise from the Proposed Oatfield Development, other windfarms and activities in the area since its response to submissions and observations in June 2024*".

This CIA report identifies and assesses the potential cumulative effects of the Proposed Oatfield Development, in combination with other projects.

References are made to the EIAR submitted as part of the Planning Application for the Proposed Development as well as EIARs for other projects, as relevant, and are identified as such throughout this report.

It should be noted that that at the time the original EIAR for the Proposed Oatfield Development was submitted, the cumulative assessment considered three wind farm projects that were at pre-planning stage, where applicable publicly available information was available. These wind farm projects included Knockshanvo Wind Farm, Ballycar Wind Farm, and Lackareagh Wind Farm. The cumulative assessments for these wind farms have been updated in this CIA Report.

1.1 Assessment Methodology

The following guidance documents were referred to when selecting the appropriate approach for the assessment of cumulative effects:

- Environmental Protection Agency. 2022. Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- European Commission. 1999. Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions. Office for Official Publications of the European Communities.
- European Commission. 2017. Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU).
- Government of Ireland. 2018. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.

- Landscape Institute & Institute for Environmental Management and Assessment (IEMA). 2013. 3rd edition. Guidelines for Landscape and Visual Impact Assessment.
- Scottish Natural Heritage (SNH) guidance on Assessing the Cumulative Impacts of onshore Wind Energy Developments (2012, and subsequent updates).

1.1.1 EIA Directive

The EIA Directive makes specific reference to the consideration of cumulation of effects. Annex IV of the EIA Directive (2011/92/EU as amended by 2014/52/EU) requires that an EIAR provides a *description of the likely significant effects of the project on the environment resulting from…the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.*

Noting that the Directive requires consideration of cumulative effects with existing and/or approved projects, this Report also considers (i) projects that are currently going through the planning application system; and (ii) projects that may be envisaged through a plan/programme although there has not been any application submitted yet (i.e., consideration of future development). It should be noted that the level of detail available per project will reflect the stage within which it sits in the planning application process. Crucially, therefore, it follows that the level of detail of cumulative assessment is reflective of the level of detail of information available at time of assessment.

Also, as per the Landscape Institute's guidance, an assessment of cumulative effects should focus on whether there are any potential cumulative impacts which are reasonably foreseeable and which are likely to influence the decision making of the Proposed Oatfield Development, rather than an assessment of every potential cumulative effect[1].

1.1.2 Projects Considered for CIA

Section 2.4.3 of the Proposed Oatfield Development EIAR **Vol II Chapter 2 EIA Methodology** describes the method employed in compiling the list of projects for consideration in the cumulative assessment. Planning research was conducted in relation to all relevant projects within the surrounding 10km as well as all wind farms within 20km of the project site. It should also be noted that a 350m corridor was identified either side of the proposed Turbine Delivery Route (TDR) option and Grid Connection Route (GCR) via a Geographic Information System (GIS) desktop exercise to see if any relevant projects could be identified.

Throughout the compilation and preparation of this submission, in-depth planning history searches were conducted[2].

The list of 'other' projects (i.e. excluding wind farm projects) considered for cumulative assessment in this report are set out in **Table 1.1** below**.** The final column in **Table 1.1** provides a reasoning for inclusion or exclusion of a project for cumulative assessment. The projects scoped in for cumulative assessment are highlighted in grey.

In identifying whether a project from the list should be scoped in for further assessment of potential cumulative effects, the following approach was taken:

[1] GLVIA3 page 121 paragraph 7.5.

[2] An updated planning search was conducted on 28/02/2025.

- If a planning application was refused, withdrawn, or expired, it was not included for assessment;
- If the project was completed at the assessment stage for the Proposed Oatfield Development, it was considered as part of the baseline;
- Consideration of the likelihood of temporal overlap between projects; and
- Consideration of whether the scale and nature of the project had the potential to significantly contribute to the effects of the Proposed Oatfield Development as assessed in each of the environmental factor chapters.

Each environmental factor chapter includes a cumulative assessment of the Proposed Oatfield Development with other proposed projects as may be relevant to that factor depending on the potential interaction and likelihood of cumulative effects within the relevant Zone of Influence (ZoI), and in accordance with specific guidance for that factor. The wind farm projects which are scoped in for cumulative assessment are listed in **Table 1.2** below**.**

Where any of the developments scoped in for assessment in **Table 1.1** and **Table 1.2** differ, this is outlined in each respective discipline assessment below.

Table 1.1: Existing, planned and proposed projects in the study area (updated 28/02/2025)

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
Within 10km from Project Site				
Solar Farm Harmony Solar Clare Ltd.	2360249 Clare County Council	Approximately 4.5km West from the proposed windfarm site	A solar farm on a site of 70 hectares consisting of the following: 309,008 sq. m. of solar photovoltaic panels on ground mounted steel frames; a 38 kV electrical substation with electrical control building and associated compound with palisade fence; the installation of 21 electrical skids within 7 no. electrical compounds (with acoustic barrier fencing); underground power and communication cables and ducts, including underground cabling along the L3056 public road; new and upgraded internal access tracks (including stream crossings as required); 3 no. upgraded site entrances to the public road (one entrance to L-3054 (Lackyle Heights), and 2 no. entrances to L-30541); boundary fencing (including 607m of acoustic barrier fencing on the eastern boundary); landscaping and biodiversity enhancement measures; and all associated ancillary development, site works and services. The solar farm will be operational for 40 years. A Natura Impact Statement (NIS) has been prepared in respect of the Proposed Oatfield Development and will	This development is scoped in for cumulative assessment due to its proximity to the Proposed Oatfield Development, and the potential for impact interactions at construction stage.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			be submitted to the planning authority with the application. Permission was granted on the 10th of October 2023 with 14 no. conditions. From examination of the online planning file, where there are no submissions for discharge of conditions, it is our understanding that this project has not yet commenced.	
Quarry	18818 Clare County Council ABP-304690-19	Approximately 4km South from the proposed wind farm site	For development which will consist of an expansion to an existing quarry consisting of 10 hectares located adjacent to the existing working quarry including extraction of rock by blasting means down to 150mOD; Extracted rock will be processed at the existing working quarry; Landscaping of the quarry during the operational phase and restoration of the quarry on completion of extraction; All associated ancillary facilities / works; The applicant is seeking a 16 year permission as part of the application. The application is accompanied by an EIAR. Application was submitted on the 17th of October 2018 and was granted on the 13th of December 2019.	As this quarry is operational, it is scoped out for cumulative assessment as it is part of the baseline. This quarry is identified as a source of materials for construction of the Proposed Oatfield Development.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
Residential Development	2023065 EIAR Portal Reference 22959 Limerick County Council 317626-23 ABP	Approximately 8.8km South from the proposed windfarm site	Proposed Oatfield Development of 98 no. residential units and a significant Biodiversity area, on a site of 9.45 hectares, which comprises Phase 3 of an overall Masterplan site. Granted permission with 27 no. Conditions on the 28th of June 2023. An appeal was submitted on the 24th of July 2023 subsequently earning a grant of permission on the 21st of November 2024. From examination of the online planning file, where there are no submissions for discharge of conditions, it is our understanding that this project has not yet commenced.	This development is scoped in for cumulative assessment due to its proximity to the Proposed Oatfield Development, and the potential for impact interactions at construction stage.
Restoration of Old Quarry Site	18995 Clare County Council	Approximately 6km East from the proposed windfarm site	For the restoration of 3.76 hectares of an extant sand and gravel quarry to agricultural grassland. The development is necessary to comply with condition no. 4 of substitute consent 03.SU.0127 and will include importation of inert material and all associated development works. Permission was granted on the 6th February 2019. The development was commenced in 24th June 2019 and is assumed complete.	This development is scoped out for cumulative assessment.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
Residential Development	2023143 EIAR Portal Reference 221114 Limerick County Council	Approximately 8.8km South from the proposed windfarm site	Proposed Oatfield Development of 54 no. residential units which comprises Phase 4 of an overall Masterplan site Permission was granted on the 11th of October 2023 with 30 no. Conditions. From examination of the online planning file, where there are no submissions for discharge of conditions, it is our understanding that this project has not yet commenced.	This development is scoped in for cumulative assessment due to its proximity to the Proposed Oatfield Development, and the potential for impact interactions at construction stage.
Ballyglass Solar Farm	22591 Clare County Council	Approximately 5km Southeast from the proposed windfarm site and within 350m of TDR	For a 10-year planning permission for a solar array at Ballyglass, Coolderry, Dromintobin North, Reanabrone, and Oakfield (townlands) Ardnacrusha, Co Clare. The development will consist of c265,000 m2 of solar panels on ground mounted frames, 8 no. single storey control cabins with associated electrical transformer units and hardstand areas, 2 no. ring main units, underground cabling within the solar array site and within the L70382 public road to connect solar array field parcels, security fencing, CCTV, access tracks (upgrade of existing and new), upgrades to four existing agricultural field entrances on the R463, l3046 and L70382 and creation of new entrance on L70382, temporary	This development is scoped in for cumulative assessment due to its proximity to the Proposed Oatfield Development, and the potential for impact interactions at construction stage..

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			construction compound, landscaping and all associated ancillary apparatus and development works. The solar array will connect to the national grid and will have an operational lifespan of 35 years. A Natura Impact Statement (NIS) has been prepared in respect of the Proposed Oatfield Development and will be submitted to the planning authority with the application. The application was submitted on the 4th of July 2022 and was granted on the 17th of February 2023 with 13 no. conditions. From examination of the online planning file, where there are no submissions for discharge of conditions, it is our understanding that this project has not yet commenced.	
Solar Farm	16368 Clare County Council ABP Ref. 247632	Approximately 9km South West from the proposed windfarm site	For a 10-year permission for the development of a solar PV panel array consisting of up to 29,225.37 sq.m of solar panels on ground mounted steel frames, 1 No. substation, 3 No. inverter cabins, underground cable ducts, a temporary site compound area and ancillary facilities, boundary security fencing, site landscaping, a site entrance and access track, CCTV and all	This development is scoped in for cumulative assessment due to its proximity to the Proposed Oatfield Development, and the potential for impact interactions at construction stage. .

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			associated site works located in the townland of Ballymorris. The application was granted on the 24th of April 2017 with 17 conditions. From examination of the online planning file, where there are no submissions for discharge of conditions, it is our understanding that this project has not yet commenced.	
Solar Farm Terra Solar	1731 Clare County Council	Approximately 9.1km South West from the proposed windfarm site	For a 10-year permission for the development of a solar PV farm consisting of up to 34,334 sq.m of solar panels on ground mounted steel frames, 1 no. substation, 2 no. inverter cabins, a battery storage container, underground cable ducts, a temporary site compound area and ancillary facilities, boundary security fencing, site landscaping, upgrade to existing farm track and new internal access track, CCTV and all associated site works. The development includes the demolition of the existing ruined cottage on site. The proposed solar farm will be connected to the National Grid. Permission was granted by Clare County Council on 11th of August 2017.	This development is scoped in for cumulative assessment due to its proximity to the Proposed Oatfield Development and the potential for impact interactions at construction stage. .

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			From examination of the online planning file, where there are no submissions for discharge of conditions, it is our understanding that this project has not yet commenced.	
Ballymorris South Solar Farm	17411 Clare County Council	Approximately 9.8km Southwest	The development will consist of a 10 year permission for the construction of a Solar PV Energy development within a total site area of up to 9.4 ha., to include one single storey electrical substation building, electrical transformer/inverter station modules, solar PV ground mounted on steel support structures, access roads, fencing, CCTV, and associated electrical cabling, ducting and ancillary infrastructure. Permission was granted as of 22nd of June 2018. It is confirmed from the Highfield Energy website that this project is operational since Q1 2021.	This development is scoped out for cumulative assessment, as it is part of the baseline.
Residential Development	2360951 Limerick County Council	Approximately 4.9km South from the proposed windfarm site	Proposed Oatfield Development of 115 no. residential units. The application was submitted on the 20th of December 2023 and was granted	This development is scoped in for cumulative assessment due to its proximity to the Proposed Oatfield Development, and the potential for impact interactions at construction stage..

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			on the 22nd of February 2024 with 34 no. conditions. From examination of the online planning file, where there are no submissions for discharge of conditions, it is our understanding that this project has not yet commenced.	
Residential Development	2460032 Limerick County Council	Approximately 5.5km South from the proposed windfarm site	Proposed Oatfield Development of 99 no. residential units. The application was submitted on the 18th of January 2024 and was granted on the 18th of July 2024 with 30 conditions. From examination of the online planning file, where there are no submissions for discharge of conditions, it is our understanding that this project has not yet commenced.	This development is scoped in for cumulative assessment due to its proximity to the Proposed Oatfield Development, and the potential for impact interactions at construction stage..
Residential Development	2460570 Limerick County Council	Approximately 7.8km South from the proposed windfarm site	Proposed Oatfield Development of 12 no. apartment buildings containing residential units. The application was submitted on the 9th of June 2024 and was granted on the 6th February 2025 with 18 conditions.	This development is scoped in for cumulative assessment due to its proximity to the Proposed Oatfield Development, and the potential for impact interactions at construction stage.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			From examination of the online planning file, where there are no submissions for discharge of conditions, it is our understanding that this project has not yet commenced.	
Residential Development	247013 Limerick County Council	Approximately 10.6km South-East from the proposed windfarm site	Proposed Oatfield Development of 89 no. residential units. The application was submitted on the 25th of June 2024 and was granted on the 30th August 2024 with 36 conditions. From examination of the online planning file, where there are no submissions for discharge of conditions, it is our understanding that this project has not yet commenced.	This development is scoped in for cumulative assessment due to its proximity to the Proposed Oatfield Development, and the potential for impact interactions at construction stage.
Within 350m of TDR and GCR				
Road Works	198000 Limerick County Council	Within 350m of TDR	The proposed improvement works will be carried out within the existing 60kph speed limit zone over a length of 750m between L6135 Curraghchase Junction and the L6125 Junction. The improvement works proposed comprise	The improvement works are planned along the N69, which is a large part of the Proposed Oatfield Development's TDR.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			a reduction of the N69 carriageway width to 6.5m over the 750m length of the scheme with a footway installed on the southern side (school side) and kerbing and a grass verge on the northern side of the carriageway. The proposed works also include for the installation of LED public lighting on the northern side of the carriageway, road lining and signage as well as surface water drainage along both sides of the N69 carriageway and pavement improvement works. Accommodation works will be undertaken as required including improvement works in and around the community hub of the national school and GAA club grounds. The implementation of the works proposed will result in a rearrangement of the existing road network in the vicinity of the scheme. Changes to the existing road network will include the reduction of road width to 6.5m over a 750m length and the installation of a kerbed footway abutting the westbound carriageway and kerbing and a verge abutting the eastbound carriageway over the scheme length. This Part 8 application for planning permission was submitted on 31st of January 2019.	This development is assumed to have not progressed and is scoped out for cumulative assessment.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			It is uncertain whether this project proceeded, as there is no decision related documents on file.	
Residential Development	201114 and 211328 Limerick County Council	Within 350m of TDR	Construction on Site 1 of 96no. residential units: 2no. 4-bedroom detached units, 20no. 4-bedroom semi-detached units, 8no. 3-bedroom semi-detached units, 32no. 3 bedroom terraced units, 13no. 2 bedroom terraced units, 17no. 2 bedroom duplex units, 4no. 1 bedroom duplex units. Provision of Creche and Community Building including external play area (Gross Floor Area - 787 sq.m, Creche 610 sq.m & Community Building 177 sq.m). Provision of shared communal and private open space, car parking, bicycle storage, bin storage, vehicular and pedestrian access, public lighting, site landscaping, services, signage, ESB substation and all associated site development works. Development to include access onto the Mungret Road(R859). The planning application is accompanied by a Natura Impact Statement. Planning permission was granted on the 27th of May 2021, and modifications granted 10th June 2022.	From examination of the online planning file, it is our understanding that this project has commenced construction as of 21st of February 2022. This development is scoped out for cumulative assessment, as it is assumed completed.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			From examination of the online planning file, it is our understanding that this project commenced construction as of 21st of February 2022 and is assumed completed.	
Residential Development	211152 Limerick County Council	Within 350m of TDR	A residential development comprising 89 no. residential units, (9 no. detached houses, 36 no. semi-detached houses, 20 no. terraced houses, 24 no. duplex units), demolition of existing farm buildings, additional parallel parking along the Castletroy College road, accessed via a new entrance onto the Castletroy College road and all ancillary site development works. Ancillary site development works include a new connection to the public water main, foul and surface water drainage, access roads, footpaths, vehicle parking, landscaping, boundary treatments and site development works above and below ground. The planning application is accompanied by an EIAR and an NIS (Natura Impact Statement). Planning permission was granted on the 20th of April 2022. From examination of the online planning file construction is ongoing.	From examination of the online planning file construction is ongoing. This development is scoped in for cumulative assessment based on its proximity to the TDR for the Proposed Oatfield Development, and the potential for impact interactions at construction stage. .

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
Residential Development	191236 Limerick County Council	Within 350m of TDR	A residential development comprising 92 no. residential units, (60 no. houses, 32 apartments) This includes 1 no block of 32 apartments specifically intended to accommodate independent living for older persons. The planning application is accompanied by an EIAR and NIS. There is also additional parallel parking along the Castletroy College road, accessed via a new entrance onto the Castletroy College road and all ancillary site development works. Ancillary site development works include a new connection to the public water main, foul and surface water drainage, access roads, footpaths, vehicle parking, landscaping, boundary treatments and site development works above and below ground. Planning permission was granted on the 4th of march 2021 by Limerick County Council. From examination of the online planning file construction is ongoing.	From examination of the online planning file construction is ongoing. This development is scoped in for cumulative assessment based on its proximity to the TDR of the Proposed Oatfield Development, and the potential for impact interactions at construction stage. .
Residential Development	19547 Limerick County Council	Within 350m of TDR	A residential development comprising 70 no. residential units, (16 no. semi-detached houses, 6 no. terrace houses, 4 no. duplex units, 1 no. 4 storey apartment block over basement), 2 storey Creche and community playing	From examination of the online planning file construction is ongoing. This development is scoped in for cumulative assessment based on its proximity to the TDR of the Proposed

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			pitch, accessed via the Castletroy College road and all ancillary site development works. Planning permission was granted on 28th of May 2020 by Limerick County Council From examination of the online planning file construction is ongoing. .	Oatfield Development, and the potential for impact interactions at construction stage.
Road Works	306146 An Bord Pleanála (ABP)	Within 350m of TDR	Foynes to Limerick Road (including the Adare Bypass) including all ancillary and consequential works. The application was approved with conditions on the 30th of August 2022 by ABP. and was subject of legal challenges which were subsequently withdrawn. As of November 2023, construction has commenced.	The improvement works are planned along the N69, which is a large part of the Proposed Oatfield Development's TDR. This development is therefore scoped in for cumulative assessment.
Road Works	306199 ABP	Within 350m of TDR	Foynes to Rathkeale Protected Road Scheme 2019, Rathkeale to Attyflin Motorway Scheme 2019 and Foynes Service Area Scheme 2019 (forming the Foynes to Limerick Road (including Adare Bypass)). The application was approved with modifications on the 30th of August 2022 by ABP, and was subject of legal challenges which were subsequently withdrawn. As of November 2023, construction has commenced.	The improvement works are planned along the N69, which is a large part of the Proposed Oatfield Development's TDR. This development is therefore scoped in for cumulative assessment.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
Residential Development	20256 Limerick County Council	Within 350m of TDR	A residential development comprising 57units (comprising 21 no. semi-detached houses, 3 no terrace, 2 duplex units) and 1 four storey apartment block over basement comprised of 31 apartments revisions to development granted under planning 18/698 consisting of alteration to a portion of the open space area, all accessed via existing entrance onto the Kilmurry Road and all ancillary site development works including connections to the public water main, foul and surface water drainage, access roads, footpaths, vehicle parking, landscaping, boundary treatments and site development works above and below ground. The planning application is accompanied by a Natura Impact Statement. Planning permission was granted on 8th of December 2020. From examination of the online planning file construction commenced in May 2021 and was completed as of February 2022.	The construction phase of the residential is complete and should therefore have no interaction with the Proposed Oatfield Development. This development is therefore scoped out of the cumulative assessment.
Residential Development	211400 211152	Within 350m of TDR	A residential development comprising 96 no. residential units, (16 no. semi-detached houses, 6 no. terrace houses, 2 detached units along with 2 no. 5 storey apartment blocks over basement,	This development is scoped out for cumulative assessment.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
	Limerick County Council		comprised of 72 no. apartments and basement parking), bin & bike stores, demolition of existing farm buildings, additional parallel parking along the Castletroy College road, accessed via a new entrance onto the Castletroy College road and all ancillary development works. Ancillary site development works include a new connection to the public water main, foul and surface water drainage, access roads, footpaths, vehicle parking, landscaping, boundary treatments and site development works above and below ground. The planning application is accompanied by a NIS. Planning permission was granted on the 9th of June 2022. From examination of the online planning file, it is our understanding that this project has been completed.	
Residential Development	21311588 Limerick County Council	Within 350m of TDR	Application - Construction of 371 residential units, proposed access road and two storey childcare facility. Planning permission was granted on the 26th of May 2022.	This development is scoped out for cumulative assessment.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			From examination of the online planning file, it is our understanding that this project commenced in February 2023 and assumed completed.	
Residential Development	21350 Limerick County Council	Within 350m of TDR	A residential development comprising 62no. residential units(14no. semi-detached house, 10no. terrace houses, 4no. duplex units, 2no. 5 storey apartment blocks over basement, comprised of 34no. apartments and basement parking), revisions to development granted under planning reference 20/256 consisting of alteration of portion of the open space area and alterations to the visitor drop off area, all accessed via existing entrance onto the Kilmurry Road and all ancillary site development works on lands at Newtown, Castletroy, Co. Limerick. Ancillary site development works include connections to the public water main, foul and surface water drainage, access roads, footpaths, vehicle parking, landscaping, bin & bike store, boundary treatments and site development works above and below ground. The planning application is accompanied by an EIAR and an NIS(Natura Impact Statement). Planning permission was granted on the 3rd of December 2021.	This development is scoped in for cumulative assessment based on its proximity to the TDR, and the potential for impact interactions at construction stage. .

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			From examination of the online planning file, it is our understanding that this project has not yet commenced.	
Road Works	218001 Limerick County Council	Within 350m of TDR	The construction of an overflow channel and new culvert under the N69 in the vicinity of Marine Cove Road. This County Council project was out to tender for construction in October 2021. It is confirmed complete by viewing the engineer's report dated October 2022..	This development is scoped out for cumulative assessment.
Residential Development	22313124 Limerick County Council	Within 350m of TDR	A 10-year permission for the construction of 384 no. residential units (202 no. houses, 182 no. apartments), creche and associated site works. The application was submitted on the 31st of March 2022 and was granted on the 1st of August 2022 with 28 conditions.	This development is scoped in for cumulative assessment due to its proximity to the TDR and the potential for impact interactions at construction stage.
Road Works	228018 Limerick County Council	Within 350m of TDR	Development works will consist of upgrades/reconstruction works commencing on the R526 (north-east of Ballykeefe Roundabout), along South Circular Rd, Henry St and terminating at Mill Lane in Limerick City Centre.	The R526 is a fly over which runs over the N18 (along the Turbine Delivery Route of the Proposed Oatfield Development). The works associated with this road development should not interact with the N18 road and is therefore scoped out of the cumulative assessment.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			Construction of this road project commenced in March 2024.	
Quarry	23294 Limerick County Council	Within 350m of TDR	The development will consist of the restoration and infilling of the existing and future void over an area of (c. 17.2 ha) of existing permitted quarry (05/7029 and ABP 13.QC.2098) using approximately 2,464,000m3 or 4,435,200 tonnes of inert soil and stone material or stone by-product, or river dredge spoil. The application was submitted for planning on the 6th of June 2023. This application was refused on 9th May 2024 and was not appealed.	This development is scoped out for cumulative assessment.
Land Disturbance	2337 Clare County Council	Within 350m of TDR	To fill land with topsoil, subsoil, stone and inorganic construction material to raise the level of the land for agricultural purposes. A Natura Impact Statement is included with the application. The application was submitted for planning on the 25th of January 2023 and was granted on the 21st of December 2023 with 9 conditions. This is a planned phased development, with planning permission expiring on 20th December 2028.	The principal road used is to be the R465 from Limerick City. Material will also be brought from Killaloe via the R471 and R463. The TDR of the Proposed Oatfield Development runs along the R471 which intersects with R463. This development is scoped in for cumulative assessment based on its use of common roads and proximity to the Proposed Oatfield Development site, and the potential for impact interactions at construction stage.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
Road Works	238002 Limerick County Council	Within 350m of TDR	The development works will consist of and extension of the existing embankment on the landowner's side and various other road upgrade works including a shared raised footpath and cycleway and footway with fencing. This Part 8application was submitted for planning on the 27th of February 2023 and was granted on the 19th of June 2023. There is an email dated 16 May 2023 on the planning file indicating that the contractor had been appointed for this Part 8 development. It cannot be confirmed that this development is completed.	This development is therefore scoped in for cumulative assessment due to its proximity to the TDR of the Proposed Oatfield Development, and the potential for impact interactions at construction stage.
Road Works	238004 Limerick County Council	Within 350m of TDR	The proposed improvement works that comprise of 550m of revised road layout on the N69 and 90m of realigned side road L1403 and will provide for various additional road upgrade features including a footway, signal-controlled pedestrian crossings, kerbing and hardscaping, etc. The application was submitted for planning on the 20th of April 2023 and was granted on the 18th of September 2023.	The improvement works are planned along the N69, which is a large part of the Proposed Oatfield Development's TDR. This development is therefore scoped in for cumulative assessment, and the potential for impact interactions at construction stage

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
			It cannot be confirmed that this Part 8 development is completed from examination of the planning file.	
Residential Development	Limerick County Council 22471 314013 ABP	Within 350m of TDR	The construction of 21 no. dwellings and all associated site works. The application is accompanied by a Natura Impact Statement (NIS). The application was submitted to ABP on the 6th of July 2022 and was granted on appeal was 22nd of January 2024. cannot be confirmed that this development has commenced construction from examination of the planning file.	This development is therefore is scoped in for cumulative assessment due to its proximity to the TDR of the Proposed Oatfield Development, and the potential for impact interactions at construction stage.
Port Works	2018007 EIAR Portal Reference 301561 ABP	Within 350m of TDR	Port capacity extension to consist of modifications to the existing jetties and quays, phased expansion of the port estate and all associated site development works. The application was granted permission on the 21st of December 2018 by ABP.	This development is scoped out for cumulative assessment on the basis that the indicative construction schedule in the planning file was ca. 3 years (assumed to end in early 2022) and that this development will therefore have no interactions with the Proposed Oatfield Development.
Road Works	2019214 EIAR Portal Reference 306146	Within 350m of TDR	Approximately 15.6km of Type 2 dual carriageway express road extending from Foynes to Rathkeale, approx. 17.5km of dual carriageway motorway from Rathkeale to Attyflin and a service	The improvement works will have potential interactions with a section of the N69, which is a part of the Proposed Oatfield Development's TDR. This development is therefore scoped in for

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
	ABP		area for Heavy Goods Vehicles approximately 5ha in size near Foynes. The application was approved on the 30th of August 2022 and was subject of legal challenges which were subsequently withdrawn. As of November 2023, construction has commenced.	cumulative assessment, due to the potential for impact interactions with the Proposed Oatfield Development at construction stage.
Port Works	2020031 EIAR Portal Reference	Within 350m of TDR	Jetty Extension between East Jetty and West Quay of area 0.361ha. Pontoon relocation and landing structures with access to West Quay of area 0.0071ha. The foreshore lease was granted on the 11th of January 2022 Foreshore Ref: FS006837.	This development is scoped out for cumulative assessment on the basis that it is a foreshore application and will therefore have no interactions with the Proposed Oatfield Development.
Solar Farm Terra Solar Ltd.	248066 ABP	Within 350m of TDR	10-year permission. for the development. of a solar PV farm consisting of up to 35,582m^2 of solar panels on mounted steel frames, 1 no. substation; 3 no. inverter cables, underground cable ducts and all associated works. Planning permission was granted on the 5th of April 2018 by ABP. There is no information on the planning file to indicate that this project has commenced.	This development is scoped out for cumulative assessment on the basis that its construction schedule will not coincide with that of the Proposed Oatfield Development, having been granted planning permission in April 2018. It is assumed that this development will therefore have no interactions with the Proposed Oatfield Development.
Residential Development	2461282	Within 350m of TDR	A Large-Scale Residential development consisting of 139 no. units.	This development, which is yet to be determined, is scoped in for cumulative

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Description / Status	Scoped in / out for cumulative assessment
	Limerick County Council		This application was submitted for planning on the 19th of December 2024 and is still under consideration.	assessment due to its proximity to the Proposed Oatfield Development.

Table 1.2: Wind farms within 20 km

Development	Status	Approximate Distance/ Direction (kilometres) [1]	Number of Turbines	Tip Height (metres)
Knockshanvo	In planning	0.51 km	9	179.5 – 185m
Ballycar	In planning	4.2 km South	12	Up to 158m
Carrownagowan	Granted	5.1 km NE	19	169
Fahybeg	Granted	6.0 km E	8	169 - 176.5
Lackareagh	In planning	6.0 km Northeast	7	179.5 – 180m
Parteen	Operational	9.4 km SE	1	Unknown
Vision Care	Operational	13.7 km SE	1	Unknown

[1] From nearest turbine of the Proposed Oatfield Development to nearest known point of cumulative development.

2 POPULATION AND HUMAN HEALTH

2.1 Statement of Authority

This chapter was prepared by Laurie McGee, Associate Director with RSK Environment Limited. Laurie is a corporate member of the Irish Planning Institute and the Royal Town Planning Institute and has over 30 years of experience in town and environmental planning consultancy. Laurie has considerable experience in onshore wind energy EIA and planning, having worked on multiple wind farms in Northern Ireland and Northwest Ireland, including the preparation of Population and Human Health chapters.

2.2 Methodology

The EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022) states that an EIAR should assess the potential impacts on population and human health under the environmental categories addressed elsewhere in the EIAR, using the source-receptor pathways of air, water and soil and other health and safety issues as relevant. The guidelines also state that the description of the likely significant effects on environmental factors should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project.

The potential cumulative effects of the Proposed Oatfield Development on the population and human health of the study area are considered herein. This assessment is based on the conclusions of the likely significant effects before and after mitigation on population, employment, land use, recreation and tourism, human health and amenity, at all project stages, as contained in EIAR **Vol II Chapter 6 Population and Human Health** (Proposed Oatfield Development EIAR), and the conclusions from the updated assessment of cumulative effects for the following EIA factors as contained in the referenced sections of this report:

- Hydrology and Hydrogeology (Section 4)
- Telecommunications and Aviation (Section 6)
- Shadow Flicker (Section 7)
- Noise (Section 8)
- Landscape and Visual (Section 9)
- Traffic and Transport (Section 11)
- Air Quality (Section 12)
- Climate (Section 13)

2.3 Do-Nothing Scenario

Should the Proposed Oatfield Development not proceed, the existing land-use practices at the wind farm site including agricultural (pastures and extensive drainage) and commercial afforestation activities are expected to continue. Similarly, excavation along the GCR and road

widening and surface upgrading along the TDR would not be required. Therefore, there would be no potential cumulative effects arising.

2.4 Construction Phase

2.4.1 Population

It is likely that many of the workers employed for construction of the Proposed Oatfield Development, and other projects and cumulative wind farms listed in **Table 1.1** and **Table 1.2** would travel from outside the study area. Any direct and indirect jobs created or supported by the Proposed Oatfield Development during its 18-month construction stage, along with cumulative projects and wind farms which construction periods coincide, would be temporary in nature. This is not expected to result in changes to the population and demographic trends of the study area. Therefore, there would be no cumulative effects on population and demographic trends during construction stage of the Proposed Oatfield Development.

2.4.2 Employment

In relation to cumulative employment effects, if the construction phase for the Proposed Oatfield Development were to occur within similar time frames as the wind farm projects listed in **Table 1.2**, there would be a significant, positive impact on employment in the study area and wider region through creating and sustaining jobs for skilled workers.

As stated in the previously submitted Applicant's Memorandum Response to Submissions Received: Population and Human Health (June 2024), where there is a drive to produce more energy from renewable sources, the real benefit lies in maintaining the jobs for skilled workers in the regions of Ireland. This is borne out in the KPMG study commissioned by Wind Energy Ireland as cited in the Memorandum (April 2021)[3] which examines the income generation and job creation potential of onshore wind in meeting the 2023 Climate Action Plan target of 8,200 MW of onshore wind by 2030. In this study, it is estimated that by 2030, total direct and indirect employment in Ireland (excluding employment related to grid transmission works) could rise by 35% to 7,200, with most of these jobs benefiting rural areas (i.e., where onshore wind projects are located). The KPMG study goes further to state that *"Meeting the target of ~8,200 MW by 2030 will require a sustained annual investment of ~400 MW annually. The number of cumulative construction job years for capital expenditure (capex) could grow from 800 in 2020 to 8,800 by 2030. This is likely a conservative figure, as it does not include a share of jobs in grid development, the systems operators, or regulators."*

Citing figures from the Sustainable Energy Authority of Ireland (SEAI) study titled 'A Macroeconomic Analysis of Onshore Wind Deployment to 2020' (June 2015)[4], in the wind only scenario (i.e., excludes electrical transmission grid works) and assuming no increase in electricity prices, it is estimated that on average 1.07 direct jobs per MW could be created in construction (i.e., construction employment only). Using this figure as a multiplier for the Proposed Oatfield Development, which would have an installed capacity in the range of 52.8MW – 72.6MW, it is

[3] KPMG for Wind Energy Ireland, Economic Impact of Onshore Wind in Ireland, April 2021, Economic impact of onshore wind in Ireland (windenergyireland.com)

[4] SEAI, A Macroeconomic Analysis of Onshore Wind Deployment to 2020: An Analysis using the Sustainable Energy Economy Model, June 2015, https://www.seai.ie/publications/A-Macroeconomic-Analysis-of-Onshore-Wind-Deployment-to-2020.pdf, accessed 13/05/2024.

estimated that during the 18-month construction phase, there is the potential to create in the range of 57 to 78 construction jobs.

In the wind only scenario, when taking account of jobs generated from all economic activity, when developing an onshore wind farm (includes construction, direct, indirect induced and investment demand jobs), the SEAI study estimated an average of 2.46 jobs per MW could be generated. Using this figure as a multiplier, the total job creation potential of the Proposed Oatfield Development would be in the range of 112 to 154.

The conclusion is that the Proposed Oatfield Development on its own will have a short-term significant positive effect on the employment profile of the study area and a short-term slight positive effect on local businesses and services in the nearby towns and villages in the study area for the duration of the construction period. In a cumulative context where the wind farms listed in **Table 1.2** would be constructed during similar or overlapping timeframes, the effect would be a sustained significant positive effect on the employment profile of the study area and wider region (direct effects) and a significant positive effect on local business and services in the study area and wider region (indirect effects). Additionally, if the solar farm, road and residential building projects listed in **Table 1.1** were to be constructed in the same time frame as the Proposed Oatfield Development, this would extend the significant positive effects on the employment profile and local businesses in the study area and wider region.

2.4.3 Land use

EIAR **Vol II Chapter 6 Population and Human Health** concluded that the impacts on land use and activities at the works areas for the proposed wind farm, GCR and TDR would be likely to lead to brief to temporary, slight to moderate negative effects on land use activities in the study area during construction. In a cumulative context, if the proposed Knockshanvo Wind Farm, the closest to the Proposed Oatfield Development, were to be constructed in the same time frame, the negative effects on land use activities in the study area would be moderate to significant negative, however temporary in duration, lasting 18 – 24 months. These effects would be managed through the site specific environmental management measures, and construction traffic management plans for each project which may include co-operation among contractors to minimise disruption if projects were to be constructed over the same time period.

2.4.4 Recreation and tourism

Similarly, in a cumulative context, if the proposed Knockshanvo Wind Farm were to be constructed in the same time frame as the Proposed Oatfield Development, there is the potential for recreation and tourism amenities located in the study area to be impacted. These would relate manly to landscape impacts arising from landscape change as a result of the Proposed Oatfield Development, and traffic impacts related to movement of vehicles and construction machinery with potential to cause disruption during the proposed works.

In relation to landscape, cumulative impacts on recreation and tourism would be Substantial-moderate / negative / short-term within and immediately around the site, reducing to moderate, slight and imperceptible at increasing distances as the wind farm developments become a progressively smaller component of the wider landscape fabric even in the context of higher sensitivity landscape units / features in the study area.

2.4.5 Human health

In a cumulative context, as stated in **Section 4 Hydrology and Hydrogeology** of this CIA Report, the effects of the construction phase to the hydrology at the Proposed Oatfield Development (wind farm, GCR and TDR) are direct, adverse, neutral to slight and temporary with some potentially beneficial, and no significant residual effects. There are no significant cumulative effects anticipated from other projects during the construction phase of the Proposed Oatfield Development.

The effects of the construction phase to the hydrogeology at the Proposed Oatfield Development are indirect, adverse, neutral to slight, temporary not significant residual effects. Construction effects of the GCR and the TDR will also be localised and no significant cumulative effects are anticipated.

Without appropriate mitigation measures, if any other development within the same catchment, sub-catchment, or river sub-basin as the Proposed Oatfield Development (included in the cumulative impact assessment in the updated Hydrology and Hydrogeology CIA - see **Section 4, Table 4.2**) were to be constructed during the same period, there could be slight but significant cumulative effects on surface water (hydrology) and potentially on groundwater (hydrogeology), with possible impacts on human health. However, it is anticipated that all permitted developments would be required to follow site specific construction stage environmental management measures. This would reduce the potential for slight significant cumulative effects on surface and groundwaters to not significant, with no impact on human health. In the case of other wind farm developments, the proposed Knockshanvo Wind Farm, which is most proximal to the site of the Proposed Oatfield Development, lies within different catchment/sub catchments so no potential for cumulative effects on hydrology or hydrogeology receptors exists, and therefore no potential exists for effects on human health.

Section 12 Air Quality of this CIA Report contains an updated assessment of cumulative effects with nine developments from **Table 1.1** and **Table 1.2** that are within 250m of the Proposed Oatfield Development site boundary and the proposed TDR. It was concluded that there would be an increase in traffic resulting from the cumulative schemes during the construction phase, the traffic effects during the construction phase will be limited to a relatively short period at each phase of the Proposed Oatfield Development and the cumulative projects. All permitted developments are expected to agree and follow site-specific Construction Environmental Management Plans, Dust Management Plans and Construction Traffic Management Plans that will adequately control dust emissions and road traffic and construction plant exhaust emissions. The mitigation measures listed in Section 17.7.1 of EIAR **Vol II Chapter 17 Air Quality** remain relevant and appropriate. Therefore, with appropriate mitigation measures in place, the construction phase cumulative effect is considered to be not significant, and therefore would have no impact on human health.

2.4.6 Amenity

2.4.6.1 Shadow flicker

Shadow flicker can only occur when the turbine blades are moving. This requires the turbine to be operational. As such, there will be no shadow flicker effects during construction of the Proposed Oatfield Development and therefore no likelihood of cumulative effects.

2.4.6.2 Noise

The updated cumulative noise assessment (**Section 8** of this Report) considered the construction phase effects in a scenario where the Proposed Oatfield Development and proposed Knockshanvo Wind Farm would be constructed over similar periods, where overlapping construction activities would potentially impact neighbouring properties. For both the Proposed Oatfield Development and Knockshanvo Wind Farm, it is considered that noise sensitive properties are distant from the works proposed on the wind farm sites, such that predicted noise levels would be below 52 dB L_{Aeq} for each wind farm. If the site works were undertaken concurrently, the cumulative predicted noise levels would result in noise levels of up to 55 dB L_{Aeq}, which is considered negligible.

In relation to other construction activities for the Proposed Oatfield Development (i.e., existing track upgrades, construction of a new site track, and off site works including road widening works for turbine component delivery or substation connection and most grid connection works along the existing road network) higher worst-case noise levels were predicted to occur but only for brief periods of time. In a cumulative context, and assuming works for the Knockshanvo Wind Farm were to be undertaken at the same time, these works are proposed for different locations for each of the proposals such that no additional cumulative increases are likely to arise. Same would apply to the other cumulative wind farm developments listed in **Table 1.1**, as there is a separation distance of more than 2km from the noise sensitive receptors identified for the Proposed Oatfield Development.

Construction traffic noise was assessed at 16 different locations along the local road network, considering the Proposed Oatfield Development in combination with other Proposed Developments (**Table 1.1** and **Table 1.2**). When assessed against the relevant noise criteria, the result would represent a negligible, minor, short-term temporary, reversible adverse effect and is therefore not significant.

2.4.6.3 Landscape and Visual

The updated cumulative landscape and visual assessment presented in **Section 9** of this CIA Report concluded that, should construction of the Proposed Oatfield Development and another consented or proposed development take place concurrently, most notably Knockshanvo Wind Farm, there is potential for an increase in the intensity of construction activities within the LVIA study area. This would include increased movement of heavy goods vehicles (HGVs) along the surrounding road networks, the storage of construction vehicles and machinery, and the erection of tower cranes for the assembly of turbine components.

Despite these potential impacts, it is important to note that the construction phase is short-term in duration (18 to 24 months) and construction works of the proposed turbines is not likely to take place all at once. It is expected that cumulative construction stage effects on the landscape and visual environment will be more notable in the immediate landscape context surrounding the Proposed Oatfield Development site, much of which is comprised of local laneways that present with some sense of remoteness. The heightened activity associated with increased HGV movements and the visual presence of cranes have the potential to impact on the surrounding visual character of the area. However, it should be noted that much of the site context is that of commercial scale forestry plantations where HGV traffic is not uncommon.

Overall, while there is some potential for notable, temporary cumulative effects during the construction phase, it is not considered that the construction-stage effects of other consented or

proposed wind farm developments will generate significant cumulative effects in relation to the Proposed Oatfield Development.

2.4.6.4 Traffic and Transport

The updated Traffic and Transport cumulative assessment presented in **Section 11** of this CIA Report examined the potential traffic generation from four other (**Table 1.2**) wind farms and identified potential traffic generation along the proposed turbine delivery routes in common with the proposed turbine delivery route for the Proposed Oatfield Development. The cumulative change in traffic flows were calculated to be 12.57%. This is well below the 30% threshold of significance and adjudged to be imperceptible as set by the IEMA. Therefore, as regards traffic flows, the cumulative effect will be temporary, lasting the duration of the construction program, with a moderate impact.

In accordance with IEMA Guidelines, projected changes in traffic flows of less than 10% create no discernible environmental effect. Therefore, overall, the effects to transport and access during construction would be temporary, slight and adverse for pedestrian severance, delay, amenity, fear and intimidation; and driver delay. For accidents and safety, the effects to transport and access during construction would be temporary, moderate-significant, adverse and not significant.

2.5 Operational Phase

2.5.1 Population

The Proposed Oatfield Development on its own and when considered cumulatively with other wind farm developments, is not expected to result in changes to population and demographic trends of the study area during its operation. The effects on population and demographic trends would be imperceptible.

2.5.2 Employment

Once it is operational, the Proposed Oatfield Development on its own is likely to bring direct and indirect employment to the study area. As highlighted in a report by Siemens/IWEA titled “An Enterprising Wind”,[5] in contrast to the short-term opportunities for employment during the construction stage, there is potential for longer term job creation (15 years) in the operations and maintenance of onshore wind farms. Based on the 0.34 jobs per MW multiplier cited in the SEAI report titled ‘A Macroeconomic Analysis of Onshore Wind Deployment to 2020’[6] (June 2015), the Proposed Oatfield Development will have potential to create 22 jobs supporting operation and maintenance of the wind farm in the long term. Along with the proposed Knockshanvo Wind Farm, the long term job creation potential in the study area this would increase to 44. This would have a long-term beneficial effect which, along with other proposed wind farms (**Table 1.2**) has the potential to sustain these skilled jobs that would benefit the local community and wider region.

[5] Siemens/IWEA, ‘An enterprising wind’ – an economic analysis of the job creation potential of the wind sector in Ireland', 2013, http://www.tara.tcd.ie/bitstream/handle/2262/71272/BKMNEXT250.pdf?sequence=1&isAllowed=y, accessed 02/06/2023.

[6] SEAI, A Macroeconomic Analysis of Onshore Wind Deployment to 2020: An Analysis using the Sustainable Energy Economy Model, June 2015, https://www.seai.ie/publications/A-Macroeconomic-Analysis-of-Onshore-Wind-Deployment-to-2020.pdf, accessed 09/06/2023.

2.5.3 Land use

For any wind farm, the land excluding that developed for wind farm infrastructure (tracks, hardstands, etc.) can continue to be used for farming and forestry operations throughout its operational lifetime. During operation of the Proposed Oatfield Development, along with the proposed Knockshanvo Wind Farm , there will be minimal change to existing land uses in the study area, and therefore no significant effects during the operational stage.

2.5.4 Recreation and tourism

As previously stated in EIAR **Vol II Chapter 6 Population and Human Health**, inevitably, the effects of the Proposed Oatfield Development on recreation and tourism relate to the perceptions of those living, working, and visiting the study area, and their attitudes towards the presence of turbines in the wider landscape. The operational effects of the Proposed Oatfield Development on recreation and tourism relate to the findings from EIAR **Vol II Chapter 14 Landscape and Visual** and the updated cumulative landscape and visual assessment contained in **Section 9** of this CIA Report.

In a cumulative context (**Table 1.2** developments), within the cumulative landscape and visual assessment 20 km study area for the Proposed Oatfield Development, wind farm developments will become one of the more prominent built developments within the surrounding landscape whereby the combined wind farm developments of the Proposed Oatfield Development and Knockshanvo Wind Farm would be perceived as a large, consolidated layout of turbines. Should all of the proposed wind farms within the study area (**Table 1.2** developments), be permitted and constructed, the updated cumulative landscape and visual assessment concluded that the Proposed Oatfield Development will contribute to a cumulative effect in the order of high-medium in the potential future baseline scenario, which is not considered to be significant.

EIAR **Vol II Chapter 14 Landscape and Visual** concluded that the Proposed Oatfield Development on its own would not result in significant visual effects on tourism, heritage and amenity features within the study area, including the nearest, Twelve O'Clock Hills walking trails. In a cumulative context, whilst there will be some high ranging residual visual effects at the nearest sections of the 12 O'Clock Hills walking trails (the nearest amenity feature to the Proposed Oatfield Development), these are deemed to be not significant.

2.5.5 Human health

There is no change to the conclusion of the EIAR **Vol II Chapter 6 Population and Human Health** as there are no impacts on human health or safety from the operational wind farm, and would apply to the cumulative context when considering the most proximal proposed development, Knockshanvo Wind Farm.

2.5.6 Amenity

2.5.6.1 Shadow flicker

The updated cumulative shadow flicker assessment (**Section 7** of this CIA Report) considered two scenarios where a range of turbine heights and rotor diameters are proposed for the wind turbines in the Proposed Oatfield Development and Knockshanvo Wind Farm. The two scenarios considered minimum turbine heights and rotor diameters (cumulative scenario 1), and maximum turbine heights and rotor diameters (cumulative scenario 2) for each project.

The predicted 'worst-case' scenario shadow flicker effects from a combination of the Proposed Oatfield Development and Knockshanvo Wind Farm turbines exceed threshold limits (30 minutes per day or 30 hours per year) for 13 receptors in cumulative scenario 1, and 10 receptors in cumulative scenario 2. It was therefore concluded that, in the absence of mitigation, cumulative shadow flicker effects that would be experienced at these receptors would be significant and adverse.

Section 12.7.1 of EIAR **Vol II Chapter 12 Shadow Flicker** details mitigation measures that will be employed at the Proposed Oatfield Development. Should the proposed Knockshanvo Wind Farm be granted planning permission and then developed, the mitigation measures proposed for the Proposed Oatfield Development and similarly proposed in the Knockshanvo Wind Farm EIAR, would ensure shadow flicker effects, if they occur at all, would be below the thresholds of 30 hours per year or 30 minutes per day, and therefore will not be significant.

2.5.6.2 Noise

The updated cumulative noise assessment for the Proposed Oatfield Development (**Section 8** of this Report) considered operational noise effects from only the turbines in Knockshanvo Wind Farm.[7] The tables presented in **Section 8** below demonstrate that cumulative noise levels are below the Knockshanvo Wind Farm EIAR noise limits and therefore both developments can operate cumulatively within the noise limits so derived. This confirms the conclusions of the Knockshanvo Wind Farm EIAR and is consistent with the conclusions of the indicative cumulative assessment presented in EIAR **Vol II Chapter 13 Noise and Vibration**. Therefore, it is concluded that cumulative noise levels would still likely represent a long-term permanent reversible adverse effect, which is not significant.

Section 8 below presents determined site-specific noise limits (day time and night time) for the Proposed Oatfield Development such that compliance with these noise limits would allow maintaining cumulative operational noise within the assessment limits, and would result in cumulative levels which do not exceed the derived criteria.

The updated cumulative noise assessment considered Ballycar Wind Farm for which predicted noise effects are 10 dB below the lowest criteria of 40 dB L_{A90} considered in the Proposed Oatfield Development noise assessment, represents an acoustically insignificant contribution according to IOA GPG. Therefore, cumulative operational effects from the Ballycar Wind Farm are considered negligible.

The nearest turbines of the Lackareagh Wind Farm and Fahybeg Wind Farm are located more than 5 km from the nearest receptors identified in the Proposed Oatfield Development noise assessment. It is concluded that cumulative operational noise effects at these distances are likely to be negligible and do not require further consideration.

Other non-wind-farm developments set out in **Table 1.1** are located more than 2 km from the Proposed Oatfield Development. Given the nature of their use and these separation distances, there would not be any potential for cumulative operational noise increases and therefore correspond to negligible effects which do not require further consideration.

[7] Cumulative operational noise effects from the substations in both developments were scoped out given the distance of more than 3km from each other.

2.5.6.3 Landscape and visual

In a cumulative context (**Table 1.2** developments), within the cumulative landscape and visual assessment 20 km study area for the Proposed Oatfield Development, wind farm developments will become one of the more prominent built developments within the surrounding landscape, whereby the combined wind farm developments of the Proposed Oatfield Development and Knockshanvo Wind Farm would be perceived as a large consolidated layout of turbines. Should all of the proposed wind farms within the study area (**Table 1.2** developments), be permitted and constructed, the updated cumulative landscape and visual assessment concluded that the Proposed Oatfield Development will contribute to a cumulative effect in the order of high-medium in the potential future baseline scenario, which is not considered to be significant.

2.5.6.4 Traffic and transport

In the cumulative context, and based upon an estimated 6 - 8 staff members employed per wind farm, each with a similar number of vehicle trips, and assuming a worst-case scenario where each operative travels to each wind farm on the same day, there would be an uplift of up to 80 two-way trips per day on the local roads. Should all these trips occur through each node identified, a net uplift in traffic generation of 10.26% is estimated. According to IEMA guidelines, an uplift of less than 10% has no perceptible environmental impact. Given that the above scenario is unlikely to occur, it is concluded that there will be no perceptible environmental impact.

The traffic and transport cumulative assessment concluded that whilst there would be an increase in traffic resulting from the cumulative schemes during the operational phase, overall, no significant cumulative effects are anticipated.

2.6 Decommissioning Phase

As stated in EIAR **Vol II Chapter 6 Population and Human Health**, when considered on its own, the potential effects of decommissioning of the Proposed Oatfield Development are the same as those associated with the construction stage, however reduced in magnitude. Given the variable time frames for planning decisions, construction and grid connection availability for the Proposed Oatfield Development and other wind farms, it is highly unlikely that one or more **Table 1.2** developments would be decommissioned at the same time as the Proposed Oatfield Development such that any significant cumulative effects on population, employment, land use (change), recreation and tourism, human health, and amenity would arise.

3 BIODIVERSITY AND ORNITHOLOGY

3.1 Statement of Authority

This assessment has been authored and reviewed by the below specialists.

Andrew Whitfield MA BA CEnv CEcol (Associate Consultant): Andrew has over 30 years of experience in undertaking and co-ordinating ecological and environmental impact assessments across a wide variety of infrastructure projects. These include projects of varying type and scale, ranging from new nuclear power generation facilities and housing developments to major road and rail construction schemes. Andrew has undertaken Habitat Regulations Assessments (HRA) of various plans and projects including transport improvement options for the Scottish Government, water supply options for Greater London, and the Heads of the Valleys road improvements in South Wales. Andrew has also given evidence at approximately 20 planning inquiries/hearings in the UK, Ireland and Africa.

Howard Williams BSc CEnv CBiol MRSB MIFM (Principal Ecologist and CEO INIS): Chartered Environmentalist and Chartered Biologist who has authored and managed Ecological Impact Assessments (EcIA), Construction Environmental Management Plans and Article 6 Appropriate Assessments for over 50 wind farm projects. Howard is an expert in the field of avian ecology and has extensive knowledge and experience of providing management recommendations for a range of terrestrial and aquatic protected species.

Dr Alex Copland BSc PhD MIEnvSc MCIEEM (Principal Ecologist, INIS): has over 30 years of professional experience working in both statutory and private companies, in third-level research institutions and with environmental NGOs. He is a full member of the Institute of Environmental Sciences (IES) and the Chartered Institute of Ecology and Environmental Management (CIEEM). He is proficient in experimental design and data analysis and has managed several large-scale, multi-disciplinary ecological projects, managing staff and resources to meet budgetary constraints and the successful delivery of projects on time. These have included research and targeted management work for species of conservation concern, ecological assessments (including fieldwork and reporting) for large-scale infrastructure projects (including Strategic Infrastructure Developments) and delivering successful planning outcomes, the design and delivery of practical conservation actions with a range of stakeholders and end-users, education and interpretation on the interface between people and the environment and the development of coordinated, strategic plans for birds and biodiversity. He has written numerous scientific papers, developed and contributed to evidence-based position papers, visions and strategies on birds and habitats in Ireland. He also sits on the Editorial Panel of the scientific journal, Irish Birds, which publishes original ornithological research relevant to Ireland's avifauna, and CIEEM'S Irish Policy Group.

Peter O Connor BA MSc (Lead GIS Specialist, INIS): lead GIS Specialist experienced in overseeing the completion of mapping for multiple windfarm projects. Peter has experience in conducting Viewshed Analysis in support of selected Vantage Points for ornithological surveys, involving the complex use of Digital Terrain Models and/or Digital Elevations Models in addition to bespoke Viewshed Analysis plugins for QGIS. Peter also has experience with field data capture and integration into project mapping (e.g., for habitats, birds, bats and invasive species), including for figures supporting EIAR chapters and associated reports.

Cillian Burke BSc (Ecologist, INIS): ecologist with a BSc (Hons) in Environmental Science from the University of Galway. Cillian has experience in undertaking multi-disciplinary surveys including

habitat classification, ornithology Vantage Point surveys, breeding wader surveys, Ecological Clerk of Works and bat surveys, and has authored ecological reports including AA Screening Reports, NIS, EcIA and Biodiversity Net Gain (BNG) Reports.

Conor Daly MSc BSc ACIEEM (Ecologist, INIS): was awarded a MSc in Biodiversity and Conservation and an Honours BSc (Hons) in Zoology. Conor has conducted bird, mammal, habitat and entomological surveys for renewable energy projects, conservation monitoring projects and private developments. Over his three years as an ecologist, Conor has written Preliminary Environmental Assessments (PEA), Appropriate Assessment (AA) Screening, NIS and EIA reports. During his employment with Inis, Conor has been involved in conducting a range of reports, including Appropriate Assessment (AA) Screenings, Natura Impact Statements (NIS), and Environmental Impact Assessment (EIA) Screenings and reports.

3.2 Assessment of Cumulative Effects – Biodiversity

3.2.1 Do-Nothing Scenario

If the Proposed Oatfield Development does not go ahead, there will be no cumulative effects arising.

The sections below provide an updated cumulative effects assessment of wind farm projects within proximity to the Proposed Oatfield Development.

3.2.2 Knockshanvo Wind Farm

The Biodiversity EIAR Chapter for the Knockshanvo Wind Farm (MKO, 2023) was reviewed on 14/02/2025. Potential cumulative effects have been assessed regarding the different elements of the windfarm and identified sensitive receptors are outlined below. Knockshanvo Windfarm lies 0.51km from the Proposed Oatfield Development at its closest point. The Independent Power Producer (IPP) cable route connecting the East Development Area of the Proposed Oatfield Development overlaps partially with the Knockshanvo grid connection. This overlap involves four watercourses crossing over existing culverts (Crossing No. 38A, 43A, 47A, 48A).

3.2.2.1 Birds

The Proposed Knockshanvo Windfarm and the Proposed Oatfield Development share the following key ornithological receptors: Hen Harrier, Peregrine, Kestrel, Red Grouse, Snipe, Woodcock and Buzzard. The potential cumulative impacts from the Proposed Oatfield Development and the proposed Knockshanvo Windfarm are discussed below.

Hen Harrier

For the Proposed Oatfield Development, during breeding Hen Harrier surveys, three nests were recorded in the 2022 breeding season and two nests were recorded in the 2023 breeding season, ranging from approximately 350m to 1km from the nearest the Proposed Oatfield Development wind turbine. These nests were in heath and open forestry plantation. The Proposed Oatfield Development design includes embedded mitigation to minimise loss and fragmentation of suitable Hen Harrier habitat during construction. Habitat loss is restricted to the habitat areas described in Table 8.10 of the Oatfield EIAR **Vol II Chapter 8 Biodiversity**. This includes loss of habitat of value to breeding and wintering Hen Harriers. Larger areas of suitable Hen Harrier habitat will be retained within the Proposed Oatfield Development boundary and the wider area (containing all identified nest sites and the majority of used foraging habitat). Despite this habitat retention and

considering the potential loss of suitable nesting habitat and active foraging habitat (including that within the core foraging range of active nests), this significant effect will be avoided through additional mitigation and enhancement measures (see Section 8.7.1 of Oatfield EIAR **Vol II Chapter 8 Biodiversity**). The SHMP (Oatfield EIAR **Volume III Appendix 7.1**) provides further measures for the enhancement of existing lands suitable for Hen Harrier. Knockshanvo Wind Farm also proposes habitat enhancement for Hen Harrier within a Biodiversity Management Plan (BMP), which states that the permanent felling of low value conifer forestry, which amounts to 54.2ha, is compensated for with the provision of high-quality replacement peatland habitat suitable for foraging, nesting and roosting Hen Harrier. A further 46.5 hectares of farmland is proposed for enhancement for foraging Hen Harrier. Significant cumulative impacts on habitat loss are therefore not predicted.

The Knockshanvo Windfarm has identified suitable nesting and roosting locations for Hen Harrier within the study area and confirm that the closest turbines to this habitat have the required separation distance (750m) as per Ruddock and Whitfield (2007) to avoid disturbance to this nesting/roosting habitat (see Appendix 7-5 of the Knockshanvo Wind Farm EIAR). Timing of works that could potentially affect nesting Hen Harrier through nest destruction or disturbance have also been addressed within the Proposed Oatfield Development SHMP (Oatfield EIAR **Volume III Appendix 7.1**). This ensures exclusion zones are implemented according to best practice (Goodship & Furness, 2022) around active nests, within which potentially disturbing works cannot take place until the young have fledged. Knockshanvo Windfarm EIAR states no construction will commence until after 2028 when the forestry plantation felling will occur and habitat for Hen Harrier will consequently become unsuitable. Given both projects involve measures to avoid direct or indirect impact on active Hen Harrier nests with extensive measures to identify any future interactions, the cumulative impact is not expected to increase the overall magnitude or significance of effect on Hen Harrier.

The Knockshanvo Wind Farm EIAR states that there is no significant collision risk during the operational phase of the Windfarm. The Proposed Oatfield Development also carried out a collision risk assessment and concluded that no significant collision risk is anticipated.

The Proposed Oatfield Development and Knockshanvo Windfarm include comprehensive compensation and enhancement plans which have been specifically designed for Hen Harrier to ensure no significant impacts will occur. These measures are designed to prevent mortality through collision risk, compensation and enhancement of foraging, nesting and roosting habitat and minimising disturbance and displacement to locally breeding Hen Harrier.

As a result, no significant cumulative effect on Hen Harrier is likely to occur.

Red Grouse

The Knockshanvo Windfarm BMP includes a comprehensive compensation and enhancement plan which includes permanent felling of 54.2ha of forestry. This will create additional open peatland habitat for the benefit of Red Grouse and increasing the connectivity between existing habitats including the Gortacullin Bog NHA. The Proposed Oatfield Development SHMP (Oatfield EIAR **Volume III Appendix 7.1**) includes measures for the benefit of Red Grouse, which include heath and heath mosaic habitat management.

According to the Knockshanvo Wind Farm EIAR, disturbance is unlikely to impact on Red Grouse within the site during the construction phase as areas of suitable habitat are located outside the Knockshanvo Wind Farm Site.

The Proposed Oatfield Development SHMP (Oatfield EIAR **Volume III Appendix 7.1**) includes disturbance mitigation measures, notably the sensitive timing of activities and/or adoption of exclusion zones to avoid effects on Red Grouse when they are likely to be most sensitive (e.g., when nesting).

The collision risk for Red Grouse within the Knockshanvo Windfarm is deemed to be 'Very Low' (Percival, 2003) and 'Long-term Imperceptible' (EPA, 2022). Red Grouse flight activity recorded over proposed turbine locations within the Proposed Oatfield Development was insufficient to justify detailed collision risk modelling. Therefore, no cumulative impacts in regard to collision risk are likely to occur.

No cumulative impacts from the Proposed Oatfield Development and Knockshanvo Windfarm on Red Grouse are likely to occur.

Peregrine

The habitats within both the Proposed Oatfield Development and Knockshanvo Windfarm are of limited value to Peregrine, therefore, cumulative impacts on foraging and nesting Peregrine are not considered significant. No significant effects for Peregrine were identified within the Knockshanvo Windfarm regarding habitat loss, disturbance, displacement or mortality. The collision risk for Peregrine within the Knockshanvo Windfarm was deemed to be 'Very Low' (Percival, 2003). Peregrine flight activity recorded over proposed turbine locations within the Proposed Oatfield Development was insufficient to justify detailed collision risk modelling Therefore, no cumulative impacts in regard to collision risk are likely to occur.

No cumulative impacts from the Proposed Oatfield Development and Knockshanvo Windfarm on Peregrine are likely to occur.

Kestrel

The Knockshanvo Wind Farm EIAR states there will be minimal loss of suitable Kestrel breeding habitat and direct loss of foraging habitat relative to its availability onsite will be minimal. Significant impacts are therefore not predicted. The majority of Kestrel habitat will be retained within the Proposed Oatfield Development and the wider area (containing all identified nest sites), although some loss of habitat of value to foraging Kestrels during the breeding and winter seasons is predicted. This significant effect will be avoided through additional mitigation and enhancement measures (see Section 8.7.1 of the Proposed Oatfield Development EIAR, **Vol II Chapter 8 Ornithology**); and notably those prescribed within the SHMP (EIAR **Vol III Appendix 7.1**), which includes creation and enhancement of suitable foraging habitat for Kestrel.

In relation to disturbance, significant impacts are not predicted within Knockshanvo Wind Farm given extensive areas of suitable foraging habitat exist and will remain in the wider area. Habitats within the Knockshanvo Windfarm site are not considered unique for Kestrel. Significant cumulative impacts on habitat loss are not predicted.

The predicted collision risk within the Proposed Oatfield Development for Kestrel during the breeding season are estimated as 0.23 to 0.26 birds per year, equating to one Kestrel collision every 3.83 to 4.42 years. Modelled Kestrel collision fatalities during the winter season are estimated as 0.05 to 0.06 birds per year, equating to one Kestrel collision every 15.02 to 18.27 years. Recent population estimates of Kestrel are not available for the local area, but they are considered locally widespread and common and collision fatalities over the operational lifespan of the Proposed Oatfield Development would likely equate to less than 1% of the county population. The resultant increases in bird mortality would not be significant when compared against the

annual background mortality for this species. The collision risk at Knockshanvo Windfarm will result in a combined (all seasons) total of 1.86 collisions per year (see Section 7.6.2.3 in Chapter 7 of the Knockshanvo EIAR). The predicted collision risk is therefore low in the context of the county population (c. 519 birds). The overall collision risk in combination with collision risk figures taken from both windfarms within the area will not be significant.

No cumulative impacts from the Proposed Oatfield Development and Knockshanvo Windfarm on Kestrel are likely to occur.

Snipe

The Proposed Oatfield Development EIAR states that low levels of Snipe activity were recorded within and adjacent to the Proposed Oatfield Development. Considering the level and type of Snipe activity, and the embedded mitigation described in Section 8.5 (notably the extent of retained suitable habitat within and adjacent to the Proposed Oatfield Development), habitat loss for Snipe is considered not significant. Suitable areas of nesting and foraging habitat for Snipe within the Knockshanvo Wind Farm (bogland) are not considered to be a scarce resource in the area and will continue to remain post construction, therefore, significant cumulative impacts on habitat loss are not predicted.

Considering the level and type of Snipe activity recorded within the Proposed Oatfield Development, effects on Snipe due to disturbance and displacement are considered not significant. The majority of Snipe activity recorded within Knockshanvo Windfarm was limited to open habitats adjacent to the Windfarm site. The Knockshanvo EIAR states that some disturbance may occur in the upland blanket bog close to T1 and T3, although significant impacts are not anticipated given the abundance of similar habitat in the wider surroundings. Significant cumulative impacts on habitat loss are not predicted.

The collision risk for Snipe within the Knockshanvo Windfarm is deemed to be 'Very Low' (Percival, 2003) and 'Long-term Imperceptible' (EPA, 2022). Snipe flight activity recorded over proposed turbine locations was insufficient to justify detailed collision risk modelling. Therefore, no cumulative impacts in regard to collision risk are likely to occur.

No cumulative impacts from the Proposed Oatfield Development and Knockshanvo Windfarm on Snipe are likely to occur.

Woodcock

The Proposed Oatfield Development and Knockshanvo Windfarm provide suitable breeding habitat for Woodcock. The construction of Knockshanvo Windfarm will result in a significant reduction in breeding habitat within the Windfarm Site. However, conifer forestry is widely available within the surrounding areas of both the Proposed Oatfield Development and Knockshanvo Windfarm, therefore, potential impacts will not result in a significant loss of breeding habitat. The Knockshanvo Windfarm EIAR states a significant proportion of the predicted habitat loss will be offset by replanted forestry (as required by felling licences to facilitate construction works). The loss of breeding habitat will be localised and relate to Windfarm infrastructure for both Windfarm sites. Habitat loss for Woodcock within the Proposed Oatfield Development is avoided through additional mitigation and enhancement measures (Section 8.7.1 of EIAR **Chapter 8 Ornithology**) and the SHMP (EIAR **Vol III Appendix 7.1**). Significant cumulative impacts on habitat loss are not predicted.

The Knockshanvo Windfarm will not result in significant disturbance to Woodcock as the suitable habitat is widely available in the surrounding areas. The Proposed Oatfield Development EIAR

states that its design includes embedded mitigation to minimise disturbance to Woodcock, these include the provision of best practice measures and ecological supervision to ensure that the destruction or significant disturbance of any active Woodcock nests is avoided (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). The Proposed Oatfield Development considers the extent and locations of construction works with regard to baseline Woodcock activity; notably the locations of breeding territories, and the reduced extent of available habitat into which disturbed Woodcock would be displaced. This potential significant effect will be avoided through additional mitigation and enhancement measures; notably the enhancement of conifer plantation and heath within the SHMP areas. Significant cumulative impacts as a result of disturbance are not predicted.

The collision risk for Woodcock within the Knockshanvo Windfarm is deemed to be 'Very Low' (Percival, 2003) and 'Long-term Imperceptible' (EPA, 2022). Woodcock flight activity recorded over proposed turbine locations for Knockshanvo Windfarm was insufficient to justify detailed collision risk modelling, Therefore, no cumulative impacts are likely to occur.

No cumulative impacts from the Proposed Oatfield Development and Knockshanvo Windfarm on Woodcock are likely to occur.

Buzzard

The Knockshanvo EIAR states that there is potential for the felling of forestry within the Windfarm site to result in the loss of nesting habitat, however, significant areas of suitable breeding habitat for Buzzard will remain onsite and in the wider area post-construction. Section 8.5 of Oatfield EIAR **Vol II Chapter 8 Ornithology** includes embedded mitigation to minimise loss and fragmentation of suitable raptor habitat during construction. The Proposed Oatfield Development will result in the loss of habitat of value to foraging raptors (e.g., grassland, scrub, heath) but does not include the locations of any known raptor nest sites. The majority of suitable raptor nesting and foraging habitat will be retained within the Proposed Oatfield Development, and wider areas of adjacent suitable habitat will be retained. Despite this habitat retention, any habitat loss is avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the SHMP (EIAR **Vol III Appendix 7.1**). No significant cumulative impacts through habitat loss are anticipated.

The Knockshanvo Windfarm EIAR states that disturbance associated with construction works will result in a measurable reduction in the breeding density of Buzzard onsite and a reduction in the amount of available foraging habitat around the margins of the Windfarm Site. These lands are not considered unique to the Knockshanvo Wind Farm Site or rare in the wider surroundings.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration. The Proposed Oatfield Development includes the provision of best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active raptor nests is avoided, including timing of works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**) (e.g., as detailed by Goodship & Furness (2022)) where required. The Proposed Oatfield Development EIAR considers the extent and locations of construction works within the Proposed Oatfield Development (with regard to baseline raptor activity), and potential effects through disturbance and displacement. These effects are avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**). As previously stated, given the wide availability of land available to Buzzard surrounding the Knockshanvo Windfarm and the embedded mitigation measures provided within the Proposed

Oatfield Development EIAR to minimise disturbance to Buzzard, such as timing of works, ecological supervision and exclusion zones, the cumulative impact is not expected to increase the overall magnitude or significance of effect on Buzzard.

The collision risk for Buzzard within the Knockshanvo Windfarm is deemed to be 'Very Low' (Percival, 2003) and 'Long-term Imperceptible' (EPA, 2022).

Flight activity recorded over proposed turbine locations for the Proposed Oatfield Development was insufficient to justify detailed collision risk modelling, therefore, no cumulative impacts in regard to collision risk are anticipated. The results of collision risk modelling for Buzzard are summarised in Table 8.12, EIAR **Vol II Chapter 8 Ornithology**. Modelled Buzzard collision fatalities during the breeding season are estimated as 0.06 to 0.07 birds per year, equating to one Buzzard collision every 13.93 to 15.94 years. In the context of the Buzzard populations recorded within the Proposed Oatfield Development area and receiving environment, and the regional and national status of this species, collision impacts on Buzzard are considered not significant.

No cumulative impacts from the Proposed Oatfield Development and Knockshanvo Windfarm on Buzzard are likely to occur.

3.2.2.2 Habitats

The Knockshanvo Windfarm habitats are predominantly comprised of different stages of coniferous plantation forestry and clear-fell. Habitats lost within the Knockshanvo Windfarm include: conifer plantation, wet heath/upland blanket bog, dry siliceous heath, oak-ash-hazel woodland, agricultural grassland, wet grassland, hedgerows, treelines and a drainage ditch. To compensate for any habitat loss of ecological importance within the Knockshanvo Windfarm, several management plans have been created to minimise impacts on habitats. These involve a BMP (See Appendix 6-5 of the Knockshanvo Windfarm EIAR), and the following measures are proposed:

- offset habitat loss and restore peatland wet heath habitats within the Windfarm;
- replanting 0.90ha of oak-ash-hazel woodland; and
- replanting of 1,170m of native hedgerow.

The SHMP prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.1**) includes for the creation and/or enhancement of heath and bog, grassland, scrub, hedgerows and conifer plantation.

Taking into account predicted impacts and the adoption of prescribed mitigation measures for both developments, no cumulative effects in regard of habitat loss are predicted.

3.2.2.3 Invasive Species

The Knockshanvo EIAR states that Japanese knotweed, rhododendron and Himalayan knotweed were recorded during field surveys. Only one stand of rhododendron was identified within the footprint of the Windfarm infrastructure, with all other records of invasive species being avoided. As such, mitigation measures are applied to prevent the spread of rhododendron, following best practice guidance, 'The Management of Invasive Alien Plant Species on National Roads' – Technical Guidance GE-ENV-01105 (TII, 2020).

Biosecurity mitigation is proposed for the Knockshanvo Windfarm, and an Invasive Species Management Plan (ISMP) has been prepared for the Proposed Oatfield Development (EIAR **Vol**

III Appendix 7.8). These mitigation measures for both developments ensure that no cumulative effects are likely to occur.

3.2.2.4 Species

Aquatic Habitats and Species

The Knockshanvo Wind Farm EIAR states that the watercourses identified with the highest ecological value in the study area of the Knockshanvo Windfarm include the Owenogarney River, River Blackwater and Glenomra Wood Stream. All the watercourses considered in the Proposed Oatfield Development EIAR were also considered in the Knockshanvo EIAR. Mitigation measures, both by design of the Windfarm and to address potential significant effects on aquatic receptors were prescribed such that no significant effects on aquatic habitats and species are likely to occur. For Knockshanvo Windfarm, these include:

- constraints mapping to inform Windfarm design and subsequent mitigation by avoidance of sensitive hydrological features by application of suitable buffer zones (i.e. 50m to EPA mapped watercourses);
- water quality mitigation is addressed in Chapter 9 of the Knockshanvo EIAR; and
- a Peat Stability Risk Assessment (See Appendix 8-1 of the Knockshanvo Windfarm EIAR) was carried out and determined that risk of a peat failure with implemented mitigation is low.

The two projects cross four watercourse crossings, all are upland stream with culverts. Both projects share identical methods of trenching within the existing roads with no plans to conduct instream works. As such, no instream direct pathways are present for cumulative impacts to occur. The Proposed Oatfield Development cable route does differ from the Knockshanvo route in construction methods at one crossing (43A). This crossing will be trenched for the Knockshanvo grid route and the Proposed Oatfield Development internal cable will be installed via Horizontal Directional Drilling.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of habitat suitable for aquatic species. Considering the potential effects on aquatics habitats and species, avoidance of disturbance, pollution and associated mortality is a key element of the Proposal and is reflected by the embedded mitigation measures within the CEMP. Mitigation measures that will be applied are outlined in EIAR **Vol II Chapter 7 Biodiversity**, (Section 7.5). Effects on aquatic species through habitat loss and fragmentation during the construction of the Proposed Oatfield Development are considered not significant.

As presented above, the proposed Knockshanvo Windfarm site has limited interactions with the Proposed Oatfield Development site. As such, due to the absence of pathways between the two projects to result in cumulative effects, taking on the accepted measure of timing of both projects to not occur at the same time, there is no increase to the likelihood for significant effects on Aquatic Habitat and Species as a result of cumulative effects between these two projects.

Bats

The Knockshanvo Windfarm EIAR states that the following species were recorded: Common pipistrelle, Soprano pipistrelle, Leisler's bat, Myotis spp., Brown long-eared bat, Lesser Horseshoe Bat, Nathusius' pipistrelle, Lesser Horseshoe Bat. A single, small, bat roost was identified within the Knockshanvo Windfarm site boundary, no roosts were identified within the footprint of the Windfarm and no significant habitat for roosting bats was identified. The Knockshanvo Windfarm

EIAR states that "*no potential for significant effect with regard to the loss of, or damage to, roosting habitat as a result of the Proposed Wind Farm is anticipated*". Regardless, mitigation measures have been applied to ensure there is no significant loss or damage to roosts and commuting/foraging habitat. These measures include:

- a pre-commencement survey prior to the felling of trees with roosting potential;
- felling works of trees with an identified roost will not be undertaken until a derogation licence is obtained;
- trees identified as containing Potential Roost Features throughout the rest of the Knockshanvo Development will be avoided and retained;
- linear habitat features lost during construction will be replaced as detailed in the BMP; and
- necessary lighting required during construction will adhere to best practice guidance provided in the Dark Sky Ireland Lighting Recommendations (Dark Sky Ireland).

Lands chosen for enhancement for Hen Harrier for the Knockshanvo Windfarm are located within the potential foraging range of the Lesser Horseshoe Bat roosts which are a designated QI under the Danes Hole, Poulnalecka Special Area of Conservation (SAC). Works proposed within these lands will also enhance potential commuting habitat used by Lesser Horseshoe Bats which may use the land for commuting. Such measures include: retaining linear features along the perimeter of the conifer plantation, consisting of treelines, hedgerows and scrub, filling gaps in hedgerows, retention and enhancement of scrub. Edge habitat along conifer plantations will be replaced with native species, increasing the foraging potential for Lesser Horseshoe Bat. These measures will improve the ecological and landscape connectivity for Lesser Horseshoe Bat. Similarly, management prescriptions outlined in the Proposed Oatfield Development SHMP (EIAR **Vol III Appendix 7.1**) for the enhancement of Hen Harrier habitat will also benefit the Lesser Horseshoe Bat.

The Proposed Oatfield Development EIAR also includes embedded mitigation to minimise loss and fragmentation of suitable bat habitat (e.g., woodland, higher quality grassland, hedgerows), and to avoid significant disturbance of this habitat. Notably, best practice construction measures and ecological supervision will minimise light spill onto suitable foraging habitat and potential roost sites.

Despite the close proximity of the two windfarm developments, taking into account predicted impacts and the adoption of prescribed mitigation measures for both developments, no cumulative effects in regard to bats are likely to occur.

Otter

The Knockshanvo Windfarm EIAR states that no Otter signs were recorded along the smaller watercourses within the study area boundary, although it was assessed that Otter are likely to use watercourse downstream from the Knockshanvo Windfarm due to poor fisheries potential of the upper reaches of watercourses within the site. Potential Otter activity in the form of three spraint sites were recorded downstream of the Knockshanvo Development study area.

The Knockshanvo Windfarm EIAR states the construction of wind farm infrastructure in the vicinity of watercourses within the EIAR Site Boundary may result in disturbance, and indirect effects on Otter habitat in the form of water pollution. Mitigation measures have been applied so that significant effects to Otter are not predicted (NRA, 2008). These include:

- a pre-commencement Otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works;
- if an Otter holt is identified within or immediately adjacent to the Knockshanvo Development footprint, construction works likely to disturb Otter will not proceed until a derogation licence is obtained;
- no works will be undertaken within 150m of any holts at which breeding females or cubs are present;
- no wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, Otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence as outlined by 'Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes' (NRA, 2006);
- all of the above works will be undertaken or supervised by an appropriately qualified ecologist.

Based on the mitigation measures proposed for both Knockshanvo Windfarm and the Proposed Oatfield Development, the magnitude of effect on Otter is not expected to increase. The extent of interaction between these two projects is isolated to small low suitability streams for Otter. Based on the unlikelihood for these projects construction phases to overlap, the existing mitigation measures for both projects and the absence of pathways for cumulative interactions to occur, significant cumulative effects are not considered likely to occur.

Despite the close proximity of the two windfarm developments, taking into account predicted impacts and the adoption of prescribed mitigation measures for both developments, no cumulative effects in regard to Otter is predicted.

Badger

The Knockshanvo Windfarm EIAR states that Badger scat and mammal trails were found in areas throughout the site, however, further surveys did not result in observations of any sett in the area. Mitigation measures are prescribed such that no significant effects on Badger are likely to occur. These include:

- a pre-commencement Badger survey will be undertaken by a qualified ecologist in accordance with standard best practice guidance (TII, 2009) prior to the commencement of site works to ensure that no additional setts in close proximity to proposed infrastructure have been built;
- if a Badger sett is identified within or immediately adjacent to the Knockshanvo Windfarm footprint, mitigations as per (TII, 2009) will be implemented for the new sett; and
- if any new setts are found within the vicinity of proposed infrastructure, mitigations as per (TII, 2009) will be implemented to prevent disturbance of the sett.

Despite the close proximity of the two windfarm developments, taking into account predicted impacts and the adoption of prescribed mitigation measures for both developments, no cumulative effects in regard of badgers are likely to occur.

Red Squirrel

The Knockshanvo Windfarm EIAR states that one Red Squirrel was recorded within coniferous forestry within the study area boundary as well as feeding remains in the form of stripped Sitka

spruce cones was found in the same area. Mitigation measures are prescribed such that no significant effects on Red Squirrel are likely to occur. These include:

- a pre-commencement survey undertaken by a qualified ecologist in accordance with best practice guidance (NRA, 2009) prior to the commencement of site works to ensure that no Red Squirrel dreys or Pine Marten dens are present within or in close proximity to the Windfarm footprint;
- if a Red Squirrel drey or Pine Marten den is identified within the Knockshanvo Development footprint during pre-commencement surveys, further surveys will be undertaken to determine if the drey/den is active; and
- consultation will be carried out with NPWS and a Species Protection Plan will be put in place in advance of felling works.

The Proposed Oatfield Development identified no significant effects on Red Squirrel as a result of the construction, operational or decommissioning phases. Due to the limited interaction of the proposed Knockshanvo windfarm elements and the Proposed Oatfield Development elements, no pathways are considered likely to result in cumulative effects.

Despite the close proximity of the two windfarm developments, taking into account predicted impacts and the adoption of prescribed mitigation measures for both developments, no cumulative significant effects on Red Squirrel are likely to occur.

Pine Marten

The Knockshanvo Windfarm EIAR states that a number of scats, likely to be of Pine Marten, were recorded within the study area. Mitigation measures are prescribed such that no significant effects on Pine Marten are likely to occur. These mitigation measures are identical to those described for Red Squirrel above.

The Proposed Oatfield Development identified no significant effects on Pine Marten as a result of the construction, operational or decommissioning phases. Due to the limited interaction of the proposed Knockshanvo windfarm elements and the Proposed Oatfield Development elements, no pathways are considered likely to result in cumulative effects.

Despite the close proximity of the two windfarm developments, taking into account predicted impacts and the adoption of prescribed mitigation measures for both developments, no cumulative significant effects on Pine Marten are likely to occur

Irish Hare

The Knockshanvo Windfarm EIAR states that no sightings or evidence of Irish Hare was recorded during field surveys and were thereby ruled out as a Key Ecological Feature (KEF) and was not considered for further consideration in the impact assessment. Therefore, no cumulative effects are likely to occur.

As described in EIAR **Vol II Chapter 7 Biodiversity**, Section 7.5, the Proposed Oatfield Development includes embedded mitigation for all KEFs during construction to minimise loss and fragmentation of suitable habitat for Irish Hare, and to avoid significant disturbance of suitable foraging habitat. Notably, best practice construction measures (Section 7.5.1) and ecological supervision (Section 7.5.4) are prescribed.

Despite the close proximity of the two windfarm developments, taking into account predicted impacts and the adoption of prescribed mitigation measures for both developments, no cumulative effects in regard of Irish Hare are likely to occur.

3.2.2.5 Designated Sites

The Knockshanvo Windfarm ZoI is predicted to not have any significant effects on the Gortacullin Bog NHA which was also the only nationally designated site screened in for further consideration within the impact assessment of the Proposed Oatfield Development. Therefore, no cumulative effects are anticipated.

An NIS was prepared for the Knockshanvo Windfarm EIAR and the following European designated sites in common with the Proposed Oatfield Development were screened in:

- Lower River Shannon SAC;
- Danes Hole, Poulnalecka SAC;
- Ratty River Cave SAC; and
- River Shannon and River Fergus Estuaries SPA.

The Knockshanvo NIS identified the following potential effects:

- Danes Hole, Poulnalecka SAC and Ratty River Cave SAC: direct effects to Lesser Horseshoe Bat roosts, collision risk to Lesser Horseshoe Bat, loss of foraging habitat, displacement of Lesser Horseshoe Bat via lighting; and
- Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA: deterioration of water quality and supporting habitat via surface and ground pathways during construction and operation and disturbance to Otter.

Similar impacts were also considered within the Proposed Oatfield Development NIS. The Knockshanvo NIS provides appropriate mitigation measures to avoid adverse significant impacts to the European sites, these mitigation measures are summarised below and include, but are not limited to:

- appropriate lighting measures (directional lighting, limited use of lighting when necessary);
- post construction monitoring;
- turbine buffers, up to 102.4m;
- blade feathering and curtailment measures;
- clear felling licenses, 10m setbacks for felling around aquatic habitats;
- embedded mitigation within the Windfarm design (maintenance of culverts, use of brash mats, silt fencing, silt traps, silt bags, settlement ponds, hydrological buffers, drainage management, surface water quality monitoring);
- mitigation by avoidance (50m buffers from main watercourses);
- mitigation by design (source controls, in-line controls, treatment systems);
- ECoW supervision;
- timing of construction works;

- implementation of CEMP;
- pre-commencement Otter survey;
- a derogation licence is required upon discovery of an Otter holt within or adjacent to the Windfarm footprint;
- 150m buffer around breeding holts;
- No vehicle access within 20m of active holts (NRA, 2008).

Detailed mitigation measures provided within the NIS anticipate and avoid any significant effects to the above-mentioned European sites. Mitigation measures described in the EIAR and the NIS for both the Knockshanvo Windfarm and the Proposed Oatfield Development ensure that no likely significant effects are anticipated alone, or in-combination with other Windfarm projects, therefore no cumulative effects are likely to occur.

3.2.3 Knockshanvo Grid Connection

The Knockshanvo Windfarm EIAR states that there is no overlap associated with the proposed grid connection for the Proposed Oatfield Development, furthermore the projects will not coincide during construction. Other receptors identified within the footprint of the Knockshanvo Windfarm EIAR in relation to the grid connection route are discussed below.

3.2.3.1 Habitats

The Baseline Habitats Report (See Appendix 6-1 of the Knockshanvo Windfarm EIAR) records the following habitats along the grid connection route: grassy verges, improved agricultural grasslands, hedgerows, treelines, agricultural sheds and private dwellings, amenity grassland, stands of broadleaved tree (sycamore and beech) scrub and broadleaved woodland. The Knockshanvo Windfarm EIAR does not detail any habitat loss within the footprint of the grid connection and that the cable will be located entirely within the road. The Proposed Oatfield Development will not result in any habitat loss of high ecological value within the footprint of the grid connection and the cable will be located entirely within the road apart from a short section off road at Ballycar at the Loop-in location.

The lack of predicted significant impacts results in no cumulative effects being likely to occur.

3.2.3.2 Invasive Species

The Knockshanvo Windfarm EIAR states that a sign indicating the presence of Japanese knotweed was identified along the verge of a rough track along the grid connection route, however no signs of the plant were recorded. For the Proposed Oatfield Development, Rhododendron was recorded along the IPP route. An ISMP has also been prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.8)** to be incorporated into the CEMP and biosecurity mitigation will be applied for the Knockshanvo Windfarm. These mitigation measures for both developments ensure that no cumulative effects are anticipated.

The proposed mitigation measures results in no cumulative effects being predicted.

3.2.3.3 Species

Bats

The Knockshanvo Windfarm EIAR states that one habitat of Low potential as a roost was identified along its grid connection route, within a water crossing in the form of a concrete bridge, horizontal directional drilling (HDD) is proposed for the water crossing in this area and disturbance impacts of any bats potentially roosting within the structure are not therefore anticipated. This feature is not crossed by the Proposed Oatfield Development IPP cable route. No such features were recorded for the Proposed Oatfield Development Grid Connection. There is therefore no potential for significant effect with regard to the loss of, or damage to, roosting habitat as a result of the grid connection for both the Knockshanvo Windfarm and the Proposed Oatfield Development.

The risk of collision for bat species along the grid connection routes for both Knockshanvo Windfarm and the Proposed Oatfield Development were considered not significant.

No cumulative impacts to bat species are likely to occur as a result of the Knockshanvo Windfarm and the Proposed Oatfield Development Grid Connections cumulative effects due to absence of roosts or habitat being impacted by these projects in-combination.

Otter

The Knockshanvo Windfarm EIAR states that the construction of the proposed grid connection route may have potential for disturbance related impacts to Otter where it passes over the Blackwater River. The EIAR prescribes mitigation measures to be undertaken on watercourse crossings along the grid connection for the avoidance of disturbance/displacement and direct mortality and to ensure that no Otter holts/breeding sites have been established since the original surveys undertaken (NRA, 2008):

- a pre-commencement Otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works;
- if an Otter holt is identified within or immediately adjacent to the Knockshanvo Development footprint, construction works likely to disturb Otter will not proceed until a derogation licence is obtained;
- no works will be undertaken within 150m of any holts at which breeding females or cubs are present;
- no wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, Otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence as outlined by ‘Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes’ (NRA, 2008);
- all of the above works will be undertaken or supervised by an appropriately qualified ecologist.

The Proposed Oatfield Development identified no significant effects on Otter as a result of the construction, operational or decommissioning phases. Due to the limited interaction of the proposed Knockshanvo Grid connection elements and the Proposed Oatfield Development IPP cable route elements, no pathways are considered likely to result in cumulative effects.

The Knockshanvo grid route involves watercourse crossing with more HDD works, where the Proposed Oatfield Development IPP route and grid route do not. As such, the potential for in-combination interactions of water contamination are not considered likely given this and the timing of these projects cable routes will not occur simultaneously.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative significant effects in regard of Otter are likely to occur.

Badger

The Knockshanvo Windfarm EIAR does not detail any sightings or secondary evidence of Badger within the footprint of the grid connection route. Badger scat and mammal trails were found in areas throughout the Knockshanvo Windfarm site with no observations of any sett in the area, regardless, appropriate mitigation measures are in place within the Knockshanvo Windfarm such that no significant effects are anticipated.

The Proposed Oatfield Development identified no significant effects on Badger as a result of the construction, operational or decommissioning phases. Due to the limited interaction of the proposed Knockshanvo Grid connection elements and the Proposed Oatfield Development IPP cable route elements, no pathways are considered likely to result in cumulative effects.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Badger are likely to occur.

Red Squirrel and Pine Marten

The Knockshanvo Windfarm EIAR does not detail any sightings or secondary evidence of Red Squirrel or Pine Marten within the footprint of the grid connection route. One Red Squirrel was recorded within coniferous forestry within the study area boundary as well as secondary evidence in the form of feeding remains, a number of scats, likely to be of Pine Marten, were recorded within the study area, as such, appropriate mitigation measures are in place within the Knockshanvo Development such that no cumulative effects are anticipated.

The Proposed Oatfield Development identified no significant effects on Red Squirrel or Pine Marten as a result of the construction, operational or decommissioning phases. Due to the limited interaction of the proposed Knockshanvo Grid connection elements and the Proposed Oatfield Development IPP cable route elements, no pathways are considered likely to result in cumulative effects.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Red Squirrel and Pine Marten are likely to occur.

Irish Hare

No sightings or evidence of Irish Hare was recorded during field surveys within the Knockshanvo grid connection route and thereby ruled out as a KEF and was not considered for further consideration in the impact assessment.

The Proposed Oatfield Development identified no significant effects on Irish Hare as a result of the construction, operational or decommissioning phases. Due to the limited interaction of the proposed Knockshanvo Grid connection elements and the Proposed Oatfield Development IPP cable route elements, no pathways are considered likely to result in cumulative effects.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Irish Hare are likely to occur.

Aquatic Habitats and Species

The Knockshanvo Windfarm EIAR states that there is a risk of run-off of sediments and other polluting materials associated with construction works associated with the proposed grid connection route, in which there are seven water crossings. Specific mitigation measures are prescribed such that no significant effects on aquatic habitats and species are likely to occur. These mitigation measures are outlined in detail in Chapter 9 of the Knockshanvo Windfarm EIAR, they include mitigation against release of suspended solids, hydrocarbons, cementitious materials, clear-felling, dewatering works controls, controls associated with construction of water crossing structures and directional drilling controls associated with the grid connection route.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of habitat suitable for aquatic species (See EIAR **Vol II Chapter 7 Biodiversity**, Section 7.5). Effects on aquatic species through habitat loss and fragmentation during the construction of the Proposed Oatfield Development are considered not significant.

As presented above, the proposed Knockshanvo Windfarm Development has limited interactions with the Proposed Oatfield Development, the Knockshanvo grid route has no instream or HDD works planned for the crossings shared with the Proposed Oatfield Development IPP cable route. As such, due to the absence of pathways between the two projects to result in cumulative effects, taking on the accepted measure of timing cable route works before or after the Knockshanvo grid route is commenced or completed, there is no increase to the likelihood for significant effects on Aquatic Habitat and Species as a result of cumulative effects between these two projects.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Aquatic Habitats and Species are likely to occur.

3.2.4 Knockshanvo Turbine Delivery Route

Loss of hedgerow and treeline habitat was identified as a significant effect for the Knockshanvo TDR. This habitat loss is compensated for within the designated BMP which provides replanting of 1.17km of hedgerow and replanting of trees being lost in their original locations. No cumulative effects are anticipated as no habitat loss is proposed along the Proposed Oatfield Development TDR.

No significant effects are anticipated during the decommissioning phase of the Knockshanvo Windfarm in combination with the Proposed Oatfield Development. Mitigation measures that are provided for sensitive receptors during the construction stage will be employed during decommissioning phase.

Taking into account the lack of predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in associated with the Turbine Delivery Routes are likely to occur.

3.2.5 Ballycar Windfarm

The Biodiversity EIAR Chapter for the Ballycar Windfarm (MWP, 2024) was consulted on 17/02/2025. The cumulative effects have been assessed regarding the different elements of the Windfarm and identified sensitive receptors as outlined below. Ballycar Windfarm lies 4.15km from the Proposed Oatfield Development at its closest point. It should be noted that the construction phases of the Ballycar Windfarm and the Proposed Oatfield Development will not coincide with each other and do not overlap.

The Ballycar windfarm substation loop-in circuits do overlap with the 1st order Kilnacreagh Stream [(25_3206) (IE_SH_25B060120)] which is upstream of the grid connection crossing for the Proposed Oatfield Development grid connection of IPP cable route.

3.2.5.1 Birds

Hen Harrier

The Proposed Oatfield Development design includes embedded mitigation to minimise loss and fragmentation of suitable Hen Harrier habitat during construction. Habitat loss is restricted to the habitat areas described in Table 8.10 of EIAR **Vol II Chapter 8 Ornithology**. This includes loss of habitat of value to breeding and wintering Hen Harriers. Larger areas of suitable Hen Harrier habitat will be retained within the Proposed Oatfield Development and the wider area (containing all identified nest sites and the majority of used foraging habitat). Despite this habitat retainment, considering the potential loss of suitable nesting habitat and active foraging habitat (including that within the core foraging range of active nests), this significant effect will be avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**). The SHMP (EIAR **Vol III Appendix 7.1)** for the Proposed Oatfield Development provides further measures for the enhancement of existing lands suitable for Hen Harrier.

The Ballycar Windfarm EIAR states that some foraging habitat for Hen Harrier will be lost during construction of the Windfarm. This habitat loss will be compensated with measures included within the Ballycar Biodiversity Enhancement Management Plan (BEMP). Such measures include the enhancement of degraded upland bog/heath habitat through rewetting and prevention of grazing. No breeding Hen Harrier habitat will be lost during construction of the Ballycar Windfarm. Significant cumulative impacts on habitat loss are therefore not predicted.

Hen Harrier breeding activity in 2023 was recorded at a distance of approximately 3km west of the study area for the Ballycar Windfarm. No winter roosts were located within a distance of at least approximately 2km of the Ballycar Windfarm site. Disturbance measures in the Ballycar Windfarm EIAR include pre-construction monitoring, the use of buffer zones, in the case of Hen Harrier of 1km around the expected location of the nest and all works will be restricted within the zone from March to August, until it can be demonstrated that the species has completed the breeding cycle. The Ballycar Windfarm EIAR contains disturbance measures for Hen Harrier including timing of works that could potentially affect nesting Hen Harrier through nest destruction or disturbance. This ensures exclusion zones are implemented according to best practice (Goodship & Furness, 2022) around active nests, within which potentially disturbing works cannot take place until the young have fledged.

The Proposed Oatfield Development includes embedded mitigation to minimise disturbance during construction and operation, providing best practice measures and ecological supervision to ensure no destruction or significant disturbance of any active Hen Harrier nests and winter roosts occurs, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (e.g., Goodship & Furness (2022)) where required (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Additional disturbance and displacement are addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the dedicated SHMP (EIAR **Vol III Appendix 7.1)**.

The collision risk for Hen Harrier during operation of the Ballycar Windfarm is calculated to be 0.0007 birds per year (0.026 birds over 35 years). The modelled Hen Harrier collision fatalities for the Proposed Oatfield Development in comparison are estimated as 0.01 birds per year, equating

to one Hen Harrier collision every 76.15 to 87.42 years. As such, when assessed in the context of the Hen Harrier population recorded within the Proposed Oatfield Development and the Ballycar Windfarm. Significant cumulative impacts on collision risk are not predicted.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Hen Harrier are likely to occur.

Peregrine

There is no habitat of significant value for nesting or foraging Peregrine within the Ballycar Windfarm site and the Proposed Oatfield Development, with this consideration, cumulative impacts on foraging and nesting Peregrine are not significant.

Breeding Peregrine activity was recorded in the summer of 2023 at Ballycar Quarry, which hosted Peregrines, and three birds were fledged. Mitigation measures are provided to prevent disturbance to breeding Peregrine include pre-construction breeding surveys to identify/confirm species distribution within the study area at the time of construction, should Peregrine be recorded breeding within the works area through confirmatory surveys before and/or during construction a buffer zone of 750m will be established around the expected location of the nest. The Proposed Oatfield Development includes the provision of best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active Peregrine nest is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**) (e.g., as detailed by Goodship & Furness (2022)) where required. The Proposed Oatfield Development EIAR considers the extent and locations of construction works within the development (with regard to baseline Peregrine activity), and potential effects through disturbance and displacement. These effects are avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**). Significant cumulative impacts on disturbance are not predicted.

For the Ballycar Windfarm, the collision risk modelling for Peregrine has calculated a rate of 1.702 collisions over the lifetime of the Windfarm or 0.049 casualties per year. Proposed mitigation to minimise risk of collision include real time monitoring of the breeding location through the breeding season or for as long as the breeding attempt is in progress, curtailment during daylight hours of turbine(s) which pose the highest risk to fledgling collision and turning off turbines immediately when the young birds are active in the morning until when they settle down. Based on the lack of flight activity within the flight risk volume of the turbines for the Proposed Oatfield Development, no collision risk modelling was required for Peregrine, therefore, cumulative impacts for collision risk are not predicted.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Peregrine are likely to occur.

Kestrel

Habitat loss within the Ballycar Windfarm include the loss of some dry-humid acid grassland, dry-humid acid grassland in mosaic with improved grassland and wet grassland in mosaic with improved grassland which provide suitable foraging habitat for Kestrel. This habitat loss will be compensated with measures from the Ballycar BEMP. Such measures include the enhancement of wet grassland through water control, land control management and prevention of grazing practices. The majority of Kestrel habitat will be retained within the Proposed Oatfield Development and the wider area, some habitat loss of value to foraging Kestrels during the breeding and winter seasons is predicted. This significant effect will be avoided through additional mitigation and

enhancement measures (Section 8, EIAR **Vol II Chapter 8 Ornithology**); notably those prescribed within the SHMP(EIAR **Vol III Appendix 7.1)**, which includes creation and enhancement of suitable foraging habitat for Kestrel. Significant cumulative impacts on habitat loss are not predicted.

Construction works at the Ballycar Windfarm site will take place in areas that have supported tree nesting pair(s) of Kestrel, as well as within areas suitable for hunting. The construction of the Ballycar Windfarm would likely have a potential disturbance effect within a distance of possibly up to 200m from the construction area. Mitigation measures provided to prevent disturbance to breeding Kestrel include pre-construction monitoring, a buffer zone (200m) will be established around the expected location of any nest site and all works will be restricted within the zone until it can be demonstrated that the species has completed the breeding cycle, taking place from March to August inclusive. The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction. The Proposed Oatfield Development EIAR includes the provision of best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active Kestrel nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones where required (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Furthermore, any significant effect will be avoided through additional mitigation and enhancement measures and the SHMP (EIAR **Vol III Appendix 7.1)**. Significant cumulative impacts for disturbance are not predicted.

For the Ballycar Windfarm, the collision risk modelling for Kestrel has calculated a rate of 10.935 collisions over the lifetime of the Windfarm or 0.312 casualties per year. For the Proposed Oatfield Development, modelled Kestrel collision fatalities during the breeding season are estimated as 0.23 to 0.26 birds per year, equating to one Kestrel collision every 3.83 to 4.42 years. Modelled Kestrel collision fatalities during the winter season are estimated as 0.05 to 0.06 birds per year, equating to one Kestrel collision every 15.02 to 18.27 years. The resultant increases in bird mortality would not be significant when compared against the annual background mortality for this species, with annual mortality reported to be 31% in adult Kestrels and 68% in juvenile Kestrels (BTO, 2023). As such, when assessed in the context of the Kestrel population recorded within the Proposed Oatfield Development site and adjacent land, and the regional and national status of this species, collision impacts on Kestrel during the operational phase are considered not significant. Significant cumulative impacts for collision risk are not predicted.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Kestrel are likely to occur.

Woodcock

Woodcock was recorded breeding to the northwest of the Ballycar Windfarm study area. The majority of habitat resulting from Ballycar Windfarm is commercial conifer plantation (15.97ha). However, similar commercial conifer forestry is widely present within the surrounding areas of both the Proposed Oatfield Development and Ballycar Windfarm, therefore, potential impacts will not result in a significant loss of breeding habitat during construction.

Woodcock was recorded within the Ballycar Windfarm study area largely as a scarce winter visitor. Breeding was recorded c.1km northwest in 2023. It is considered unlikely that construction works would have significant disturbance effects on wintering Woodcock in the area of the site due to the large availability of roosting habitat in the area. Should Woodcock be recorded breeding within the given distances of the works area through confirmatory surveys before and/or during construction, a buffer zone (200m) will be established around the expected location of the nest and all works will be restricted within the zone until it can be demonstrated that the species has completed the

breeding cycle. The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during its operation. In addition, The Proposed Oatfield Development includes the provision of best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active Woodcock nests is avoided (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Considering the limited scale of operational disturbance and the embedded mitigation described, effects on breeding and wintering Woodcock due to disturbance and displacement during the operational phase are considered not significant.

Collision risk modelling was not undertaken for Woodcock for the Ballycar Windfarm. The Ballycar Windfarm proposes monitoring (in line with best practice guidance) at pre-construction, construction, operational and decommissioning phases to prevent significant effect on birds alone or in combination with other developments. Whilst displaying Woodcock may fly at heights which would potentially bring them into contact with turbine blades, Woodcock flight activity recorded over proposed turbine locations was insufficient to justify detailed collision risk modelling for the Proposed Oatfield Development. Cumulative impacts for collision risk are not predicted.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Woodcock are likely to occur.

Buzzard

Habitat loss within the Ballycar Windfarm include the loss of some dry-humid acid grassland (2.22ha), dry-humid acid grassland in mosaic with improved grassland (1.83ha) and wet grassland in mosaic with improved grassland (2.22 ha), which provide suitable foraging habitat for Buzzard. This habitat loss will be compensated with measures from the Ballycar BEMP. Such measures include the enhancement of wet grassland through water control, land control management and prevention of grazing practices. The majority of Buzzard habitat will be retained within the Proposed Oatfield Development and the wider area (containing all identified nest sites), some habitat loss within loss of value to foraging Buzzard during the breeding and winter seasons is predicted. Potentially significant habitat loss will be avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**); notably those prescribed within the SHMP (EIAR **Vol III Appendix 7.1)**, which includes creation and enhancement of suitable foraging habitat for Buzzard. Significant cumulative impacts on habitat loss are not predicted.

Construction works on the Ballycar Windfarm will take place in areas that have supported tree nesting pair or pairs of Buzzard, as well as within areas suitable for hunting. It is considered that the construction of the wind farm would likely have a potential disturbance effect on breeding birds within a distance of possibly up to 200m from the construction area. Mitigation measures provided to prevent disturbance to breeding Buzzard include pre-construction monitoring, a buffer zone (200m) will be established around the expected location of any nest site and all works will be restricted within the zone until it can be demonstrated that the species has completed the breeding cycle, taking place from March to August inclusive. The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction. The Proposed Oatfield Development EIAR includes the provision of best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active Buzzard nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones where required (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Furthermore, any significant effect will be avoided through additional mitigation and enhancement measures and the SHMP (EIAR **Vol III Appendix 7.1)**.

For Buzzard, the collision risk modelling has calculated a rate of 14.958 collisions over the lifetime of the Ballycar Windfarm or 0.427 casualties per year. The avoidance of the immediate areas around turbines by vegetation management of the area with a radius up to 95m around each turbine will be actively encouraged so as to minimise risk of collision. The Ballycar Windfarm proposes monitoring (in line with best practice guidance) at pre-construction, construction, operational and decommissioning phases to prevent significant effect on birds alone or in combination with other developments. For the Proposed Oatfield Development, modelled Buzzard collision fatalities during the breeding season are estimated as 0.06 to 0.07 birds per year, equating to one Buzzard collision every 13.93 to 15.94 years and 0.03 birds per year for the winter season, equating to one Buzzard collision every 32.11 to 36.75 years. When assessed in the context of the Buzzard populations recorded within the Proposed Oatfield Development and receiving environment, and the regional and national status of this species, collision impacts on Buzzard during the operational phase are considered not significant. Cumulative impacts for collision risk are not predicted.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Buzzard are likely to occur.

3.2.5.2 Habitats

The study area for the Ballycar Windfarm is dominated by conifer plantation and intensively managed agricultural grassland. No rare or protected flora species were recorded. Habitats lost within the Windfarm include conifer plantation, agricultural grassland, wet grassland, dry-humid acid grassland buildings and artificial surfaces. To compensate for any habitat loss of ecological importance within the Ballycar Windfarm, several management plans have been created to minimise impacts. These involve the BEMP (See Appendix 6E of the Ballycar Windfarm EIAR), the proposed measures are outlined in Table 2 of the BEMP.

The SHMP prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.1)** includes for the creation and/or enhancement of heath and bog, grassland, scrub, hedgerows and conifer plantation. As such, these mitigation measures in place for both developments will ensure that no cumulative effects on habitats are likely to occur.

3.2.5.3 Invasive Species

The Ballycar Windfarm EIAR states that Japanese knotweed and Himalayan Balsam were identified within the study area. An ISMP will be implemented as part of the EIAR (see Appendix 6F of the Ballycar Wind Farm EIAR). An ISMP has also been prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.8)**. These mitigation measures for both developments ensure that no cumulative effects are likely to occur.

3.2.5.4 Species

Aquatic Habitats and Species

The Ballycar Windfarm EIAR has identified importance aquatic habitat within the study area, which include eroding/upland rivers, and several aquatic species have been identified as KEFs that were also identified within the Proposed Oatfield Development. These include lamprey, salmon, brown trout and eel.

Significant negative effects identified include the loss of primary instream production and reduced macroinvertebrate diversity and abundance due to a reduction of light. There are potential indirect

effects due to deterioration of water and stream habitat quality as a result of potential run of silt/sediment, ingress of cementitious material, fuel or oil and /or impacts on flow regime and in-stream vegetation which could have significant negative effects on aquatic habitats and species.

Mitigation measures proposed for the Ballycar Windfarm include a site-specific surface water management plan and water quality management system. Further mitigations are proposed for the following aspects regarding water quality: dewatering, cement bound granular mixtures, forestry felling, fuel management, refuelling of construction plant on-site, construction wheel wash, temporary construction compound, temporary local road widening, storage, excavation works, excavated materials and soil management. Macroinvertebrates will be sampled annually on the first, second and third years at aquatic sites during the operational stage of the Ballycar Windfarm.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of habitat suitable for aquatic species. Considering the potential effects on aquatics habitats and species, avoidance of disturbance, pollution and associated mortality is considered and is reflected by the embedded mitigation measures within the CEMP. Mitigation measures that will be applied include hydrological buffers around watercourses, best practices to reduce noise, light pollution spillages, and vibration generation, aiming to minimize disturbance, off-site refuelling activities, excavated soil from access road construction will be reused on-site and the implementation of a Sustainable Drainage System (SuDS) with on-site flow retention, buffer zones, and silt removal techniques to promote environmentally responsible water management (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Effects on aquatic species through habitat loss and fragmentation during the construction of the Proposed Oatfield Development are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Aquatic Habitat and Species are likely to occur.

Bats

The Ballycar Windfarm EIAR states that the following species were recorded: common pipistrelle, soprano pipistrelle, brown long-eared bat, Daubenton's bat, Leisler's bat, Lesser Horseshoe Bat, Natterers, whiskered bat and Myotis sp. No structures within the Ballycar study area were considered suitable to support a significant bat roost. Habitat loss, disturbance and displacement during construction and collision risk, disturbance and displacement during operation have been identified as significant effects to bats. Mitigation measures have been proposed during the construction and operation phases, including pre-construction surveys, habitat enhancement measures as detailed in the BEMP, CEMP measures, bat activity surveys, turbine buffer felling (98m buffer), tree-felling, provision of bat boxes, lighting measures, bat monitoring (passive, fatality and monitoring of bat boxes) and curtailment if required. All measures will be carried out in accordance with best practice guidance.

The Proposed Oatfield Development SHMP (EIAR **Vol III Appendix 7.1)** also includes compensatory habitat measures. The Proposed Oatfield Development EIAR states that best practice construction measures and ecological supervision will be used where necessary. Pre-construction surveys will also be undertaken to identify any further potential roosts which would be affected, with mitigation subsequently adopted as appropriate. These mitigation measures for both developments ensure that no cumulative effects are anticipated.

The Proposed Oatfield Development includes embedded mitigation during the operational phase to minimise the loss and fragmentation of suitable bat foraging and commuting habitat and avoid

significant disturbance of suitable habitat. Removal of potential roost sites will also be avoided wherever possible. The embedded mitigation is outlined in EIAR **Chapter 7 Biodiversity**, Section 7.5 and also the SHMP (EIAR **Vol III Appendix 7.1**).

The Proposed Oatfield Development includes embedded mitigation to minimise the risk of collisions and baropressure effects, notably by clearing linear tree/hedgerow features and forestry features within 50m of turbine blade tips to make this area unfavourable for bats and thus discourage them from flying through/in close proximity to turbines. The current recommended guidance for this mitigation is 50m for most bat species.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Bats are likely to occur.

Otter

The Ballycar Windfarm EIAR states that no Otter holts were identified, and no evidence of Otter was found during the baseline ecology surveys. Mitigation measures have been proposed, pre-construction surveys for Otter will be undertaken prior to the commencement of any construction activity to identify any changes within the site with regard to protected mammals. Surveys and implementation of best-practice guidelines for Otter will be overseen by the Project Ecologist/ECoW and in accordance with NRA/TII Guidelines 'Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes' (NRA, 2008). Other mitigations are outlined in the CEMP and BEMP which includes measures to enhance watercourses suitable for Otter.

No Otter breeding or resting places were identified during the surveys undertaken for the Proposed Oatfield Development. The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss, fragmentation and pollution of suitable Otter habitat, and to avoid significant disturbance, notably, best practice construction measures and ecological supervision will prevent pollution of watercourses and ensure suitable habitat for holts within/near works areas are identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Chapter 7 Biodiversity**).

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Otter are likely to occur.

Badger

The Ballycar EIAR states that four Badger setts were recorded within the study area. None of the sets are within 30m or 50m of a proposed turbine location or access track. Mitigation measures have been proposed which include pre-construction surveys for Badger, which will be undertaken prior to the commencement of any construction activity to identify any changes within the site with regard to protected mammals. If new Badger sets are discovered during the pre-construction surveys within or in proximity to the construction corridor, all works within a 30m buffer (50 m buffer during the breeding season) will cease. NPWS will be contacted, and the necessary mitigation implemented further to consultation. Surveys and implementation of best-practice guidelines for Badger will be overseen by the Project Ecologist/ECoW and in accordance with NRA/TII Guidelines 'Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes' (NRA, 2008). Other mitigations are outlined in the CEMP and BEMP which includes measures to enhance suitable habitat for Badger.

For the Proposed Oatfield Development, no Badger breeding or resting places were identified during the surveys. The Proposed Oatfield Development includes embedded mitigation during

construction to minimise loss and fragmentation of suitable Badger habitat, and to avoid significant disturbance of suitable foraging habitat and habitat suitable for setts. Notably, best practice construction measures and ecological supervision will minimise light spill onto suitable foraging and commuting habitat and ensure that suitable habitat for setts within/near works areas is identified, and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**).

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Badger are likely to occur.

Red Squirrel

The Ballycar Windfarm EIAR states that Red Squirrel was not recorded during surveys but suitable habitat for foraging and breeding/resting is present within the site. Mitigation measures proposed include felling of forestry to be limited to periods outside of when Red Squirrel are likely to have young in dreys/dens (peak period January to March). If this is not possible, the felling area will be surveyed by a suitably qualified ecologist to search for the presence of breeding sites.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of suitable Red Squirrel habitat (i.e., conifer plantation), and to avoid significant disturbance of this habitat. Whilst the Proposed Oatfield Development will involve the removal of approximately 8.01ha of conifer plantation, this habitat loss is minimal in the context of wider retained conifer plantation within the Proposed Oatfield Development site and (notably) the wider landscape. Best practice construction measures and ecological supervision will minimise light spill onto suitable foraging habitat and ensure suitable habitat within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Chapter 7 Biodiversity**). Mitigation specified in the SHMP (EIAR **Vol III Appendix 7.1)** will include the enhancement of retained conifer plantation for Red Squirrel.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Red Squirrel are likely to occur.

Pine Marten

The Ballycar Windfarm EIAR states that presence of Pine Marten was confirmed within the site during camera surveys. Scat was located in wooded areas, along treelines and hedgerows. Suitable foraging and breeding/resting habitat is considered to occur at the site. Mitigation measures proposed include felling of forestry to be limited to periods outside of when Pine Marten are likely to have young in dens (March and April for Pine Marten). If this is not possible, the felling area will be surveyed by a suitably qualified ecologist to search for the presence of breeding sites.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of suitable Pine Marten habitat (i.e., conifer plantation), and to avoid significant disturbance of this habitat. Whilst the Proposed Oatfield Development will involve the removal of approximately 8.01ha of conifer plantation, this habitat loss is minimal in the context of wider retained conifer plantation within the Proposed Oatfield Development site and (notably) the wider landscape. Best practice construction measures and ecological supervision will minimise light spill onto suitable foraging habitat and ensure suitable habitat within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted. Mitigation specified in the SHMP (EIAR **Vol III Appendix 7.1)** will include the enhancement of retained conifer plantation for Pine Marten.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Pine Marten are likely to occur.

Irish Hare

The Ballycar Windfarm EIAR states that Irish Hare was recorded within the site during surveys; suitable foraging and breeding/resting habitat was considered to occur at the subject site. Mitigation measures include pre-checks by a suitably qualified ecologist before vegetation clearance takes place, to check for the presence of young Irish Hares.

The Proposed Oatfield Development site includes embedded mitigation during construction to minimise loss and fragmentation of suitable Irish Hare habitat, and to avoid significant disturbance of suitable foraging and sheltering habitat (e.g., grassland, heathland, bog). Notably, best practice construction measures and ecological supervision will minimise disturbance of suitable habitat and ensure suitable habitat is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**).

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Irish Hare are likely to occur.

3.2.5.5 Designated Sites

The Gortacullin Bog NHA is within the ZoI of the Ballycar Windfarm, however it is screened out for further consideration within the impact assessment due to an absence of connectivity and impact pathways, therefore, no cumulative effects are antcipated.in regards to nationally designated sites.

An NIS accompanies the Ballycar Windfarm EIAR and screens in European sites in common with the Proposed Oatfield Development: Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA.

The Ballycar NIS identified the following potential effects:

- Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA: water quality impacts during construction and operation and loss of aquatic habitat, affecting aquatic species which include Lamprey species, Salmon and semi-aquatics which include Otter.

Similar impacts were also considered within the Proposed Oatfield Development NIS. Mitigation measures are summarised and include but not limited to:

- site-specific surface water run-off drainage system;
- silt fencing, settlement ponds, check dams;
- ECoW supervision during construction;
- pre-commencement Otter surveys;
- derogation license requirement upon identification of holts;
- CEMP;
- surface water monitoring;
- wheel washing;
- management of refuelling activities;
- bunded storage;

- appropriate lighting measures for turbines;
- clear felling activities (vegetation removal outside of the breeding season, felling license);
- exclusion of works around active nests; and
- post-construction bird monitoring.

Detailed mitigation measures provided within the NIS anticipate and avoid any significant effects to the above-mentioned European sites. Mitigation measures provided by the NIS for both the Ballycar Windfarm and the Proposed Oatfield Development ensure that no likely significant effects are anticipated alone, or in-combination with other Windfarm projects, therefore no cumulative effects are predicted.

3.2.6 Ballycar Grid Connection

There is no overlap associated with the proposed grid connection route for the Ballycar Wind Farm and any infrastructure elements associated with the Proposed Oatfield Development. Furthermore, the projects will not coincide during construction.

3.2.6.1 Habitats

The habitats recorded within, or in close proximity to, the grid connection route for the Ballycar Windfarm include the following habitats: recently felled woodland, commercial forestry and the Kilnacreagh Stream, within a conifer forestry area of the site. No instream works will be required for the grid connection route. The habitat lost during construction of the grid connection route comprises commercial forestry, which is habitat of low ecological value. The Ballycar Windfarm EIAR does not detail any habitat loss within the footprint of the grid connection and indicates that the cable will be located entirely within the road.

The Proposed Oatfield Development will not result in any habitat loss of high ecological value within the footprint of the grid connection and the cable will be located entirely within the road with the exception of one short section at Ballycar at the proposed loop-in location.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Habitats are likely to occur.

3.2.6.2 Invasive Species

The Ballycar Windfarm EIAR states that no invasive species were recorded along the grid connection route. Biosecurity mitigations and an ISMP have been applied for the Ballycar Windfarm. A pre-construction survey for invasive species will be conducted along the grid connection route, the ISMP will be updated accordingly if required, prior to construction works commencing.

For the Proposed Oatfield Development, Rhododendron was recorded along the grid connection route (IPP). An ISMP has also been prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.8)** to be incorporated into the CEMP.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Aquatic Habitat and Species are likely to occur.

3.2.6.3 Species

Bats

The Ballycar Windfarm EIAR states that a detector was deployed along the proposed grid connection route in Autumn 2023. No significant tree roost locations suitable to support large numbers of roosting bats were noted along the grid connection route. Results of bat activity for the grid connection route recorded no patterns of activity suggesting proximity to a significant roost location, with a low level of activity observed. Mitigation measures include pre-clearance ecological surveys to confirm negligible bat roosting potential within the grid connection footprint and any changes in site context are acknowledged. Bat monitoring (passive, fatality and monitoring of bat boxes) will also be implemented. All measures will be carried out in accordance with best practice guidance Other mitigation and enhancement measures are outlined in the CEMP and BEMP respectively.

No bat roosting or foraging activity was recorded along the grid connection route for the Proposed Oatfield Development. The risk of collision for bat species along both grid connection routes is considered not significant.

Taking into account the separation of the two routes, predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Bats are likely to occur.

Otter

The Ballycar Windfarm EIAR does not record any sightings or secondary evidence of Otter or Otter holts within the footprint of the grid connection route. Mitigation measures have been proposed and pre-construction surveys for Otter will be undertaken, prior to the commencement of any construction activity to identify any changes within the site with regard to protected mammals. Surveys and implementation of best-practice guidelines for Otter will be overseen by the Project Ecologist/ECoW and in accordance with NRA/TII Guidelines 'Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes' (NRA 2008). Other mitigations are outlined in the CEMP and BEMP which includes measures to enhance watercourses suitable for Otter.

For the Proposed Oatfield Development, a possible Otter sign, in the form of a mammal crossing, was identified on the banks of the Blackwater (Clare) River (EPA Code: 25B06), 107m west of the grid connection route. The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss, fragmentation and pollution of suitable Otter habitat, and avoiding significant disturbance. Best practice construction measures and ecological supervision will prevent pollution of watercourses and ensure suitable habitat for holts within/near works areas are identified and appropriate mitigation adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**).

Taking into account the separation of the two routes, predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Otters are likely to occur.

Badger

The Ballycar Windfarm EIAR does not detail any sightings or secondary evidence of Badger within or in close proximity to the grid connection route, no significant effects are likely to occur for Badger during construction and operation of the proposed grid connection route.

For the Proposed Oatfield Development, no sightings or secondary evidence of Badger within or in close proximity to the grid connection route were recorded and no significant effects are likely to occur for Badger during construction of the proposed grid connection route.

Taking into account the separation of the two routes, predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Badgers are likely to occur.

Red Squirrel

The Ballycar Windfarm EIAR does not detail any sightings or secondary evidence of Red Squirrel within or in close proximity to the grid connection route, no significant effects are likely to occur for Red Squirrel during construction and operation of the proposed grid connection route.

For the Proposed Oatfield Development, no sightings or secondary evidence of Red Squirrel within or in close proximity to the grid connection route were recorded and no significant effects are likely to occur for Red Squirrel during construction of the proposed grid connection route.

Taking into account the separation of the two routes, predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Red Squirrels are likely to occur.

Pine Marten

The Ballycar Windfarm EIAR does not record any sightings or secondary evidence of Pine Marten within or in close proximity to the grid connection route, no significant effects are likely to occur for Pine Marten during construction and operation of the proposed grid connection route.

For the Proposed Oatfield Development, no sightings or secondary evidence of Pine Marten within or in close proximity to the grid connection route were recorded and no significant effects are likely to occur for Pine Marten during construction of the proposed grid connection route.

Taking into account the separation of the two routes, predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Otters are likely to occur

Irish Hare

The Ballycar Windfarm EIAR does not record any sightings or secondary evidence of Irish Hare within or in close proximity to the grid connection route, no significant effects are likely to occur for Irish Hare during construction and operation of the proposed grid connection route.

For the Proposed Oatfield Development, no sightings or secondary evidence of Irish Hare within or in close proximity to the grid connection route were recorded and no significant effects are likely to occur for Irish Hare during construction of the proposed grid connection route.

Taking into account the separation of the two routes, predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Irish Hare are likely to occur.

Aquatic Habitats and Species

The Ballycar Windfarm EIAR states that the grid connection route crosses the Kilnacreagh Stream (EPA segment code 25_3206), within a conifer forestry area of the site. The culvert will be bottomless and there will be no instream works, so there will be no direct loss of substrate habitats. There will however be loss of primary instream production and reduced macroinvertebrate diversity

and abundance due to a reduction of light. There are potential indirect effects due to deterioration of water and stream habitat quality as a result of potential run of silt/sediment, ingress of cementitious material, fuel or oil and /or impacts on flow regime and in-stream vegetation which could have significant negative effects on aquatic habitats and species.

Mitigation measures proposed for the Ballycar Windfarm include a site-specific surface water management plan and water quality management system. Further mitigations are proposed for the following aspects regarding water quality: dewatering, cement bound granular mixtures, forestry felling, fuel management, refuelling of construction plant on-site, construction wheel wash, temporary construction compound, temporary local road widening, storage, excavation works, excavated materials and soil management. Macroinvertebrates will be sampled annually on the first, second and third years at aquatic sites during the operational stage of the Ballycar Windfarm.

The Proposed Oatfield Development EIAR and CEMP (EIAR **Vol III Appendix 5.1)** contains mitigation measures for the avoidance of disturbance, pollution and associated mortality (e.g., from pollution events) as a key consideration (Section 7.5, EIAR **Chapter 7 Biodiversity**). Where the proposed grid connection cable route encounters minor culverts, the ducts will be installed above or below the culvert depending on its depth in accordance with construction methodologies outlined in the CEMP. The crossing of Blackwater (Clare) stream along the Proposed Oatfield Development grid route will be via HDD works and will not involve instream works or pathways for surface run-off. As such, no pathway for the impact of the Ballycar substation loop-in works (which are more than 1km upstream of the Oatfield crossing) are likely to result in cumulative effects with the Proposed Oatfield Development.

Taking into account the separation of the two routes, the absence of a likely pathway interaction to cause cumulative effects, the predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Aquatic Habitats and Species are likely to occur.

3.2.7 Ballycar Turbine Delivery Route

Himalayan Balsam was recorded along the proposed turbine delivery route. Mitigation measures provided include the provision of an ISMP to prevent the spread of invasive species during works required along the TDR.

For the Proposed Oatfield Development, Rhododendron was recorded along the grid connection route (IPP) which overlaps with the TDR. An ISMP has also been prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.8)** to be incorporated into the CEMP. These mitigation measures for both developments ensure that no cumulative effects are anticipated.

The TDR for the Ballycar Windfarm will involve the removal of trees of low bat roosting potential, the EIAR states that bat surveys (surveys at height/emergence surveys) will be undertaken before turbine deliver takes place. A derogation license will be acquired if trees are identified with suitability for bat roosting followed by appropriate mitigation measures as outlined in Section 6.5, Chapter 6 of the Ballycar EIAR. An emergence survey carried out along the TDR for the Proposed Oatfield Development identified a Soprano Pipistrelle roost at a water crossing, this watercourse crossing will not require any structural works and potential disturbance will be consistent with the current usage of the transport infrastructure. It should be noted that this structure will not be used by the TDR for Ballycar. As such, no cumulative effects are anticipated.

No significant effects are anticipated during the decommissioning phase of the Ballycar Windfarm in combination with the Proposed Oatfield Development. The same mitigations proposed during

the construction phase will apply to the decommissioning phase and required mitigation measures will be carried out using best practice, these include mitigation measures undertaken for minimising disturbance to nesting birds during construction which will be applied during the decommissioning phase.

Taking into account the separation of the two routes, predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of the TDRs are likely to occur.

3.2.8 Carrownagowan Windfarm

The EIAR Biodiversity Chapter and Ornithology Chapters for the Carrownagowan Windfarm (Malachy Walsh and Partners, 2020) were consulted on 18/02/2025 The cumulative effects have been assessed regarding the different elements of the Windfarm and identified sensitive receptors as outlined below. Carrownagowan Windfarm lies 5.12km from the Proposed Oatfield Development at its closest point. This project shares one water course crossing with both Knockshanvo Windfarm and the Proposed Oatfield Development (38A IPP grid route). All three projects address this culvert crossing as trenching within the existing road. No instream works will be involved. It should be noted that the construction phases of the Carrownagowan Windfarm and the Proposed Oatfield Development will not coincide with each other.

3.2.8.1 Birds

Carrownagowan Windfarm and the Proposed Oatfield Development share the following key ornithological receptors: Hen Harrier, Peregrine, Kestrel, Merlin, Woodcock, Buzzard, Red Grouse and Golden Plover.

Hen Harrier

The Carrownagowan Windfarm EIAR states that Hen Harriers have been recorded breeding within the study area, with an estimated three breeding pair within 5km of the project site. No evidence of a winter roost on site or in the wider area was recorded during winter seasons. During the construction phase of the project 31.87ha of potentially suitable Hen Harrier foraging habitat will be lost. To compensate for this habitat loss, improvement lands to provide foraging and potentially suitable nesting habitat for Hen Harrier over the lifetime of the Windfarm are proposed.

The objectives listed include:

- to rehabilitate the blanket bog and heath habitats to provide suitable habitat for Hen Harrier prey such as meadow pipit, skylark and small mammals;
- allow blanket bog and wet heath vegetation to recover in felled areas, providing foraging habitat for Hen Harrier; and
- improve connectivity with adjacent open peatland habitat protect and enhance the adjacent bog by improving hydrological conditions within the habitat improvement areas.

The Proposed Oatfield Development design includes embedded mitigation to minimise loss and fragmentation of suitable Hen Harrier habitat during construction. Habitat loss is restricted to the habitat areas described in Table 8.10 of EIAR **Vol II Chapter 8 Ornithology**. This includes loss of habitat of value to breeding and wintering Hen Harriers. Larger areas of suitable Hen Harrier habitat will be retained within the Proposed Oatfield Development and the wider area (containing all identified nest sites and the majority of used foraging habitat). Despite this habitat retainment, considering the potential loss of suitable nesting habitat and active foraging habitat (including that

within the core foraging range of active nests), this significant effect will be avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**). The SHMP (EIAR **Vol III Appendix 7.1)** for the Proposed Oatfield Development provides further measures for the enhancement of existing lands suitable for Hen Harrier.

Likely significant effects to Hen Harrier identified within the Carrownagowan Windfarm include: displacement and barrier effects during construction. Mitigation measures proposed within the Carrownagowan Windfarm for habitat loss, disturbance and displacement include: mitigation by design to avoid any construction activities and minimise habitat loss for Hen Harrier, pre construction and construction phase bird surveys at the site, in the case that a Hen Harrier nest is discovered within 500m of planned construction work, heavy duty construction activities within 500m from the nest site will be excluded during the Hen Harrier breeding season (April to August) to allow for successful breeding, Hen Harrier activity at any nest will be monitored throughout the breeding season, timing of works (to prevent disturbance to breeding birds), ecological supervision (ECoW), avoidance of sensitive habitats, site reinstatement measures such as replacing hedgerow with like for like, reseeding of native species if required, a CEMP will also be implemented.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction and operation, providing best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active Hen Harrier nests and winter roosts is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (e.g., Goodship & Furness (2022)) where required (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Additional disturbance and displacement are addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the dedicated SHMP (EIAR **Vol III Appendix 7.1)**.

The collision risk for the Carrownagowan Windfarm is calculated at a rate of 0.056 collisions per year, or 1.65 birds over the 30-year lifetime of the wind farm. This corresponds to a 2% increase in the background mortality rate of the local population and a 0.1% increase in the background mortality rate of the national population. Therefore, the magnitude of the collision effect is considered Low. The modelled Hen Harrier collision fatalities for the Proposed Oatfield Development in comparison are estimated as 0.01 birds per year, equating to one Hen Harrier collision every 76.15 to 87.42 years. As such, when assessed in the context of the Hen Harrier population recorded within the Proposed Oatfield Development and the Carrownagowan Windfarm. Significant cumulative impacts on collision risk are not predicted.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Hen Harrier are likely to occur.

Peregrine

The Carrownagowan Windfarm EIAR indicates that a number of Peregrine flight-lines were recorded towards the periphery of the site. No optimal breeding habitat is present within, or adjacent to the site, confirmed breeding activity was recorded 2km from the site.

The Carrownagowan Windfarm EIAR states that there are no likely significant effects at a local or national level predicted during construction and operation. Mitigation measures proposed within the Carrownagowan Windfarm for habitat loss, disturbance and displacement include: mitigation by design to avoid any construction activities and minimise habitat loss, pre construction and construction phase bird surveys at the site, timing of works (to prevent disturbance to breeding birds), ecological supervision (ECoW), avoidance of sensitive habitats, site reinstatement measures such as replacing hedgerow with like for like, reseeding of native species if required, a

CEMP will also be implemented. The Proposed Oatfield Development design includes embedded mitigation to minimise loss and fragmentation of suitable raptor habitat during construction (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Habitat loss will therefore be restricted to the habitat areas described in Table 8.10 in EIAR **Vol II Chapter 8 Ornithology**. This includes the loss of habitat of value to foraging raptors (e.g., grassland, scrub, heath) but does not include the locations of any known raptor nest sites. The majority of suitable raptor nesting and foraging habitat will be unaffected or retained within the Proposed Oatfield Development, and wider areas of suitable habitat will be retained adjacent to the Proposed Oatfield Development. Potential loss of nest sites and foraging habitat is addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the SHMP (EIAR **Vol III Appendix 7.1)**.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction and operation; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration. This includes the provision of best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active raptor nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (e.g., as detailed by Goodship & Furness (2022)) where required. Disturbance and displacement is addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the dedicated SHMP (EIAR **Vol III Appendix 7.1)**.

The collision risk for Peregrine within the Carrownagowan Windfarm is calculated at zero collisions per year and is considered 'Very Low' (Percival, 2003) and Long-term, Slight to Imperceptible Negative effect (EPA, 2022). Based on the lack of flight activity within the flight risk volume of the proposed turbines, no collision risk modelling was required for Peregrine within the Proposed Oatfield Development.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Peregrine are likely to occur.

Kestrel

For the Carrownagowan Windfarm, over three years of vantage point surveys, Kestrel was observed on 144 occasions and is deemed a resident, regularly occurring population.

The Carrownagowan Windfarm EIAR states that no likely significant effects at a local or national level for Kestrel are likely to occur during construction and operation and it is classified as a 'low sensitivity' species. Mitigation measures proposed within the Carrownagowan Windfarm for habitat loss, disturbance and displacement include: mitigation by design to avoid any construction activities and minimise habitat loss, pre construction and construction phase bird surveys at the site, timing of works (to prevent disturbance to breeding birds), ecological supervision (ECoW), avoidance of sensitive habitats, site reinstatement measures such as replacing hedgerow with like for like, reseeding of native species if required, a CEMP will also be implemented.

The Proposed Oatfield Development design includes embedded mitigation to minimise loss and fragmentation of suitable raptor habitat during construction (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Habitat loss will therefore be restricted to the habitat areas described in Table 8.10 in EIAR **Vol II Chapter 8 Ornithology**. This includes the loss of habitat of potential value to foraging raptors (e.g., grassland, scrub, heath) but does not include the locations of any known raptor nest sites. The majority of suitable raptor nesting and foraging habitat will be retained within the Proposed Oatfield Development, and wider areas of suitable habitat will be retained adjacent to the Proposed Oatfield Development. Potential loss of nest sites and foraging habitat is

addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the SHMP (EIAR **Vol III Appendix 7.1)**.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction and operation; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration. This includes the provision of best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active raptor nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (e.g., Goodship & Furness (2022)) where required. Disturbance and displacement is addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the dedicated SHMP.

The collision risk for Kestrel within the Carrownagowan Windfarm has been calculated at a rate of 0.365 collisions per year, or 11 birds over the 30-year lifetime of the project. The significance of the effect as a result of the operational phase of the project on Kestrel is considered Low - Very Low (Percival, 2003) and is assessed as a Long-term Slight – Imperceptible Negative Effect (EPA, 2022). For the Proposed Oatfield Development, modelled Kestrel collision fatalities during the breeding season are estimated as 0.23 to 0.26 birds per year, equating to one Kestrel collision every 3.83 to 4.42 years. Modelled Kestrel collision fatalities during the winter season are estimated as 0.05 to 0.06 birds per year, equating to one Kestrel collision every 15.02 to 18.27 years. The resultant increases in bird mortality would not be significant when compared against the annual background mortality for this species, with annual mortality reported to be 31% in adult Kestrels and 68% in juvenile Kestrels (BTO, 2023). As such, when assessed in the context of the Kestrel population recorded within the Proposed Oatfield Development site and adjacent land, and the regional and national status of this species, collision impacts on Kestrel during the operational phase are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Kestrel are likely to occur.

Woodcock

Breeding bird surveys at Carrownagowan indicate that Woodcock are breeding in small numbers at the study area. The Carrownagowan Windfarm EIAR states that no likely significant effects at a local or national level for Woodcock are likely to occur during construction and operation and it is classified as a 'medium sensitivity' species. Mitigation measures proposed within the Carrownagowan Windfarm for habitat loss, disturbance and displacement include: mitigation by design to avoid any construction activities and minimise habitat loss, preconstruction and construction phase bird surveys at the site, timing of works (to prevent disturbance to breeding birds), ecological supervision (ECoW), avoidance of sensitive habitats and site reinstatement measures, a CEMP will also be implemented.

The Proposed Oatfield Development design includes embedded mitigation to minimise loss and fragmentation of suitable Woodcock habitat during construction and operation (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Permanent and temporary land take will therefore be restricted to the habitat areas described in Table 8.10 in EIAR **Vol II Chapter 8 Ornithology**. This includes the loss of highly suitable breeding and wintering habitat for Woodcock (notably conifer plantation). Wider areas of suitable Woodcock habitat will be retained within and adjacent to the Proposed Oatfield Development (including identified breeding territories). This significant effect will be avoided through additional mitigation and enhancement measures (Section 8.7.1 **EIAR Vol II Chapter 8 Ornithology**) and the SHMP (EIAR **Vol III Appendix 7.1)**.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction and operation; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration using best practice measures and ecological supervision to ensure that the destruction or significant disturbance of any active Woodcock nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones where required (Section 8.5, **Vol II Chapter 8 Ornithology**). Significant effects through disturbance and displacement will be avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**); notably the enhancement of conifer plantation and heath within the SHMP (EIAR **Vol III Appendix 7.1)**.

Woodcock was not recorded flying at the potential collision risk zone within the Carrownagowan Windfarm, regardless, the collision risk was assessed as being 'Low' (Percival, 2003) and 'Long term Slight to Imperceptible Negative' (EPA, 2022) using recoded flight activity during surveys to determine flight height. For the Proposed Oatfield Development, Woodcock flight activity recorded over proposed turbine locations was insufficient to justify detailed collision risk modelling. Collision impacts on Woodcock during the operational phase are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Woodcock are likely to occur.

Merlin and Buzzard

The Carrownagowan Windfarm EIAR states that there were only four observations of Merlin over the three years of surveys in the study area. Three of the observations during the breeding season. No breeding or roosting activity was recorded. Buzzards recorded within the Carrownagowan study area during the breeding season are likely to be associated with a breeding population from the wider area.

The Carrownagowan Windfarm EIAR states that there are no likely significant effects at a local or national level for Merlin and Buzzard predicted during construction and operation. Merlin was classified as a 'medium sensitivity' species, Buzzard is classified as 'low sensitivity' species. Mitigation measures proposed within the Carrownagowan Windfarm for habitat loss, disturbance and displacement include: mitigation by design to avoid any construction activities and minimise habitat loss, preconstruction and construction phase bird surveys at the site, timing of works (to prevent disturbance to breeding birds), ecological supervision (ECoW), avoidance of sensitive habitats and site reinstatement measures, a CEMP will also be implemented.

The Proposed Oatfield Development design includes embedded mitigation to minimise loss and fragmentation of suitable raptor habitat during construction and operation. Habitat loss will therefore be restricted to the habitat areas described in Table 8.10 in EIAR **Vol II Chapter 8 Ornithology**. This includes the loss of habitat of potential value to foraging raptors (e.g., grassland, scrub, heath) but does not include the locations of any known raptor nest sites. The majority of suitable raptor nesting and foraging habitat will be retained within the Proposed Oatfield Development, and wider areas of suitable habitat will be retained adjacent to the Proposed Oatfield Development. Significant effects through direct habitat loss and fragmentation will be avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the SHMP (EIAR **Vol III Appendix 7.1)**.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration, using best practice measures and ecological supervision to ensure

the destruction or significant disturbance of any active raptor nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (e.g., as detailed by Goodship & Furness (2022)) where required. Significant effects through disturbance and displacement is avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**).

No Merlin flight activity was recorded within the potential collision risk zone for the Carrownagowan Windfarm and was assessed as being zero within available accuracy levels. Based on the lack of flight activity within the flight risk volume of the proposed turbines, no collision risk modelling was required for Merlin within the Proposed Oatfield Development.

The collision risk for the Carrownagowan Windfarm has been calculated at a rate of 0.12 collisions per year, or 3.5 birds over the 30-year lifetime of the project, which is considered Very Low (Percival, 2003) and a 'Long-term Slight – Imperceptible Negative Effect' (EPA, 2022). For the Proposed Oatfield Development, modelled Buzzard collision fatalities during the breeding season are estimated as 0.06 to 0.07 birds per year, equating to one Buzzard collision every 13.93 to 15.94 years. Modelled Buzzard collision fatalities during the winter season are estimated as 0.03 birds per year, equating to one Buzzard collision every 32.11 to 36.75 years. When assessed in the context of the Buzzard populations recorded within the Proposed Oatfield Development and receiving environment, and the regional and national status of this species, collision impacts on Buzzard during the operational phase are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Merlin and Buzzard are likely to occur.

Red Grouse

Breeding territories were detected outside of the Carrownagowan Windfarm site to the south. The Carrownagowan Windfarm EIAR states that there are no likely significant effects at a local or national level for Red Grouse predicted during construction and operation. Red Grouse was classified as a 'medium sensitivity' species.

Mitigation measures proposed within the Carrownagowan Windfarm for habitat loss, disturbance and displacement include: mitigation by design to avoid any construction activities and minimise habitat loss, preconstruction and construction phase bird surveys at the site, timing of works (to prevent disturbance to breeding birds), ecological supervision (ECoW), avoidance of sensitive habitats and site reinstatement measures, a CEMP will also be implemented.

The Proposed Oatfield Development design includes embedded mitigation to minimise loss and fragmentation of suitable Red Grouse habitat during construction. Habitat loss will therefore be restricted to the habitat areas described in Table 8.10 in EIAR **Vol II Chapter 8 Ornithology**. Whilst this includes the loss of suitable Heather-dominated habitat (e.g., heath, bog, plantation edge), no Red Grouse observations were recorded in this habitat during the detailed field surveys undertaken between 2021 and 2023 inclusive, and much larger areas of suitable Red Grouse habitat (including that within which breeding territories were recorded) will be retained within and adjacent to the Proposed Oatfield Development (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). This retained suitable habitat includes land within the adjacent Gortacullin Bog NHA. This significant effect of habitat loss and fragmentation will be avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the dedicated SHMP (EIAR **Vol III Appendix 7.1)**.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration and provides best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active Red Grouse nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones where required. Any potential significant effects through disturbance and displacement will be avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the dedicated SHMP (EIAR **Vol III Appendix 7.1)**.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Hen Harrier are likely to occur.

3.2.8.2 Habitats

The footprint for the Carrownagowan Windfarm is dominated by conifer plantation which accounts for 90% of the Windfarm footprint. Habitat loss and possible disturbance is expected for the following additional terrestrial habitats:

- Hedgerow and treeline habitat;
- Oak-birch-holly woodland;
- Upland blanket bog;
- Upland blanket bog/wet heath;
- Cutover bog; and
- Wet heath.

This habitat loss will result from works associated with turbine foundations and associated infrastructure (existing roads tracks), road widening works associated with the delivery route which accounts for the loss of hedgerow and treeline habitats.

Habitat loss during construction is addressed through mitigation measures which include:

- employing a qualified and experienced project ecologist during the construction phase of the project to ensure all environmental controls and EIAR mitigation is implemented in full;
- a CEMP will be implemented to provide mitigation measures to prevent significant negative impacts to the ecological receptors identified in the EIAR;
- hedgerow and treeline removal required for the proposed turbine delivery route will be reinstated with native hedgerow and tree species indigenous to the local area;
- oak-birch-holly woodland will be reinstated with native tree species, exclusion zones will be implemented for sensitive habitats (bog, heath habitat);
- vegetation removal will be conducted outside of the restricted period (March 1st to 31st August); and
- tree felling for the conifer plantation will be undertaken in accordance with a tree felling licence in accordance with Forest Service Guidelines.

The Carrownagowan EIAR also provides a Biodiversity Enhancement Measures report which identifies opportunities for biodiversity enhancement that have been identified during ecology

surveys and assessment at the Carrownagowan site (Appendix 6-11 of the Carrownagowan EIAR). Significant negative effects on habitats have been identified within the Proposed Oatfield Development EIAR (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Furthermore, The SHMP prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.1)** includes for the creation and/or enhancement of heath and bog, grassland, scrub, hedgerows and conifer plantation.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Habitats are likely to occur.

3.2.8.3 Invasive Species

The Carrownagowan Windfarm EIAR identified several invasive species: Himalayan knotweed is located within the footprint of the proposed substation, rhododendron occurs in the proximity of T1, T6, and T17 and along the proposed delivery route. Mitigation measures to address to potential spread of invasive species within the Carrownagowan Windfarm site include: a CEMP which contains mitigations measures for the management of invasive species and a site specific ISMP has been developed (Appendix 6-9, Chapter 6 of the Carrownagowan EIAR).

An ISMP has also been prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.8)** to be incorporated into the CEMP.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Invasive Species are likely to occur.

3.2.8.4 Species

Aquatic Habitats and Species

The Carrownagowan Windfarm EIAR has identified important aquatic habitat within the study area, which include eroding/upland rivers and drainage ditches and several aquatic species were also identified for consideration for significant negative effects through disturbance and displacement:

- Drainage ditches;
- Salmon;
- Brown trout;
- Lampreys; and
- Eel.

Site mitigation within the Carrownagowan Windfarm include hydrological buffers of 75m applied to streams, a CEMP which includes mitigation measures including a Surface Water Management Plan, Fuels and Oil Management. Other measures include water quality control measures (Chapter 3 of the Carrownagowan EIAR) and site management during construction.

The Proposed Oatfield Development similarly has the potential for effects on habitats through disturbance and pollution, especially sensitive habitats that include watercourses and habitats used by specially protected and notable species such as heath and woodland. The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of habitat suitable for aquatic species. Considering the potential effects on aquatics habitats and species, avoidance of disturbance, pollution and associated mortality is considered

and is reflected by the embedded mitigation measures within the CEMP (EIAR **Vol III Appendix 5.1)**. Mitigation measures that will be applied include hydrological buffers around watercourses, best practices to reduce noise, light pollution spillages, and vibration generation, aiming to minimize disturbance, off-site refuelling activities, excavated soil from access road construction will be reused on-site and the implementation of a Sustainable Drainage System (SuDS) with on-site flow retention, buffer zones, and silt removal techniques to promote environmentally responsible water management (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Effects on aquatic species through habitat loss and fragmentation during the construction of the Proposed Oatfield Development are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Aquatic Habitats and Species are likely to occur.

Bats

Similar to the Proposed Oatfield Development, habitat loss effects and collision impacts during operation on bats within the Carrownagowan Windfarm are assessed as long-term slight negative effects.

Mitigation measures proposed for the Carrownagowan Windfarm include: pre-construction bat roost surveys to be carried out at the project site following best practice guidance, lighting measures to prevent overspill into forestry, post-construction (fatality) monitoring during the construction and operation phases.

In regard to Lesser Horseshoe Bat at Carrownagowan, the species was recorded in low numbers and the EIAR concluded that the species' use of the site is rare and the site is not within the core, or extended, foraging range of the local population of this species. Therefore, Lesser Horseshoe Bat is not considered to be negatively affected by the Windfarm but is considered under the precautionary principle in the above mitigation measures.

The Proposed Oatfield Development SHMP (EIAR **Vol III Appendix 7.1)** includes compensatory habitat measures for bat species. The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of suitable bat habitat (e.g., woodland, higher quality grassland, hedgerows), and to avoid significant disturbance of this habitat. Notably, best practice construction measures and ecological supervision will minimise light spill onto suitable foraging habitat and potential roost sites (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Whilst no bat roosts have been identified as requiring removal to facilitate the Proposed Oatfield Development, pre-construction surveys will be undertaken to identify any potential roosts which would be affected, with mitigation subsequently adopted as appropriate. Considering this embedded mitigation, disturbance and direct mortality effects on bats during construction will not be significant.

The Proposed Oatfield Development includes embedded mitigation during the operational phase to minimise the loss and fragmentation of suitable bat foraging and commuting habitat (i.e., rough grassland, heath, hedgerows, scrub and watercourses) and avoid significant disturbance of suitable habitat. Removal of suitable bat habitat during the operation of the Proposed Oatfield Development is expected to be minimal, and light spill onto habitat used by bats (notably potential roost sites and key foraging and commuting areas) during operation will be avoided. ECoW support during relevant maintenance activities will ensure that any suitable bat habitat is identified prior to operational activities and appropriate measures (e.g., further surveys, precautionary working methods, sensitive timing of works) are implemented to avoid any harming or disturbance of bats

(Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering this embedded mitigation, and the scope for impacts during the operational stage, effects on foraging, roosting and commuting bats through habitat loss, fragmentation and disturbance during the operation of the Proposed Oatfield Development are considered not significant.

The Carrownagowan Windfarm will have bat buffers of 86m around each turbine to prevent bat collision risk during operation of the Windfarm. The Proposed Oatfield Development includes embedded mitigation to minimise the risk of collisions and baropressure effects, notably by clearing linear tree/hedgerow features and forestry features within 50m of turbine blade tips to make this area unfavourable for bats and thus discourage them from flying through/in close proximity to turbines. The current recommended guidance for this mitigation is 50m for most bat species.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Aquatic Habitats and Species are likely to occur.

Otter

The Carrownagowan Windfarm EIAR states that no Otter observations, or evidence of this species using the rivers and streams were recorded from within site the boundary. Disturbance, and or displacement effects on Otter foraging habitat and Otter foraging/commuting activity was assessed as being a significant negative impact to be addressed. Mitigation measures detailed in the Carrownagowan Windfarm EIAR for Otter include: mitigation measures prescribed within the CEMP, pre-construction surveys following best practice guidance, water quality controls and monitoring during the construction phase.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss, fragmentation and pollution of suitable Otter habitat, and to avoid significant disturbance (e.g., of aquatic habitat for foraging and commuting, and of terrestrial habitat suitable for dens). Notably, best practice construction measures and ecological supervision will prevent pollution of watercourses and ensure suitable habitat for dens within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering the level of Otter activity recorded within the ecological baseline of the Proposed Oatfield Development, and this embedded mitigation, construction effects on Otter through habitat loss and fragmentation, pollution and disturbance are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Otter are likely to occur.

Badger

The Carrownagowan Windfarm EIAR states that suitable breeding habitat and resting habitat for Badger is present and a number of observations of this species within the Carrownagowan Windfarm site were recorded. Significant potential effects on Badger were identified in the form of habitat loss, and disturbance/displacement during the construction phase. Mitigation measures detailed in the Carrownagowan Windfarm EIAR for Badger include: mitigation measures prescribed within the CEMP, pre-construction surveys following best practice guidance and monitoring during the construction phase.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of suitable Badger habitat, and to avoid significant disturbance of suitable foraging habitat (e.g., grassland, farmland) and habitat suitable for setts (e.g., woodland,

scrub, hedgerows). Notably, best practice construction measures and ecological supervision will minimise light spill onto suitable foraging and commuting habitat and ensure suitable habitat for setts within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering the level of Badger activity recorded within the ecological baseline of the Proposed Oatfield Development and this embedded mitigation, construction effects on Badger through habitat loss and fragmentation and disturbance are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Badger are likely to occur.

Red Squirrel

The Carrownagowan Windfarm EIAR states that a number of observations of Red Squirrel foraging and flushed within the site boundary as well as suitable breeding habitat occurs at the project site. Significant effects on Red Squirrel were identified in the form of habitat loss, and disturbance/displacement during the construction phase. Mitigation measures detailed in the Carrownagowan Windfarm EIAR for Badger include: mitigation measures prescribed within the CEMP, pre-construction surveys following best practice guidance and monitoring during the construction phase.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of suitable Red Squirrel habitat (i.e., conifer plantation), and to avoid significant disturbance of this habitat. Whilst the Proposed Oatfield Development will involve the removal of approximately 8.01ha of conifer plantation, this habitat loss is minimal in the context of wider retained conifer plantation within the Proposed Oatfield Development site and (notably) the wider landscape. Best practice construction measures and ecological supervision will minimise light spill onto suitable foraging habitat and ensure suitable habitat within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering this embedded mitigation, and the limited extent of habitat loss in a local and wider context, construction effects on Red Squirrel through habitat loss and fragmentation and disturbance are considered not significant. Mitigation specified in the SHMP will include the enhancement of retained conifer plantation for Key Ecological Features (KEFs) including Red Squirrel.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Red Squirrel are likely to occur.

Pine Marten

The Carrownagowan Windfarm EIAR states that a number of observations of Pine Marten foraging within the site boundary were recorded as well as suitable breeding habitat occurring at the project site. Significant effects on Pine Marten were identified in the form of habitat loss, and disturbance/displacement during the construction phase. Mitigations measures detailed in the Carrownagowan Windfarm EIAR for Badger include: mitigation measures prescribed within the CEMP, pre-construction surveys following best practice guidance and monitoring during the construction phase.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of suitable Pine Marten habitat (i.e., conifer plantation), and to avoid significant disturbance of this habitat. Whilst the Proposed Oatfield Development will involve the removal of approximately 8.01ha of conifer plantation, this habitat loss is minimal in the context

of wider retained conifer plantation within the Proposed Oatfield Development site and (notably) the wider landscape. Best practice construction measures and ecological supervision will minimise light spill onto suitable foraging habitat and ensure suitable habitat within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering this embedded mitigation, and the limited extent of habitat loss in a local and wider context, construction effects on Pine Marten through habitat loss and fragmentation and disturbance are considered not significant. Mitigation specified in the SHMP will include the enhancement of retained conifer plantation for KEF including Pine Marten.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Pine Maten are likely to occur.

Irish Hare

The Carrownagowan Windfarm EIAR states that Irish Hare was recorded infrequently in low numbers and more optimal and abundant habitat is present away from the site. The species was not included for further consideration in the impact assessment and cumulative effects are therefore not considered significant.

3.2.8.5 Designated Sites

The Gortacullin Bog NHA is within the ZoI of the Carrownagowan Windfarm however, it is screened out for further consideration within the impact assessment due to the intervening distance, poor ecological connectivity and lack of hydrological connectivity to the project.

An NIS accompanies the Carrownagowan Windfarm EIAR, however, there are no common European sites with potential for cumulative effects between the Carrownagowan Windfarm and the Proposed Oatfield Development, therefore no cumulative effects are predicted.

3.2.9 Carrownagowan Grid Connection

There is a minor overlap with the proposed grid connection route for the Carrownagowan Windfarm and the Proposed Oatfield Development grid connection route, at the junction crossing between R471 and L-30423. Both works are isolated to the road and even in a worst-case scenario of both project working this junction simultaneously, will not require access to the road in a manner that would exceed the already scoped in separate effect magnitudes for noise surface run-off or other potential impact pathways as addressed in the respective EIARs. No surface run-off or other pathway is present to consider an increase of magnitude or effect. As such, cumulative effects are not expected between this project and the Proposed Oatfield Development. Other receptors identified within the footprint of the Carrownagowan EIAR in relation to the grid connection are discussed below.

3.2.9.1 Habitats

The proposed grid connection for the Carrownagowan Windfarm is confined to public road and there will be no requirement for hedgerow clearance. The proposed grid connection route will be mainly confined to low ecological value habitat, which includes an existing forestry track and the public road network and improved agricultural grassland. Therefore, the potential for loss of higher quality habitat has been avoided.

The Proposed Oatfield Development grid connection route will not result in any habitat loss of high ecological value within the footprint of the grid connection and that the cable will be located entirely within the road. As such, no cumulative effects are likely to occur.

3.2.9.2 Invasive Species

The Carrownagowan Windfarm EIAR details that Japanese knotweed, Himalayan knotweed and giant rhubarb occur in hedgerows and disturbed ground bounding the proposed grid connection route.

Mitigation measures to address to potential spread of invasive species in close proximity to the Carrownagowan grid connection route include: a CEMP which contains mitigations measures for the management of invasive species and a site specific ISMP has been developed (Appendix 6-9, Chapter 6 of the Carrownagowan EIAR).

For the Proposed Oatfield Development grid connection route, Rhododendron was recorded along the grid connection route (IPP). An ISMP has also been prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.8)** to be incorporated into the CEMP.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Invasive Species are likely to occur.

3.2.9.3 Species

Bats

The Carrownagowan Windfarm EIAR states that bats could potentially use structures along the proposed grid connection route. However, it is considered that the low to moderate potential roost sites available are unlikely to support significant roost sites such as maternity roosts. Pre-construction bat roost surveys will be carried out, including structures along the proposed grid connection. In the event that a new bat roost is identified mitigation will follow best practice guidance.

No bat roosts were identified along the Proposed Oatfield Development grid connection route. The risk of collision for bat species along the grid connection route is considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Bats are likely to occur.

Otter

The Carrownagowan Windfarm EIAR states that disturbance, and or displacement effects on Otter may occur during the construction phase of the proposed grid connection route. Mitigations measures detailed in the Carrownagowan Windfarm EIAR for Otter include: mitigation measures prescribed within the CEMP, pre-construction surveys following best practice guidance, water quality controls and monitoring during the construction phase.

For the Proposed Oatfield Development, a mammal crossing (possibly Otter) was identified on the banks of the Blackwater (Clare) River approximately 107m west of the grid connection route. Two Otter spraints were identified, one spraint is located on the banks of the Oatfield River, approximately 55m west of the grid connection route. The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss, fragmentation and pollution of suitable Otter habitat, and to avoid significant disturbance (e.g., of aquatic habitat for foraging and

commuting, and of terrestrial habitat suitable for dens). Notably, best practice construction measures and ecological supervision will prevent pollution of watercourses and ensure suitable habitat for dens within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering the level of Otter activity recorded within the ecological baseline of the Proposed Oatfield Development, and this embedded mitigation, construction effects on Otter through habitat loss and fragmentation, pollution and disturbance are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Otter are likely to occur.

Badger

The Carrownagowan Windfarm EIAR does not detail any sightings or secondary evidence of Badger within or in close proximity to the grid connection route, no significant effects are likely to occur for Badger during construction and operation of the proposed grid connection route.

For the Proposed Oatfield Development, no sightings or secondary evidence of Badger within or in close proximity to the grid connection route, no significant effects are likely to occur for Badger during construction and operation of the proposed grid connection route.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Badger are likely to occur.

Red Squirrel

The Carrownagowan Windfarm EIAR does not detail any sightings or secondary evidence of Red Squirrel within or in close proximity to the grid connection route, no significant effects are likely to occur for Red Squirrel during construction and operation of the proposed grid connection route.

For the Proposed Oatfield Development, no sightings or secondary evidence of Red Squirrel within or in close proximity to the grid connection route, no significant effects are likely to occur for Red Squirrel during construction of the proposed grid connection route.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Red Squirrel are likely to occur.

Pine Marten

The Carrownagowan Windfarm EIAR does not detail any sightings or secondary evidence of Pine Marten within or in close proximity to the grid connection route, no significant effects are likely to occur for Pine Marten during construction and operation of the proposed grid connection route.

For the Proposed Oatfield Development, no sightings or secondary evidence of Pine Marten within or in close proximity to the grid connection route, no significant effects are likely to occur for Pine Marten during construction of the proposed grid connection route.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Pine Marten are likely to occur.

Aquatic Habitats and Species

The Carrownagowan Windfarm EIAR states that the grid connection route runs along the River Blackwater, which recorded lamprey and low densities of lamprey may occur in the mid upper reaches of the rivers. Significant effects in the form of indirect disturbance and or displacement as a result of poor water quality via pollution have been identified. Mitigation measures include: a

CEMP which includes mitigation measures including a Surface Water Management Plan, Fuels and Oil Management, other measures include water quality control measures (Chapter 3 of the Carrownagowan EIAR) and site management during construction.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of habitat suitable for aquatic species. Where the proposed grid connection cable route encounters minor culverts, the ducts will be installed above or below the culvert depending on its depth in accordance with construction methodologies outlined in the CEMP (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Mitigation measures that will be applied include hydrological buffers around watercourses, best practices to reduce noise, light pollution spillages, and vibration generation, aiming to minimize disturbance, off-site refuelling activities, excavated soil from access road construction will be reused on-site and the implementation of a Sustainable Drainage System (SuDS) with on-site flow retention, buffer zones, and silt removal techniques to promote environmentally responsible water management. Effects on aquatic species through habitat loss and fragmentation during the construction of the Proposed Oatfield Development are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Aquatic Habitats and Species are likely to occur.

3.2.10 Carrownagowan Turbine Delivery Route

Significant effects to the TDR for the Carrownagowan Windfarm include habitat loss of hedgerow and treelines and disturbance and or displacement to hedgehog within the Proposed Carrownagowan Windfarm, mitigation measures are provided for hedgehog within the Carrownagowan EIAR. Mitigation measures include the reinstatement of hedgerows with native species endemic to the locality.

No significant effects are anticipated during the decommissioning phase of the Carrownagowan Windfarm in combination with the Proposed Oatfield Development. All mitigation measures will be carried out using best practice and works will be agreed with Clare County Council prior to works commencing.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects relating to the two TDRs are likely to occur.

3.2.11 Fahybeg Windfarm

The EIAR Biodiversity Chapter for the Fahybeg Windfarm (Fehily Timoney, 2023) was consulted on 24/02/2025. The cumulative effects have been assessed regarding the different elements of the Windfarm and identified sensitive receptors as outlined below. Fahybeg Windfarm lies 6.04km from the Proposed Oatfield Development at its closest point. Fahybeg grid route crosses the Blackwater (Clare)_010 over 2km downstream of the nearest the Proposed Oatfield Development crossing of the same waterbody. Given the upstream distance with the project and the absence of instream works related to the Proposed Oatfield Development watercourse crossing, there is no likely interaction to result in significant cumulative effects. It should be noted that the construction phases of the Fahybeg Windfarm and the Proposed Oatfield Development are not expected to coincide with each other.

3.2.11.1 Birds

Fahybeg Windfarm and the Proposed Oatfield Development share the following key ornithological receptors: Hen Harrier, Peregrine, Kestrel, Merlin, Woodcock, Buzzard and Golden Plover.

Hen Harrier

The Fahybeg Windfarm EIAR states that Hen Harrier flight activity was recorded at negligible levels within the study area (three individuals over 2 years). No winter roosts were recorded, the Windfarm site was deemed to be not important for Hen Harrier regarding breeding and roosting habitat. No significant effects via habitat loss or alteration are likely to occur. More suitable breeding habitat for Hen Harrier is widely available 2.5km north of the 500m turbine buffer. Based on the low usage and presence of Hen Harrier at the Windfarm site, significant effects via disturbance and displacement is deemed unlikely. Hen Harrier flightline records did not meet the required criteria (>200 flight records) for collision risk analysis. Based on the lack of flight activity within the flight risk volume of the proposed turbines, no collision risk modelling was required for Hen Harrier, no additional significant effects for Hen Harrier during the operational phase were identified.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction and operation, providing best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active Hen Harrier nests and winter roosts is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (e.g., as detailed by Goodship & Furness (2022)) where required (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Additional disturbance and displacement are addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the dedicated SHMP (EIAR **Vol III Chapter 8 Appendix 7.1)**.

The modelled Hen Harrier collision fatalities for the Proposed Oatfield Development in comparison are estimated as 0.01 birds per year, equating to one Hen Harrier collision every 76.15 to 87.42 years. As such, when assessed in the context of the Hen Harrier population recorded within the Proposed Oatfield Development and the Fahybeg Windfarm, significant cumulative impacts on collision risk are not predicted.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Hen Harrier are likely to occur.

Peregrine

The Fahybeg Windfarm EIAR states that there is no suitable nesting habitat for Peregrine within the 2km turbine buffer. This statement is confirmed by the low levels of activity recorded within the survey area. Quarries south of the proposed turbines were checked and determined not to contain nesting Peregrines. No breeding or roosting habitat suitable for Peregrine were recorded on the Windfarm site and it is therefore deemed not important for this species. There is no potential for disturbance effects to breeding or roosting Peregrine due to the low usage of the site by the species and lack of suitable nesting habitat. Based on the lack of flight activity within the flight risk volume of the proposed turbines, no collision risk modelling was required for Peregrine

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction and operation; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration. This includes the provision of best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active raptor

nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (e.g., as detailed by Goodship & Furness (2022)) where required. Disturbance and displacement is addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the dedicated SHMP. Based on the lack of flight activity within the flight risk volume of the proposed turbines, no collision risk modelling was required for Peregrine within the Proposed Oatfield Development.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Peregrine are likely to occur.

Kestrel

The Fahybeg Windfarm EIAR states that Kestrel were recorded foraging within the Windfarm site over both winter and breeding seasons. One pair was identified as breeding within the 2km turbine buffer. The Windfarm will result in the loss of hunting habitat for Kestrel. Mitigation measures provided include:

- clearance of vegetation at the Site, GCR and TDR nodes, including forestry plantation, should only be carried outside of the breeding season (September to February);
- pre-construction surveys carried out by and ecologist;
- planting new pollinator-friendly hedgerows;
- construction activity will be undertaken in daylight to minimise disturbances to roosting birds, or active nocturnal bird species;
- toolbox talks will be undertaken with construction staff on disturbance to key species during construction to minimise disturbance;
- re-instated hedgerows will be planted with locally sourced native species; and
- re-confirmatory surveys (March/April) of the proposed turbine locations, Roads and hard standings will be conducted to assess any evidence of Kestrel.

The closest Kestrel territory recorded in proximity to the Fahybeg Windfarm is beyond the range of disturbance (100-200m; Goodship & Furness, 2022) from the proposed wind farm, but the GCR is within the disturbance range for this territory, however, lower level of construction activity and shorter duration of works for grid cable installation reduces the magnitude of potential disturbance. The Fahybeg EIAR states that hunting Kestrels could occur across the proposed site and would be potentially therefore subject to disturbance, such disturbance would be temporary and localised and large areas of the site and surrounding area would remain available for use. There are no potential effects for Kestrel via disturbance during construction.

The predicted number of collisions for Kestrel is estimated at 6.34-8.33 for the lifetime of the Windfarm. The proposed impact of collision risk will be a 'Long-term Imperceptible' effect at the national scale.

The Proposed Oatfield Development design includes embedded mitigation to minimise loss and fragmentation of suitable raptor habitat during construction (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Habitat loss will therefore be restricted to the habitat areas described in Table 8.10 in EIAR **Vol II Chapter 8 Ornithology**. This includes the loss of habitat of value to foraging raptors (e.g., grassland, scrub, heath) but does not include the locations of any known raptor nest sites. The majority of suitable raptor nesting and foraging habitat will be retained within the Proposed Oatfield Development, and wider areas of suitable habitat will be retained adjacent to the Proposed

Oatfield Development. Potential loss of nest sites and foraging habitat is addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the SHMP (EIAR **Vol III Appendix 7.1)**.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction and operation; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration. This includes the provision of best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active raptor nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (e.g., as detailed by Goodship & Furness (2022)) where required. Disturbance and displacement is addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the dedicated SHMP (EIAR **Vol III Appendix 7.1)**.

The predicted number of collisions for Kestrel is estimated at 6.34-8.33 for the lifetime of the Fahybeg Windfarm. The proposed impact of collision risk will be a 'Long-term Imperceptible' effect at the national scale. For the Proposed Oatfield Development, modelled Kestrel collision fatalities during the breeding season are estimated as 0.23 to 0.26 birds per year, equating to one Kestrel collision every 3.83 to 4.42 years. Modelled Kestrel collision fatalities during the winter season are estimated as 0.05 to 0.06 birds per year, equating to one Kestrel collision every 15.02 to 18.27 years. The resultant increases in bird mortality would not be significant when compared against the annual background mortality for this species, with annual mortality reported to be 31% in adult Kestrels and 68% in juvenile Kestrels (BTO, 2023). As such, when assessed in the context of the Kestrel population recorded within the Proposed Oatfield Development site and adjacent land, and the regional and national status of this species, collision impacts on Kestrel during the operational phase are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Kestrel are likely to occur.

Woodcock

Wintering Woodcock could be displaced by construction activities, with removal of woodland potentially having a longer-term displacement on Woodcock. There was no evidence of breeding Woodcock within the study area, the Fahybeg EIAR states that the development will not effect breeding Woodcock. The amount of suitable Woodcock habitat anticipated to be lost is 10.7-11.3ha, which is described as a very low significant effect (Percival, 2003) and local 'Long-term Imperceptible' effect (EPA, 2022). Mitigation measures provided include:

- clearance of vegetation at the Windfarm site, grid connection route and TDR nodes, including forestry plantation, should only be carried outside of the breeding season (September to February);
- pre-construction surveys carried out by and ecologist;
- planting new pollinator-friendly hedgerows;
- construction activity will be undertaken in daylight to minimise disturbances to roosting birds, or active nocturnal bird species;
- toolbox talks will be undertaken with construction staff on disturbance to key species during construction to minimise disturbance;
- re-instated hedgerows will be planted with locally sourced native species; and

- re-confirmatory surveys (March/April) of the proposed turbine locations, roads and hard standings will be conducted to assess any evidence of Woodcock.

Wintering Woodcock could be displaced by construction activities, with removal of woodland potentially having a longer-term displacement on Woodcock. Mitigation measures provided during the operational phase of the Windfarm are as follows:

- post-construction monitoring programme to confirm mitigation measures are successful;
- fatality monitoring;
- breeding bird surveys to assess displacement due to habitat loss; and
- breeding wader survey; and
- the use of flashing red lights will reduce the likelihood of birds being attracted to turbine locations.

Based on the lack of flight activity within the flight risk volume of the proposed turbines, no collision risk modelling was required for Woodcock within the Fahybeg Windfarm. According to the Fahybeg EIAR, there are no potential effects on Woodcock through disturbance as they are a nocturnal species unlikely to be affected by noise. The magnitude of daily barrier effect is assessed as imperceptible as literature suggests low published avoidance rates of wind farms.

The Proposed Oatfield Development design includes embedded mitigation to minimise loss and fragmentation of suitable Woodcock habitat during construction and operation (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Permanent and temporary land take will therefore be restricted to the habitat areas described in Table 8.10 in EIAR **Vol II Chapter 8 Ornithology**. This includes the loss of highly suitable breeding and wintering habitat for Woodcock (notably conifer plantation). Wider areas of suitable Woodcock habitat will be retained within and adjacent to the Proposed Oatfield Development (including identified breeding territories). This significant effect will be avoided through additional mitigation and enhancement measures (see Section 8.7.1 in EIAR **Vol II Chapter 8 Ornithology**) and the SHMP (EIAR **Vol III Appendix 7.1)**.

The Proposed Oatfield Development includes embedded mitigation to minimise disturbance during construction and operation; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration using best practice measures and ecological supervision to ensure that the destruction or significant disturbance of any active Woodcock nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones where required (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). through disturbance and displacement. Significant effects through disturbance and displacement will be avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**); notably the enhancement of conifer plantation and heath within the SHMP (EIAR **Vol III Appendix 7.1)**.

For both Fahybeg Windfarm and the Proposed Oatfield Development, Woodcock flight activity recorded over proposed turbine locations was insufficient to justify detailed collision risk modelling. Collision impacts on Woodcock during the operational phase are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Woodcock are likely to occur.

Merlin

For the Fahybeg Windfarm EIAR, no roosts or breeding sites were detected within the 2km turbine buffer. There was no suitable nesting habitat for breeding Merlin within the 500m turbine buffer. Overall, the Windfarm site and surrounding area was not found to be important for Merlin. According to the Fahybeg Windfarm EIAR, disturbance during construction is unlikely to occur for Merlin due to the limited occurrence of Merlin at the proposed site. No operational significant effects through disturbance to barrier effects are anticipated for Merlin due to low activity levels within the Windfarm site.

The Proposed Oatfield Development includes embedded mitigation to minimise loss and fragmentation of suitable raptor habitat during construction and operation. Habitat loss will therefore be restricted to the habitat areas described in Table 8.10 in EIAR **Vol II Chapter 8 Ornithology**. This includes the loss of habitat of value to foraging raptors (e.g., grassland, scrub, heath) but does not include the locations of any known raptor nest sites. The majority of suitable raptor nesting and foraging habitat will be retained within the Proposed Oatfield Development, and wider areas of suitable habitat will be retained adjacent to the Proposed Oatfield Development. Significant effects through direct habitat loss and fragmentation will be avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the SHMP (EIAR **Vol III Appendix 7.1)**.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction; notably by avoiding/minimising the generation of additional noise, dust, light spill and vibration, using best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active raptor nests is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (e.g., as detailed by Goodship & Furness (2022)) where required. Significant effects through disturbance and displacement is avoided through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**).

Based on the lack of flight activity within the flight risk volume of the proposed turbines, no collision risk modelling was required for Merlin within the Fahybeg Windfarm and the Proposed Oatfield Development.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Merlin are likely to occur.

Buzzard

The Fahybeg Windfarm EIAR states that possible Buzzard breeding was recorded within the woodland in the north of the study area. There will be the permanent loss of 0.4 Ha (2%) of long-established woodland, which is the prime nesting habitat available in the area. Habitat loss during construction is perceived to have a very low effect (Percival, 2003) and a local 'Long-term Imperceptible' effect on Buzzard (EPA, 2022). According to the Fahybeg Windfarm EIAR, a Buzzard breeding territory overlaps part of the Windfarm site and as such disturbance during construction to breeding birds is likely to occur. Mitigation measures provided within the EIAR include:

- clearance of vegetation at the Windfarm site, grid connection route and TDR nodes, including forestry plantation, should only be carried outside of the breeding season (September to February);
- pre-construction surveys carried out by and ecologist;

- construction activity will be undertaken in daylight to minimise disturbances to roosting birds;
- toolbox talks will be undertaken with construction staff on disturbance to key species during construction to minimise disturbance; and
- re-confirmatory surveys (March/April) of the proposed turbine locations, roads and hard standings will be conducted to assess any evidence of Woodcock.

The Fahybeg Windfarm EIAR states that disturbance effects to Buzzard are not significant and effects are very low (Percival, 2003) and a local imperceptible long-term impact (EPA 2022). The magnitude of daily barrier effects is assessed as very low (Percival, 2003) and imperceptible; overall the significance is considered as county-level imperceptible long-term impact (EPA 2022).

The predicted number of collisions for Buzzard is estimated at 10.78- 13.84 for the lifetime of the Fahybeg Windfarm. The proposed impact of collision risk will be a 'Long-term Imperceptible' effect at the national scale. The results of collision risk modelling for Buzzard within the Proposed Oatfield Development are summarised in Table 8.12 in EIAR **Vol II Chapter 8 Ornithology**. Modelled Buzzard collision fatalities during the breeding season are estimated as 0.06 to 0.07 birds per year, equating to one Buzzard collision every 13.93 to 15.94 years. Modelled Buzzard collision fatalities during the winter season are estimated as 0.03 birds per year, equating to one Buzzard collision every 32.11 to 36.75 years. When assessed in the context of the Buzzard populations recorded within the Proposed Oatfield Development and receiving environment, and the regional and national status of this species, collision impacts on Buzzard during the operational phase are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Buzzard are likely to occur.

Golden Plover

According to the Fahybeg Windfarm EIAR, limited and fragmented habitat availability within the site is considered unlikely to support any significant numbers of wintering or breeding waders including Golden Plover. Foraging habitat loss will be minimal. Low numbers of Golden Plover records during surveys and absence of high-quality breeding and wintering habitat within the Windfarm site means the effects of habitat loss and alteration during construction on Golden Plover is a local long-term not significant effect (EPA, 2022).

The Fahybeg Windfarm EIAR states significant effects via disturbance during construction to Golden Plover will not be significant due to limited breeding and wintering habitat availability including foraging habitat within the Windfarm site and suboptimal potential breeding habitat is outside the disturbance range for this species (200-500m) (Goodship & Furness, 2022).

Disturbance to Golden Plover during the operation of the Fahybeg Windfarm is considered not significant due to the absence within the site, the overall impact is deemed as low (Percival, 2003). The Fahybeg Windfarm references published evidence that suggests wind farms do not act as significant barriers to Golden Plover (Pearce-Higgins et al., 2012), the barrier effects are considered to be low (Percivel, 2003) and a county-level imperceptible long-term effect (EPA, 2022). The EIAR further states that the low level of Golden Plover flight activity in the study area suggests any impacts will be very low or absent.

Based on the lack of flight activity within the flight risk volume of the proposed turbines, no collision risk modelling was required for Golden Plover within the Fahybeg Windfarm. Modelled Golden

Plover collision fatalities are estimated as 0.04 birds per year, equating to one Golden Plover collision every 24.46 to 27.63 years. This would affect less than 1% of the county population and when assessed in the context of the Golden Plover population recorded within the Proposed Oatfield Development and adjacent land, collision impacts on Golden Plover during the operational phase are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Golden Plover are likely to occur.

3.2.11.2 Habitats

There are no common habitats considered for significant negative effects within the footprints of both the Proposed Oatfield Development and the Fahybeg Windfarm proposed for habitat loss. Both Windfarms contain habitat enhancement measures to improve the habitat quality within their respective site boundaries. The operation of the Fahybeg Windfarm and the Proposed Oatfield Development will not result in any significant additional land take or loss of habitats and as such there is no potential for any significant effects in this regard. The Fahybeg Windfarm EIAR includes a BEMP, and the Proposed Oatfield Development includes an SHMP, both contributing to habitat enhancement and biodiversity. The protection of habitats have also been taken into consideration within the respective CEMPs for both Windfarm projects.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Habitats are likely to occur.

3.2.11.3 Invasive Species

The Fahybeg Windfarm EIAR states that no invasive species are present within the Windfarm site. To prevent the possible spread of invasive species in the intervening period an ISMP has been prepared, and a preconstruction invasive species survey is required as part of the ISMP. An ISMP has also been prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.8)** to be incorporated into the CEMP.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Invasive Species are likely to occur.

3.2.11.4 Species

Aquatic Habitats and Species

The Fahybeg Windfarm EIAR has identified potential direct impacts during the construction phase via the release of suspended solids and other substances associated with upgrading, realigning and construction of access roads within the site and also during the excavation work associated with these types of works. Indirect effects via degradation of water quality has also been identified via silt and sediment-runoff, pollution events originating from the site works and machinery used, which could indirectly affect areas elsewhere in the catchment. These effects are considered significant, and mitigation is provided:

- construction phase mitigation will adhere to mitigations outlined in Chapter 10 of the Fahybeg EIAR;
- Measures to protect water quality are also outlined in the CEMP;

- check dams/silt fences will be installed within any drainage channels within turbine felling buffers prior to commencement of felling;
- drains and silt traps will be maintained throughout all felling works;
- brash mats will be used to support vehicles on soft ground and mineral soils;
- felling is proposed for the spring period to facilitate the sowing of grass seeds post-harvest to aid sediment filtration and nutrient absorption to aid sensitive species such as lamprey and salmon;
- surface water management plan;
- infrastructure will have a setback distance of 50m away from all streams within the site except for the watercourse crossings;
- maintenance and monitoring of such silt fences which will be placed downstream of all works;
- spoil heaps from excavations be covered with geotextile and surrounded by silt fences;
- Emergency Erosion and Silt Control Response Plan is included as a contingency in the CEMP;
- settlement basins for standing water which will drain into existing or proposed drainage channels on site;
- wheel washing; and
- refuelling of plant during construction will be carried out in an appropriately designed designated area.

Mitigation measures are detailed within the Fahybeg EIAR, CEMP and Chapter 10 of the EIAR.

The Proposed Fahybeg windfarm does not overlap with the Proposed Oatfield Development at any point, the windfarm sites share no connection via hydrological pathways.

The Proposed Oatfield Development has the potential for effects on habitats through disturbance and pollution. Especially sensitive habitats include watercourses and habitats used by specially protected and notable species such as heath and woodland. The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of habitat suitable for aquatic species. Considering the potential effects on aquatics habitats and species, avoidance of disturbance, pollution and associated mortality is considered and is reflected by the embedded mitigation measures within the CEMP. Mitigation measures that will be applied include hydrological buffers around watercourses, best practices to reduce noise, light pollution spillages, and vibration generation, aiming to minimize disturbance, off-site refuelling activities, excavated soil from access road construction will be reused on-site and the implementation of a Sustainable Drainage System (SuDS) with on-site flow retention, buffer zones, and silt removal techniques to promote environmentally responsible water management (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Effects on aquatic species through habitat loss and fragmentation during the construction of the Proposed Oatfield Development are considered not significant.

The operational stage of the Fahybeg Windfarm will have a negligible effect on aquatic ecological interests and fisheries, as there are no further potential impacts on surface water run-off or watercourses within the site. Measures will be taken to ensure no significant effects will occur to aquatic habitat or species during the operational phase of the Fahybeg Windfarm, including:

weekly inspections of the erosion and sediment control measures on site followed by fortnightly inspections until the risk of erosion or siltation has declined following the successful establishment of vegetation during the operational phase, sediment control measures for turbine felling buffers shall be maintained and replaced as required throughout the lifespan of the Windfarm.

In regard to the Proposed Oatfield Development, whilst habitat loss and fragmentation during operation will be minimal, the operation of the the Proposed Oatfield Development will involve activities with the potential to cause additional light spill, vibration and pollution (including siltation of watercourses), with potential disturbance and mortality effects. However, considering the scope of operational maintenance, the potential for such effects is far lower than during the construction phase. In addition, detailed embedded mitigation measures (Sections 7.5, EIAR **Vol II Chapter 7 Biodiversity**) will be adopted to avoid disturbance of watercourses and prevent pollution of aquatic habitat used by important species. Considering this embedded mitigation, and the scope for effects during the operational phase, effects on aquatic species through habitat loss and fragmentation, disturbance, pollution and associated mortality during the operation of the Proposed Oatfield Development are considered not significant. The status of aquatic habitats and species will continue to be monitored throughout the operation of the Proposed Oatfield Development, the findings of which will inform any requirement for additional mitigation.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Aquatic Habitats and Species are likely to occur.

Bats

The Fahybeg Windfarm EIAR states that direct effects on bats during construction include vegetation removal, resulting in a loss of potential roost sites in mature trees. It should be noted that a derelict building occupied by small numbers of common pipistrelle and Lesser Horseshoe Bat will not be subjected to demolition or modification and will remain in situ, the locations of roost sites are detailed in Appendix 8-4 of the Fahybeg EIAR. Mitigation measures include:

- buffer zone around treelines, hedgerows and woodland features into which no part of the turbine will intrude;
- supervision of vegetation clearance by an ecologist/ECoW;
- retention of trees, an exclusion zone of at least 7m or equivalent to canopy height, protected trees to be fenced off prior to works commencing;
- pre-construction surveys;
- retention of tree potential roosting features (PRFs);
- where hedgerows and treelines are affected by turbine felling buffers, bats will be directed away from tree-free buffers along an alternative commuting route. This will be achieved by planting new pollinator-friendly hedgerows;
- hedgerows will be cut every three to four years in rotation if cutting is required, leaving areas of undisturbed hedgerows;
- construction operations within the wind farm site will take place during the hours of daylight where possible to minimise disturbances to bats at night; and
- directional lighting will be used to prevent overspill.

The Proposed Oatfield Development SHMP includes compensatory habitat measures for bat species and embedded mitigation during construction to minimise loss and fragmentation of suitable bat habitat (e.g., woodland, higher quality grassland, hedgerows), and to avoid significant disturbance of this habitat. Notably, best practice construction measures and ecological supervision will minimise light spill onto suitable foraging habitat and potential roost sites (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Whilst no bat roosts have been identified as requiring removal to facilitate the Proposed Oatfield Development, pre-construction surveys will be undertaken to identify any potential roosts which would be affected, with mitigation subsequently adopted as appropriate. Considering this embedded mitigation, disturbance and direct mortality effects on bats during construction will not be significant.

The Fahybeg Windfarm outlines significant effects during operation which include both direct collision with rotor blades and barotrauma. Disturbance effects to roosting bats and disturbance of foraging bats though lighting impacts during the operational phase is unlikely for most species, as the installation of additional lighting proposed will be minimal. Mitigation measures include the following:

- blade feathering;
- increasing the cut-in speed;
- focused curtailment regime from year four of operation;
- post-construction surveys will be undertaken for the first three years of operation to confirm if blanket curtailment restrictions can be amended in line with post-construction activity levels;
- curtailment monitoring;
- fatality monitoring;
- flashing red aviation obstruction lights will be provided on perimeter turbines, subject to approval by the IAA;
- vegetation-free buffer zones around the identified turbines will be managed and maintained during the operational life of the development;
- hedgerow planting to maintain connectivity and divert bats around felling buffers; and
- monitoring of mitigation measures.

The Proposed Oatfield Development includes embedded mitigation during the operational phase to minimise the loss and fragmentation of suitable bat foraging and commuting habitat (i.e., rough grassland, heath, hedgerows, scrub and watercourses) and avoid significant disturbance of suitable habitat. Removal of potential roost sites will also be avoided wherever possible. Removal of suitable bat habitat during the operation of the Proposed Oatfield Development is expected to be minimal, and light spill onto habitat used by bats (notably potential roost sites and key foraging and commuting areas) during operation will be avoided. ECoW support during relevant maintenance activities will ensure that any suitable bat habitat is identified prior to operational activities and appropriate measures (e.g., further surveys, precautionary working methods, sensitive timing of works) are implemented to avoid any harming or disturbance of bats (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering this embedded mitigation, and the scope for impacts during the operational stage, effects on foraging, roosting and commuting bats through habitat loss, fragmentation and disturbance during the operation of the Proposed Oatfield Development are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Bats are likely to occur.

Otter

The Fahybeg Windfarm EIAR states that no holts were recorded during surveys at watercourses within 150m of any elements of the proposed Windfarm. Secondary evidence of Otter was recorded (prints) at the crossing for the Blackwater (Clare) river and Glenomra wood stream, direct significant effects on Otter are limited to disturbance. Potential indirect effects to Otter were identified through degradation of suitable habitat which could negatively affect their prey items (salmonids). The following mitigation measures are provided:

- preconstruction mammal survey will be undertaken to reconfirm the findings of the EIAR; and
- construction operations will take place predominantly during the hours of daylight to minimise disturbances.

Mitigation measures to protect Otter habitat are detailed within the CEMP and Chapter 10 of the EIAR.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss, fragmentation and pollution of suitable Otter habitat, and to avoid significant disturbance (e.g., of aquatic habitat for foraging and commuting, and of terrestrial habitat suitable for dens). Notably, best practice construction measures and ecological supervision will prevent pollution of watercourses and ensure suitable habitat for dens within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering the level of Otter activity recorded within the ecological baseline of the Proposed Oatfield Development, and this embedded mitigation, construction effects on Otter through habitat loss and fragmentation, pollution and disturbance are considered not significant.

The Fahybeg EIAR states that operational effects on Otter will be not significant and perceived as a 'Long-term Imperceptible' reversible effect at the local scale. This is due to the level of human activity associated with the maintenance of the operational Windfarm will be infrequent and minimal given that it will be monitored remotely. The Windfarm is also located within an agricultural area, which is already subjected to human activity and disturbance associated with agricultural management.

No significant effects on habitat fragmentation for Otter was identified within the the Proposed Oatfield Development. The Proposed Oatfield Development includes embedded mitigation during the operational phase to minimise the loss and fragmentation of suitable mammal habitat and avoid significant disturbance of suitable habitat (notably habitat suitable for Otter holts/dens). Removal of suitable habitat for these species during the operation of the Proposed Oatfield Development is expected to be minimal, and light spill onto habitat used by nocturnal mammal species during operation will be avoided. ECoW support during relevant maintenance activities will ensure that any suitable habitat for dens or sheltering by this species is identified prior to operational activities, and that appropriate measures (e.g., precautionary working methods, including sensitive timing of works) are implemented to avoid harm or significant disturbance (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering the ecological baseline regarding these species, and the embedded mitigation measures, effects on Otter and any other terrestrial mammal species during the operation of the Proposed Oatfield Development are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Otter are likely to occur.

Badger

The Fahybeg Windfarm EIAR states that six Badger setts were noted within the study area. Three sets are located in areas which may be impacted (indirectly) during construction by the Windfarm. Disturbance to Badger setts was also noted, with the closest set in relation to the construction works site being 19m, two other sets are within 50m of proposed infrastructure. Mitigation measures include:

- pre-construction Badger survey;
- in the event that a Badger sett should be encountered at any point, then NPWS will be informed and NRA 'Guidelines for the Treatment of Badgers Prior To the Construction of National Road Schemes' will be followed;
- Setts in close proximity to the development will require temporary hard-blocking and exclusion for the duration of construction works;
- No hard-blocking or sett exclusions will be undertaken during the Badger breeding season (December-June inclusive); and
- A dedicated Badger Mitigation Plan will be implemented.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of suitable Badger habitat, and to avoid significant disturbance of suitable foraging habitat (e.g., grassland, farmland) and habitat suitable for setts (e.g., woodland, scrub, hedgerows). Notably, best practice construction measures (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**) and ecological supervision will minimise light spill onto suitable foraging and commuting habitat and ensure suitable habitat for setts within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted. Considering the level of Badger activity recorded within the ecological baseline of the Proposed Oatfield Development, and this embedded mitigation, construction effects on Badger through habitat loss and fragmentation and disturbance are considered not significant.

The Fahybeg EIAR states that operational effects on Badger will be not significant and perceived as a 'Long-term Imperceptible' reversible effect at the local scale. This is due to the level of human activity associated with the maintenance of the operational Windfarm will be infrequent and minimal given that it will be monitored remotely. The Windfarm is also located within an agricultural area, which is already subjected to human activity and disturbance associated with agricultural management. One Badger sett was recorded in an area potentially affected by fencing maintenance activities which is addressed in the Badger Mitigation Plan.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Badger are likely to occur.

Red Squirrel

The Fahybeg Windfarm states that Red Squirrel was not recorded during surveys. There is a good availability of habitat for Red Squirrel in the form of conifer plantation and mixed broadleaved woodland in the immediate area and wider surroundings. The Fahybeg Windfarm EIAR states that it is assumed that they may occur in any area of woodland where felling is proposed during construction. Mitigation measures provided include:

- required felling of trees in forestry areas will be limited to time periods outside which Red Squirrel may have young in dreys (peak period January to March); and
- if this is unavoidable then areas to be clear felled will be surveyed in advance by a suitably qualified ecologist to determine whether any occupied dreys are present, mitigation measures will be implemented, and a derogation/disturbance licence will be sought if dreys are found within the felling footprint or adjacent.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of suitable Red Squirrel habitat (i.e., conifer plantation), and to avoid significant disturbance of this habitat. Whilst the Proposed Oatfield Development will involve the removal of approximately 8.01ha of conifer plantation, this habitat loss is minimal in the context of wider retained conifer plantation within the Proposed Oatfield Development site and (notably) the wider landscape. Best practice construction measures and ecological supervision will minimise light spill onto suitable foraging habitat and ensure suitable habitat within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering this embedded mitigation, and the limited extent of habitat loss in a local and wider context, construction effects on Red Squirrel through habitat loss and fragmentation and disturbance are considered not significant. Mitigation specified in the SHMP will include the enhancement of retained conifer plantation for KEF including Red Squirrel.

The Fahybeg EIAR states that operational effects on Red Squirrel will be not significant and perceived as a 'Long-term Imperceptible' reversible effect at the local scale. This is due to the level of human activity associated with the maintenance of the operational Windfarm will be infrequent and minimal given that it will be monitored remotely. The Windfarm is also located within an agricultural area, which is already subjected to human activity and disturbance associated with agricultural management.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Red Squirrel are likely to occur.

Pine Marten

The Fahybeg Windfarm EIAR states that Pine Marten was present within the Windfarm site as evidenced by observations of scat, a trail camera image of pine martin was also captured with the individual traversing woodland. The Fahybeg Windfarm EIAR states it assumes Pine Marten occurs in areas where tree felling is proposed. Mitigation measures provided include:

- felling of trees in forestry areas will be limited to time periods outside which 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 suitably qualified ecologist to determine whether any occupied Pine Marten dens are present. A license under the Wildlife act will be applied for should any sites have to be disturbed.

The Fahybeg EIAR states that operational effects on Pine Marten will be not significant and perceived as a 'Long-term Imperceptible' reversible effect at the local scale. This is due to the level of human activity associated with the maintenance of the operational Windfarm will be infrequent and minimal given that it will be monitored remotely. The Windfarm is also located within an agricultural area, which is already subjected to human activity and disturbance associated with agricultural management.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of suitable Pine Marten habitat (i.e., conifer plantation), and to avoid significant disturbance of this habitat. Whilst the Proposed Oatfield Development will involve the removal of approximately 8.01ha of conifer plantation, this habitat loss is minimal in the context of wider retained conifer plantation within the Proposed Oatfield Development site and (notably) the wider landscape. Best practice construction measures and ecological supervision will minimise light spill onto suitable foraging habitat and ensure suitable habitat within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering this embedded mitigation, and the limited extent of habitat loss in a local and wider context, construction effects on Pine Marten through habitat loss and fragmentation and disturbance are considered not significant. Mitigation specified in the SHMP will include the enhancement of retained conifer plantation for KEF including Pine Marten.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Pine Marten are likely to occur.

Irish Hare

Irish Hare was not included as a KEF for further consideration in the Fahybeg Windfarm EIAR and therefore, no cumulative impacts on this species are likely to occur.

3.2.11.5 Designated Sites

The Gortacullin Bog NHA is within the ZoI of the Fahybeg Windfarm however, it is screened out for further consideration within the impact assessment due to the intervening distance and lack of connectivity to the project.

An NIS accompanies the Fahybeg Windfarm EIAR and screens in European sites in common with the Proposed Oatfield Development: Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA and Danes Hole, Poulnalecka SAC.

The potential significant effects identified within the Fahybeg NIS are summarised below:

- Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA: water quality impacts during construction and decommissioning, spread of invasive species.
- Danes Hole, Poulnalecka SAC: barotrauma and collision risk, light pollution.

Similar impacts were also considered within the Proposed Oatfield Development NIS. The Fahybeg NIS provides appropriate mitigation measures to avoid adverse significant impacts to the European sites, these mitigation measures are summarised below and include but are not limited to:

- embedded mitigation by design (utilising exiting tracks, hard-standing areas minimised to reduce habitat loss);
- 50m buffers from watercourses;
- use of culverts to prevent water contamination;
- SuDs;
- CEMP;
- ECoW supervision of biodiversity management measures;

- ISMP;
- water management measures (silt traps, silt fencing, settlement ponds);
- site drainage system;
- emergency Erosion and Silt Control Response Plan;
- turbines fitted with directional lighting;
- wastewater management during operation; and
- buffer zones around turbines.

The Danes Hole, Poulnalecka SAC was assessed for adverse effects as a result of the Fahybeg Windfarm and the NIS concluded that there is no potential for significant effects to the QI Lesser Horseshoe Bat due to a lack of pathways for effect, i.e. the closest turbine is located outside of the core forging range (2.5km) for Lesser Horseshoe Bat and no operational lighting will be used within the core foraging range. An auxiliary roost was identified within the Windfarm site boundary, this roost site (derelict farm) and surrounding vegetation will be retained.

Detailed mitigation measures provided within the NIS anticipate and avoid any significant effects to the above-mentioned European sites. Mitigation measures provided by the NIS for both the Fahybeg Windfarm and the Proposed Oatfield Development ensure that no likely significant effects are anticipated alone, or in-combination with other Windfarm projects, therefore no cumulative effects are likely to occur.

3.2.12 Fahybeg Grid Connection

There is no overlap with the proposed grid connection route for the Fahybeg Windfarm and the Proposed Oatfield Development grid connection route. The projects will not coincide during construction.

3.2.12.1 Habitats

The Fahybeg Windfarm grid connection route will not result in the permanent loss of any significant habitat. The habitat loss within the Windfarm site associated with the grid connection route is encompassed within the footprint of proposed access tracks. The habitat loss proposed for the grid connection route is not permanent or significant at any geographic scale.

The Proposed Oatfield Development will not result in any habitat loss of high ecological value within the footprint of the grid connection and that the cable will be located entirely within the road. As such, no cumulative effects are likely to occur.

3.2.12.2 Invasive Species

The Fahybeg Windfarm EIAR details that Japanese Knotweed, and giant hogweed was recorded along the proposed grid connection route. An invasive species survey will be undertaken to confirm the survey results which informed the EIAR prior to any trimming or vegetation removal. The same mitigation measures proposed within the ISMP for the management and prevention of spread of invasive species within the Windfarm site will also apply for the grid connection route. For the Proposed Oatfield Development, Rhododendron was recorded along the grid connection route (IPP). An ISMP has also been prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.8)** to be incorporated into the CEMP.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Invasive Species are likely to occur.

3.2.12.3 Species

Bats

The Fahybeg Windfarm EIAR states that trees with low bat roosting potential will be retained. Two bridges along the grid connection route were confirmed as bat roosts. These proposed crossings will be undertaken using HDD, and no direct effects to the roosting features at these bridges are anticipated. No significant effect to bats during the operational phase of the Windfarm are anticipated as the grid connection route will be installed underground resulting in no potential for disturbance.

This project has no overlap with the Proposed Oatfield Development grid route or at any bridge crossing where works are required to the bridge. As such, there is no pathway for the Fahybeg Development to interact with the Proposed Oatfield Development to result in cumulative effects.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Bats are likely to occur.

Otter

The Fahybeg Windfarm EIAR states that no holts were recorded during surveys at watercourses within 150m of any elements of the proposed Windfarm. The Fahybeg Windfarm EIAR states that no holts were recorded during surveys at watercourses within 150m of any elements of the proposed Windfarm. Secondary evidence of Otter was recorded (prints) at the crossing for the Blackwater (Clare) river and Glenomra wood stream, direct significant effects on Otter are limited to disturbance and indirect effects to Otter were identified through degradation of suitable habitat. These significant effects are addressed in the corresponding section above.

The Fahybeg EIAR states that operational effects on Otter will be not significant and perceived as a ‘Long-term Imperceptible’ reversible effect at the local scale. This is due to the level of human activity associated with the maintenance of the operational Windfarm will be infrequent and minimal given that it will be monitored remotely. The Windfarm is also located within an agricultural area, which is already subjected to human activity and disturbance associated with agricultural management.

Fahybeg grid route crosses the Blackwater (Clare)_010 over 2km downstream of the nearest the Proposed Oatfield Development crossing of the same waterbody. Given the upstream distance between the projects and the absence of instream works related to the Proposed Oatfield Development watercourse crossing, there is no likely interaction to result in significant cumulative effects.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard to Otter are likely to occur.

Badger

The Fahybeg Windfarm EIAR does not detail any significant effects for Badger during the construction and operational phases for the grid connection route. For the Proposed Oatfield Development, no sightings or secondary evidence of Badger within or in close proximity to the grid

connection route were recorded and no significant effects are likely to occur for Badger during construction and operation of the proposed grid connection route.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Badger are likely to occur.

Red Squirrel and Pine Marten

The Fahybeg Windfarm EIAR does not detail any significant effects for Red Squirrel or Pine Marten in relation to the grid connection route, no significant effects are likely to occur for these species during construction and operation of the proposed grid connection route. For the Proposed Oatfield Development, no sightings or secondary evidence of Red Squirrel or Pine Marten within or in close proximity to the grid connection route were recorded and no significant effects are likely to occur for Red Squirrel during construction of the proposed grid connection route.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Red Squirrel and Pine Marten are likely to occur.

Aquatic Habitats and Species

The Fahybeg Windfarm EIAR states that the grid connection route crosses the River Blackwater [Clare] catchment. The survey sites are located on the River Blackwater [Clare] and Glenomra Wood Stream. Species recorded in this area include salmon and lamprey species. Direct impacts during construction of the grid connection route include releases of suspended solids and other substances associated with construction works and impacts on physical habitat (e.g., nurseries). Indirect effects during construction were identified via impacts degradation of water quality via accidental releases of silt and sediment-laden runoff, vegetation removal resulting in erosion and spread of invasive species via machinery or materials. Mitigation measures provided include:

- Surface Water Management Plan sets out measures to avoid siltation, erosion, surface water run-off and accidental pollution events;
- sealed silt fence will be placed at both sides of points where rivers or streams are crossed and to a minimum of 10m upstream and downstream of each crossing at both sides of the road;
- maintenance and monitoring of such silt fences;
- spoil heaps from any excavations will be covered with geotextile and surrounded by silt fences to filter sediment from the surface water run-off from excavated material;
- trench excavations will not be carried out during heavy rainfall (over 4mm per hour), or during 24-hour periods before heavy rainfall;
- Emergency Erosion and Silt Control Response Plan have been included as a contingency in the CEMP;
- timing of the proposed works will also take account of the fisheries constraints within the study area, where no works will be undertaken in the instream environment during the salmonid close season (October–March annually), which also avoids the lamprey spawning season;
- ECoW will monitor both turbidity and observe the riverbed during the horizontal directional drilling process to detect any leakage (frac-out) of drilling fluid;

- works as a precautionary measure will be undertaken within the salmonid open season for instream works (June 1st -September 30th);
- machinery will be stored in the site compound;
- wheel washing facilities;
- fuel and oil prevention and containment measures;
- preventative measures are detailed in the ISMP to ensure that non-native aquatic/riparian species are not introduced into the site ('The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads' by NRA (2010));
- strict biosecurity measures will be implemented if plant and machinery working in areas with invasive species along the grid connection route is used at the wind farm site; and
- operatives entering watercourses will be required to disinfect clothing and equipment coming in contact with water prior to and after entering the watercourse.

Fahybeg grid route crosses the Blackwater (Clare)_010 over 2km downstream of the nearest the Proposed Oatfield Development crossing of the same waterbody. Given the upstream distance between the projects and the absence of instream works related to the Proposed Oatfield Development watercourse crossing, there is no likely interaction to result in significant cumulative effects.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of habitat suitable for aquatic species. Where the proposed grid connection cable route encounters minor culverts, the ducts will be installed above or below the culvert depending on its depth in accordance with construction methodologies outlined in the CEMP (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Mitigation measures that will be applied include hydrological buffers around watercourses, best practices to reduce noise, light pollution spillages, and vibration generation, aiming to minimize disturbance, off-site refuelling activities, excavated soil from access road construction will be reused on-site and the implementation of a Sustainable Drainage System (SuDS) with on-site flow retention, buffer zones, and silt removal techniques to promote environmentally responsible water management. Effects on aquatic species through habitat loss and fragmentation during the construction of the Proposed Oatfield Development are considered not significant. No cumulative effects are anticipated.

The Fahybeg Windfarm EIAR states that effects on aquatic ecology during the operational phase of the grid connection route are unlikely. It outlines that there is the potential for spills of any oil or fuels from site vehicles finding its way to the local stream network and if repairs are required and soil excavation is required, there is the potential for effects regarding suspended solids. Due to the low numbers of vehicles involved and the unlikely need of maintenance, potential operational phase effects on aquatic ecology are assessed as being imperceptible negative (EPA, 2022), temporary and in the local context.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Aquatic Habitats and Species are likely to occur.

3.2.13 Fahybeg Turbine Delivery Route

Significant effects to the TDR for the Fahybeg Windfarm include direct effects during construction via potential release of suspended solids and silt runoff where the TDR crosses watercourses. Indirect effects during construction include run-off or pollution events for watercourses during vegetation clearance. The introduction and spread of invasive species during TDR works was also identified as a significant effect. The same mitigation measures proposed for the management and protection of aquatic habitats and species within the Windfarm site will also apply for the TDR. The same mitigation measures proposed for the management and prevention of spread of invasive species within the Windfarm site and grid connection route will also apply for the TDR as outlined in the ISMP (Appendix 8.8 of the Fahybeg EIAR).

The Proposed Oatfield Development and Fahybeg Windfarm follow the same TDR route between Foynes Port in County Limerick until the junction between R463 and R466. The Proposed Oatfield Development TDR continues along the R463 while the Fahybeg heads North-West along the R466. As such, there is overlap of works related to the TDR. None of the works proposed for either project pose a risk for likely significant effects on their own to designated sites or sensitive receptors. In-combination interactions will not increase the magnitude, scale or likelihood of effects.

In a worst-case scenario where both TDR works will take place at the same time it will not contribute to a likely cumulative significant effect. In such a scenario it could be argued that the duration of the impact for both projects can be reduced by the works and turbine transport being conducted to avoid repetition of certain road surface works. Even where repetition of road works occurs, the duration of effects will not differ greatly from the ones established for each project respectively.

As such, significant cumulative effects are unlikely to occur as result of interactions between the Fahybeg Windfarm and the Proposed Oatfield Development's respective TDR works.

3.2.14 Lackareagh Windfarm

The EIAR Biodiversity Chapter for the Lackareagh Windfarm was consulted on 20/02/2025 (MKO, 2024). The cumulative effects have been assessed regarding the different elements of the Windfarm and identified sensitive receptors as outlined below. Lackareagh Windfarm lies 6.07km from the Proposed Oatfield Development at its closest point. Lackareagh grid route does not cross any watercourses connected to the Proposed Oatfield Development water course crossings. It does cross the Blackwater (Clare)_020 (IE_SH_25B060250). The nearest the Proposed Oatfield Development water course crossing is over 5km upstream of this crossing point Given the upstream distance with the project and the absence of instream works related to the Proposed Oatfield Development watercourse crossing, there is no likely interaction to result in significant cumulative effects. It should be noted that the construction phases of the Lackareagh Windfarm and the Proposed Oatfield Development will not coincide with each other.

3.2.14.1 Birds

Lackareagh Windfarm and the Proposed Oatfield Development share the following key ornithological receptors: Hen Harrier, Peregrine, Kestrel, Red Grouse and Buzzard.

Hen Harrier

The Lackareagh Windfarm EIAR states that the Windfarm site contains sub-optimal habitat for breeding and wintering Hen Harrier. Two winter roosts were identified during the 2022/23 winter seasons; the closest roost was located 2.7km from the turbine layout. No breeding territories or

nesting was observed within or adjacent to the Windfarm site. Low foraging activity was recorded within the Windfarm site boundary and only 2.9% of the land will be lost to the development footprint, there is an abundance of suitable habitat widely available to Hen Harrier within the surround areas. No significant effects through habitat loss are anticipated for Hen Harrier. Disturbance during construction of the Lackareagh Windfarm will not have a significant effect on Hen Harrier given the low levels of activity within the site boundary and lack of dependence on the habitats for foraging or roosting Hen Harrier.

No operational effects are anticipated for Hen Harrier through habitat loss, displacement and barrier effects due to no additional infrastructure being proposed during operation, and no evidence of roosting within 2km of the Lackareagh Windfarm site and low numbers of Hen Harrier were observed throughout the survey period. Furthermore, there is an abundance of suitable habitat for Hen Harrier within the surrounding areas of the Lackareagh Windfarm. The closest observation of Hen Harrier breeding activity was recorded over 1km from the Windfarm site, the Windfarm is not likely to impact breeding Hen Harrier through disturbance and barrier effects. Foraging Hen Harrier are also not anticipated to experience significant effects through disturbance due to low and infrequent foraging activity recorded within the Lackareagh Windfarm site boundary.

The Proposed Oatfield Development design includes embedded mitigation to minimise disturbance during construction and operation, providing best practice measures and ecological supervision to ensure the destruction or significant disturbance of any active Hen Harrier nests and winter roosts is avoided, including timing works outside the most sensitive periods, and the implementation of ecological supervision and exclusion zones (e.g., as detailed by Goodship & Furness (2022)) where required (Section 8.5, EIAR **Vol II Chapter 8 Ornithology**). Additional disturbance and displacement are addressed through additional mitigation and enhancement measures (Section 8.7.1, EIAR **Vol II Chapter 8 Ornithology**) and the dedicated SHMP (EIAR **Vol III Appendix 7.1)**.

The collision risk for wintering Hen Harrier has been calculated at a rate of one bird every 584 years, breeding Hen Harrier collision risk has been calculated at a rate of one bird every 200 years with a maximum blade length of 77.5m. The predicted collision risk is insignificant over the 35-year lifetime of the Windfarm. The modelled Hen Harrier collision fatalities for the Proposed Oatfield Development in comparison are estimated as 0.01 birds per year, equating to one Hen Harrier collision every 76.15 to 87.42 years. As such, when assessed in the context of the Hen Harrier population recorded within the Proposed Oatfield Development and the Lackareagh Windfarm. Significant cumulative impacts are not predicted.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Hen Harrier are likely to occur.

Peregrine

The Lackareagh Windfarm EIAR states that no significant effects through habitat loss are anticipated for Peregrine due to no recorded breeding within the site and the closest breeding was recorded record over 4km from the site boundary. Suitable areas of foraging habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area. Peregrine is not anticipated to be significantly affected by disturbance during construction of the Windfarm as Peregrine has been noted to become accustomed to human disturbance (Ruddock et al., 2007).

No significant effects to Peregrine are anticipated through habitat loss during operation of the Lackareagh Windfarm as no additional windfarm infrastructure is proposed. Disturbance and

barrier effects are also not anticipated as Peregrine has been noted to become accustomed to human disturbance (Ruddock et al., 2007).

The collision risk for Peregrine during operation of the Lackareagh Windfarm has been calculated at a rate of one bird every 54 years with a maximum blade length of 77.5m. The predicted collision risk is insignificant over the 35- year lifetime of the Windfarm. Based on the lack of flight activity within the flight risk volume of the proposed turbines for the Proposed Oatfield Development, no collision risk modelling was required for Peregrine.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Peregrine are likely to occur.

Kestrel

The Lackareagh Windfarm EIAR states that three breeding territories were recorded in 2022, the closest probable territory was located 600m from the turbine layout. There will be minimal loss of suitable Kestrel breeding habitat within the Windfarm site during construction and is not anticipated to be a significant effect given the extent of similar habitats outside the proposed turbine infrastructure. No significant effects through disturbance during construction are anticipated for Kestrel given that extensive areas of suitable foraging habitat exist in areas surrounding the Windfarm and that the Lackareagh Windfarm itself contains no unique, high-quality habitat for Kestrel.

No significant effects to Kestrel are anticipated through habitat loss during operation of the Windfarm as no additional Windfarm infrastructure is proposed. Significant effects through displacement and barrier effects during operation are not anticipated given the extensive areas of suitable foraging habitat for Kestrel surrounding the Windfarm site exist and that habitats within the Windfarm site are not considered unique and high quality for Kestrel.

The collision risk for Kestrel within the Lackareagh Windfarm has been calculated at a rate of one bird every three years with a maximum blade length of 77.5m. The predicted collision risk is negligible. For the Proposed Oatfield Development, modelled Kestrel collision fatalities during the breeding season are estimated as 0.23 to 0.26 birds per year, equating to one Kestrel collision every 3.83 to 4.42 years. Modelled Kestrel collision fatalities for the Proposed Oatfield Development during the winter season are estimated as 0.05 to 0.06 birds per year, equating to one Kestrel collision every 15.02 to 18.27 years. The resultant increases in bird mortality would not be significant when compared against the annual background mortality for this species, with annual mortality reported to be 31% in adult Kestrels and 68% in juvenile Kestrels (BTO, 2023). As such, when assessed in the context of the Kestrel population recorded within the Proposed Oatfield Development site and adjacent land, and the regional and national status of this species, collision impacts on Kestrel during the operational phase are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Kestrel are likely to occur.

Red Grouse

For the Lackareagh Windfarm, significant habitat loss for Red Grouse is not anticipated during construction and operation. There will be minimal habitat loss and the majority of habitat within the Windfarm site are not optimal for Red Grouse. Large areas of undisturbed suitable breeding and foraging habitat will remain both within the Lackareagh Windfarm site and the wider surroundings after construction. Disturbance during construction is not anticipated to significantly affect Red

Grouse as suitable breeding areas for Red Grouse are located on the fringes or outside of the Lackareagh Windfarm site boundary.

Significant effects through displacement and barrier effects during operation are not anticipated for Red Grouse as large areas of undisturbed suitable breeding and foraging Red Grouse habitat will remain both within the Lackareagh Windfarm and surrounding areas postconstruction. Furthermore, no disturbance effects were identified for Red Grouse during Windfarm operation (Douglas et al., 2011).

Red Grouse flight activity recorded over the proposed turbine locations for both the Lackareagh and the Proposed Oatfield Development was insufficient to justify detailed collision risk modelling. Collision impacts on Red Grouse during the operational phase are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Red Grouse are likely to occur.

Buzzard

The Lackareagh Windfarm EIAR states that no significant effects through habitat loss or disturbance during construction is anticipated due to a minimal loss of foraging habitat and an abundance of available habitat in the surrounding areas of the Windfarm.

No significant effects through displacement and barrier effects are anticipated during operation of the Windfarm. The habitat within the Windfarm site boundary is not unique to the surrounding areas which provide extensive suitable habitat for Buzzard.

The collision risk has been calculated at a rate of one bird every three years with a maximum blade length of 77.5m. The loss one bird every three years from the local population of Buzzard is considered of low significance. For the Proposed Oatfield Development, modelled Buzzard collision fatalities during the breeding season are estimated as 0.06 to 0.07 birds per year, equating to one Buzzard collision every 13.93 to 15.94 years. Modelled Buzzard collision fatalities during the winter season are estimated as 0.03 birds per year, equating to one Buzzard collision every 32.11 to 36.75 years. When assessed in the context of the Buzzard populations recorded within the Proposed Oatfield Development and receiving environment, and the regional and national status of this species, collision impacts on Buzzard during the operational phase are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Buzzard are likely to occur.

3.2.14.2 Habitats

Due to the distance between these projects (6.07km), there is no habitat assemblage at risk of significant negative effects as a result of both the Proposed Oatfield Development and the Lackareagh Windfarm developments in-combination or cumulatively. Both Windfarms contain habitat enhancement measures to improve the habitat quality within their respective site boundaries. The operation of the Lackareagh Windfarm and the Proposed Oatfield Development will not result in any additional land take or loss of habitats and as such there is no potential for any significant effects in this regard. The Lackareagh Windfarm EIAR includes a BEMP, and the Proposed Oatfield Development includes an SHMP, both contributing to habitat enhancement and biodiversity.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Habitats are likely to occur.

3.2.14.3 Invasive Species

The Lackareagh Windfarm EIAR identified significant effects in the potential for spread of rhododendron and Japanese knotweed to other habitats within the Windfarm site boundary. This effect is addressed through mitigation in the form of pre-commencement surveys for invasive species within the footprint of the Windfarm, works close to infested areas will be carried out under supervision by a suitably qualified ECoW, no contaminated soil is to be removed unless required and will be moved to a suitably licenced waste facility under license from the NPWS, an ISMP will be provided to implement measures to prevent spread.

An ISMP has also been prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.8)** to be incorporated into the CEMP.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Invasive Species are likely to occur.

3.2.14.4 Species

Aquatic Habitats and Species

The Lackareagh Windfarm EIAR states that there are potential significant effects to aquatic habitat and fauna species also identified within the Proposed Oatfield Development for significant effects, including: lamprey, eel, white-clawed crayfish, salmon and trout via construction related impacts on water quality. The Broadford River was also considered by both Windfarm projects within their respective study areas.

Potential impacts to surface water during construction is addressed in Chapter 9 of the Lackareagh Windfarm EIAR, key mitigation measures include the avoidance of sensitive hydrological features by application of suitable buffer zones and other mitigation measures including:

- using only pre-cast concrete bottomless box culverts or clear span culverts
- no in-stream excavation works
- near stream construction work will only be carried out during in accordance with best practice guidance (IFI, 2004).
- double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase
- no batching or storage of cement allowed on-site
- buffer zone of 50m has been put in place for on-site streams and rivers;
- 10m buffer will be applied to the main manmade agricultural and forestry drains within the Windfarm site.
- drainage maintenance plan (Chapter 4 of the Lackareagh EIAR).
- Mitigation measures for watercourse crossings within the Windfarm site (Chapter 9 of the Lackareagh EIAR).

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of habitat suitable for aquatic species. Considering the potential effects on aquatics habitats and species, avoidance of disturbance, pollution and associated mortality is considered and is reflected by the embedded mitigation measures within the CEMP.

Mitigation measures that will be applied include hydrological buffers around watercourses, best practices to reduce noise, light pollution spillages, and vibration generation, aiming to minimize disturbance, off-site refuelling activities, excavated soil from access road construction will be reused on-site and the implementation of a Sustainable Drainage System (SuDS) with on-site flow retention, buffer zones, and silt removal techniques to promote environmentally responsible water management (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Effects on aquatic species through habitat loss and fragmentation during the construction of the Proposed Oatfield Development are considered not significant.

The Lackareagh Windfarm EIAR considers operational effects in the form of additional runoff during storm rainfall events, resulting in erosion of watercourses and impact on aquatic habitats and species. Mitigation measures include:

- interceptor drains installed up-gradient of all Windfarm infrastructure to collect clean surface runoff;
- swales/roadside drains will be used to collect runoff from access roads and turbine hardstanding areas of the site;
- drains will be constructed in the surface layer of the road to divert any runoff off the road into swales/roadside drains;
- check dams will be used along sections of access road drains to intercept silts at source; and
- settlement ponds, emplaced downstream of road swale sections and at turbine locations.

In regard to the Proposed Oatfield Development, whilst habitat loss and fragmentation during operation will be minimal, the operation of the Proposed Oatfield Development will involve activities with the potential to cause additional light spill, vibration and pollution (including siltation of watercourses), with potential disturbance and mortality effects. However, considering the scope of operational maintenance, the potential for such effects is far lower than during the construction phase. In addition, detailed embedded mitigation measures (Sections 7.5, EIAR **Vol II Chapter 7 Biodiversity**) will be adopted to avoid disturbance of watercourses and prevent pollution of aquatic habitat used by important species. Considering this embedded mitigation, and the scope for effects during the operational phase, effects on aquatic species through habitat loss and fragmentation, disturbance, pollution and associated mortality during the operation of the Proposed Oatfield Development are considered not significant. The status of aquatic habitats and species will continue to be monitored throughout the operation of the Proposed Oatfield Development, the findings of which will inform any requirement for additional mitigation.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no significant cumulative effects in regard of Aquatic Habitats and Species are likely to occur.

Bats

The Lackareagh Windfarm EIAR states that the project is located in proximity of two European Sites designated for the protection of Lesser Horseshoe Bats, which was recorded foraging and commuting across the site. However, the populations associated with the designated roosts are not likely to utilise the site as it is not within or in close proximity of their core foraging ranges (2.5km). A lesser horseshoe roost was identified although this is not located in proximity to any

works and will not be affected by the project. No significant bat roosts were identified within the Windfarm footprint.

Significant effects to bats were identified in the form of displacement and disturbance during construction. As such, the following mitigation measures are proposed:

- mitigation and enhancement measures in relation to habitats are detailed in the BEMP, despite habitat loss not being a significant effect, there will be additional foraging and commuting habitat for bats within the project;
- displacement measures will adhere to the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001);
- directional lighting will be used to prevent overspill on to forestry edges;
- exterior lighting during construction, shall be designed to minimize light spillage;
- proposed lighting around the project site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting in the UK;
- necessary lighting during construction will follow guidance that is provided in the Dark Sky Ireland Lighting Recommendations.

Significant effects during operation for bat species for the Lackareagh Windfarm include collision risk for high collision risk bat species. Detailed mitigation is provided in Appendix 6-2 of the Lackareagh Windfarm EIAR, a summary is provided:

- felling buffers around turbines;
- blade feathering as a standard;
- curtailment on proposed turbines which recorded high activity levels;
- a minimum of three years operational monitoring to assess changes in bat activity patterns post construction and to monitor the implementation of the mitigation strategy; and
- adaptive mitigation strategy based on the results of the postconstruction monitoring.

The Proposed Oatfield Development SHMP includes compensatory habitat measures for bat species and embedded mitigation during construction to minimise loss and fragmentation of suitable bat habitat (e.g., woodland, higher quality grassland, hedgerows), and to avoid significant disturbance of this habitat. Notably, best practice construction measures and ecological supervision will minimise light spill onto suitable foraging habitat and potential roost sites (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Whilst no bat roosts have been identified as requiring removal to facilitate the Proposed Oatfield Development, pre-construction surveys will be undertaken to identify any potential roosts which would be affected, with mitigation subsequently adopted as appropriate. Considering this embedded mitigation, disturbance and direct mortality effects on bats during construction will not be significant.

The Proposed Oatfield Development includes embedded mitigation during the operational phase to minimise the loss and fragmentation of suitable bat foraging and commuting habitat (i.e., rough grassland, heath, hedgerows, scrub and watercourses) and avoid significant disturbance of suitable habitat. Removal of potential roost sites will also be avoided wherever possible. Removal of suitable bat habitat during the operation of the Proposed Oatfield Development is expected to

be minimal, and light spill onto habitat used by bats (notably potential roost sites and key foraging and commuting areas) during operation will be avoided. ECoW support during relevant maintenance activities will ensure that any suitable bat habitat is identified prior to operational activities and appropriate measures (e.g., further surveys, precautionary working methods, sensitive timing of works) are implemented to avoid any harming or disturbance of bats (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering this embedded mitigation, and the scope for impacts during the operational stage, effects on foraging, roosting and commuting bats through habitat loss, fragmentation and disturbance during the operation of the Proposed Oatfield Development are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Bats are likely to occur.

Otter

The Lackareagh Windfarm EIAR states that no signs of Otter were recorded within any of the watercourses within the Windfarm site. Significant effects to Otter have been identified in the form of habitat degradation during construction. Mitigation measures provided include:

- a pre-commencement Otter survey will be undertaken in accordance with standard best practice guidance;
- if an Otter holt is identified within or immediately adjacent to the Windfarm site footprint, consultation will be undertaken with the NPWS and a derogation licence applied for with all conditions of the license to be implemented;
- no works undertaken within 150m of any holts with breeding females or cubs present;
- no vehicles of any kind will be used within 20m of active, but non-breeding, Otter holts;
- light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence (NRA, 2008); and
- all mitigation measures will be undertaken or supervised by a qualified ecologist.

Potential for significant effects on Otter during the operation phase of the Windfarm were identified in the form of fragmentation. In the case that Otter holts, sightings or breeding activity is identified, the above mitigation measures will apply.

No significant effects on habitat fragmentation for Otter was identified the Proposed Oatfield Development. The Proposed Oatfield Development includes embedded mitigation during the operational phase to minimise the loss and fragmentation of suitable mammal habitat and avoid significant disturbance of suitable habitat (notably habitat suitable for Otter holts/dens). Removal of suitable habitat for these species during the operation of the Proposed Oatfield Development is expected to be minimal, and light spill onto habitat used by nocturnal mammal species during operation will be avoided. ECoW support during relevant maintenance activities will ensure that any suitable habitat for dens or sheltering by this species is identified prior to operational activities, and that appropriate measures (e.g., precautionary working methods, including sensitive timing of works) are implemented to avoid harm or significant disturbance (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering the ecological baseline regarding these species, and the embedded mitigation measures, effects on Otter and any other terrestrial mammal species during the operation of the Proposed Oatfield Development are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Otter are likely to occur.

Badger

The Lackareagh Windfarm EIAR states that there is potential for significant effects on Badger via disturbance and mortality during construction. Baseline surveys identified that the site is being utilised by a local Badger population, therefore any potential for physical damage or significant disturbance of occupied setts would be considered significant. The following mitigation measures have been provided:

- pre-commencement Badger survey will be carried out to identify the presence of any setts that may have been established in the intervening period;
- setts identified within 150m of the Windfarm infrastructure will subsequently be monitored for a minimum period of 2 weeks using remote
- if an active Badger sett is identified and works can be undertaken safely (as to avoid sett collapse) then an exclusion zone will be set up around the active setts as follows with fencing, and appropriate signage during construction activities;
- newly established and active setts identified within an area where works could not avoid direct impacts on the set then the sett would likely need to be excluded prior to works commencing, measures will be undertaken in line with current guidelines by an appropriately qualified ecologist in advance of construction works commencing and in consultation with NPWS; and
- Mitigation measures as per “Guidelines For The Treatment Of Badgers Prior To The Construction Of National Road Schemes” (TII, 2009) will be implemented to prevent disturbance of any active sett.

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of suitable Badger habitat, and to avoid significant disturbance of suitable foraging habitat (e.g., grassland, farmland) and habitat suitable for setts (e.g., woodland, scrub, hedgerows). Notably, best practice construction measures and ecological supervision will minimise light spill onto suitable foraging and commuting habitat and ensure suitable habitat for setts within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering the level of Badger activity recorded within the ecological baseline of the Proposed Oatfield Development, and this embedded mitigation, construction effects on Badger through habitat loss and fragmentation and disturbance are considered not significant.

The Lackareagh Windfarm EIAR states that there is no potential for significant negative effects on Badger during the operational phase.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Badger are likely to occur.

Red Squirrel and Pine Marten

Red Squirrel and Pine Marten were not considered as KEFs to be considered for potential significant effects during the construction and operation phase of the Windfarm development. The Lackareagh Windfarm EIAR states that implementation of the BEMP measures during the operational phase of the development will result in a no net loss of linear features of value for local faunal species, providing more foraging opportunities for fauna and shelter for mammals. Den/nesting boxes provided for Red Squirrel and Pine Marten will be provided for additional suitable breeding sites within the Windfarm site. The SHMP and embedded mitigation measures

included in the Proposed Oatfield Development EIAR also endure no significant effects for Red Squirrel and Pine Marten within the Proposed Oatfield Development.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Peregrine are likely to occur.

Irish Hare

Irish Hare was not included as a KEF for further consideration in the Lackareagh EIAR and no cumulative impacts are therefore predicted.

3.2.14.5 Designated Sites

The Gortacullin Bog NHA is within the ZoI of the Lackareagh Windfarm however, it is screened out for further consideration within the impact assessment due to the intervening distance and lack of hydrological connectivity to the project.

An NIS accompanies the Lackareagh Windfarm EIAR and screens in European sites in common with the Proposed Oatfield Development: Lower River Shannon SAC, Lough Derg (Shannon) SPA and River Shannon and River Fergus Estuaries SPA.

The Lackareagh Windfarm NIS identified the following potential effects:

- Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA: construction related impacts on water quality.

The implementation of mitigation measures as outlined in the NIS for both the Lackareagh Windfarm and the Proposed Oatfield Development ensures that there is no potential for significant in-combination effects. Therefore, no cumulative effects are anticipated.

3.2.15 Lackareagh Grid Connection

There is no overlap with the proposed grid connection route for the Lackareagh Windfarm and the Proposed Oatfield Development grid connection route. The projects will not coincide during construction.

3.2.15.1 Habitats

The Lackareagh Windfarm grid connection route will not result in the permanent loss of any habitat. The works will be primarily restricted to the existing road categorised as buildings and artificial surfaces. This is not significant at any geographic scale.

The Proposed Oatfield Development will not result in any habitat loss of high ecological value within the footprint of the grid connection and that the cable will be located entirely within the road. As such, no cumulative effects are likely to occur.

3.2.15.2 Invasive Species

The Lackareagh Windfarm EIAR details that giant hogweed was recorded along the proposed grid connection route. The same mitigation measures proposed for the management and prevention of spread of invasive species within the Windfarm site will also apply for the grid connection route. For the Proposed Oatfield Development, Rhododendron was recorded along the grid connection route (IPP). An ISMP has also been prepared for the Proposed Oatfield Development (EIAR **Vol III Appendix 7.8)** to be incorporated into the CEMP. These mitigation measures for both developments ensure that no cumulative effects are anticipated.

3.2.15.3 Species

Bats

The Lackareagh Windfarm EIAR states that there will be no requirement to fell trees/forestry as part of the proposed grid connection route, no other significant effects on bat during construction or operations of the Lackareagh Windfarm are anticipated for the grid connection route. No cumulative effects are therefore anticipated.

Otter

The Lackareagh Windfarm EIAR states that there is potential for construction works to result in the run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream of the proposed grid connection route. Mitigation measures provided include:

- a pre-commencement Otter survey will be undertaken in accordance with standard best practice guidance;
- if an Otter holt is identified within or immediately adjacent to the Windfarm site footprint, consultation will be undertaken with the NPWS and a derogation licence applied for with all conditions of the license to be implemented;
- no works undertaken within 150m of any holts with breeding females or cubs present;
- no vehicles of any kind will be used within 20m of active, but non-breeding, Otter holts;
- light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence (NRA, 2008); and
- all mitigation measures will be undertaken or supervised by a qualified ecologist.

Specific water quality mitigation measures are provided in Chapter 9 of the Lackareagh EIAR.

For the Proposed Oatfield Development, a mammal crossing (possibly Otter) was identified on the banks of the Blackwater (Clare) River approximately 107m west of the grid connection route. Two Otter spraints were identified, one spraint is located on the banks of the Oatfield River, approximately 55m west of the grid connection route. The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss, fragmentation and pollution of suitable Otter habitat, and to avoid significant disturbance (e.g., of aquatic habitat for foraging and commuting, and of terrestrial habitat suitable for dens). Notably, best practice construction measures and ecological supervision will prevent pollution of watercourses and ensure suitable habitat for dens within/near works areas is identified (through pre-construction surveys) and appropriate mitigation is subsequently adopted (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Considering the level of Otter activity recorded within the ecological baseline of the Proposed Oatfield Development, and this embedded mitigation, construction effects on Otter through habitat loss and fragmentation, pollution and disturbance are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Otter are likely to occur.

Badger

The Lackareagh Windfarm EIAR does not detail any significant effects for Badger during the construction and operational phases for the grid connection route. For the Proposed Oatfield Development, no sightings or secondary evidence of Badger within or in close proximity to the grid

connection route, no significant effects are likely to occur for Badger during construction and operation of the proposed grid connection route. No cumulative effects are therefore anticipated.

Red Squirrel and Pine Marten

The Lackareagh Windfarm EIAR does not detail any significant effects for Red Squirrel or Pine Marten in relation to the grid connection route, no significant effects are likely to occur for these species during construction and operation of the proposed grid connection route. For the Proposed Oatfield Development, no sightings or secondary evidence of Red Squirrel or Pine Marten within or in close proximity to the grid connection route, no significant effects are likely to occur for Red Squirrel during construction of the proposed grid connection route. No cumulative effects are anticipated.

Aquatic Habitats and Species

The Lackareagh Windfarm EIAR states that there is no potential for significant effects via direct impacts to aquatic species such as lamprey which was recorded during aquatic surveys along the grid connection route due to measures used to minimise potential for impact on the receiving environment as instream works are completely avoided. Potential for indirect effects on water quality via pollution was identified along the proposed grid connection route. Mitigation measures provided for the Windfarm site will also apply for the proposed grid connection route, these include:

- using only pre-cast concrete bottomless box culverts or clear span culverts
- no in-stream excavation works
- near stream construction work will only be carried out during in accordance with best practice guidance: “Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites” (IFI, 2004).
- double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase
- no batching or storage of cement allowed on-site
- buffer zone of 50m has been put in place for on-site streams and rivers;
- 10m buffer will be applied to the main manmade agricultural and forestry drains within the Windfarm site.
- drainage maintenance plan (Chapter 4 of the Lackareagh EIAR).
- Mitigation measures for watercourse crossings within the Windfarm site (Chapter 9 of the Lackareagh EIAR).

The Proposed Oatfield Development includes embedded mitigation during construction to minimise loss and fragmentation of habitat suitable for aquatic species. Where the proposed grid connection cable route encounters minor culverts, the ducts will be installed above or below the culvert depending on its depth in accordance with construction methodologies outlined in the CEMP (Section 7.5, EIAR **Vol II Chapter 7 Biodiversity**). Mitigation measures that will be applied include hydrological buffers around watercourses, best practices to reduce noise, light pollution spillages, and vibration generation, aiming to minimize disturbance, off-site refuelling activities, excavated soil from access road construction will be reused on-site and the implementation of a Sustainable Drainage System (SuDS) with on-site flow retention, buffer zones, and silt removal techniques to promote environmentally responsible water management. Effects on aquatic species

through habitat loss and fragmentation during the construction of the Proposed Oatfield Development are considered not significant.

Taking into account predicted impacts and the adoption of prescribed mitigation, and embedded measures for both developments, no cumulative effects in regard of Aquatic Habitats and Species are likely to occur.

3.2.16 Lackareagh Turbine Delivery Route

Significant effects to the TDR for the Lackareagh Windfarm include the potential spread of invasive species, Japanese knotweed was recorded adjacent to proposed road upgrades along the TDR. The same mitigation measures proposed for the management and prevention of spread of invasive species within the Windfarm site will also apply for the TDR. No cumulative impacts are anticipated.

The Proposed Oatfield Development and Lackareagh Windfarm follow the same TDR route between Foynes Port in County Limerick until the junction between R463 and R466. The Proposed Oatfield Development TDR continues along the R463 while the Lackareagh heads North-West along the R466. As such, there is overlap of works related to the TDR. None of the works proposed for either project pose a risk for likely significant effects on their own to designated sites or sensitive receptors. In-combination interactions will not increase the magnitude, scale or likelihood of effects.

In a worst-case scenario where both TDR works will take place at the same time it will not contribute to a likely cumulative significant effect. In such a scenario it could be argued that the duration of the impact for both projects can be reduced by the works and turbine transport being conducted to avoid repetition of certain road surface works. Even where repetition of road works occurs, the duration of effects will not differ greatly from the ones established for each project respectively.

As such, significant cumulative effects are unlikely to occur as result of interactions between the Lackareagh Windfarm and the Proposed Oatfield Development respective TDR works.

No significant effects are anticipated during the decommissioning phase of the Lackareagh Windfarm in combination with the Proposed Oatfield Development. The Lackareagh Windfarm provides a decommissioning plan (Appendix 4-7) which will be agreed with the local authority prior to any works. The same mitigation measures provided to sensitive receptors during construction will be apply during the decommissioning phase.

3.2.17 Multi-project Cumulative Effects

The Proposed Oatfield Development overlaps with the TDR of the Lackareagh and Fahybeg windfarm Developments. Should all three projects conduct TDR works simultaneously this would not increase the magnitude or change the likelihood for significant effects. This is based on the mitigation measures set for all three projects and the projects respective works being near identical for the crossings in common that will undergo road works. As such, either consecutively or concurrently, these projects scale or effects will not be drastically changed through cumulative effects. As such, overall significant cumulative effects are not considered likely to occur.

The Knockshanvo and Carrownagowan windfarm developments grid connections overlap with the Proposed Oatfield Development IPP cable route briefly together at a drain culvert crossing at the junction between L-3042 and the R471. Even in a worst-case scenario, should all three projects occur simultaneously at this crossing, which is not expected to occur, the impact would not change

the likelihood for effects given the absence of instream works and the mitigation measures implemented for all three projects.

In consideration of the number of windfarm projects present within the 20km receiving environment:

- When considering all windfarm projects listed above for potential disturbance, mortality and displacement impacts. There is potential for a larger scale displacement effect on bird receptors. However, as stated for each project, none had high activity for species sensitive to operating turbines;
- When considering all five windfarms, there are still pathways and flight networks to facilitate waterbirds commuting between Lough Derg and the River Shannon Estuary and to the Western areas of Clare. As such, displacement effect from cumulative effects from all 5 windfarms project is considered to be of negligible magnitude and unlikely to occur. The Proposed Oatfield Development will include post-construction monitoring of bird activity to observe any changes to baseline activity outside the predicted levels from the EIAR.

In conclusion, in consideration of windfarm developments within the 20km ZoI for cumulative effects and all proposed mitigation measures weighed to inform the likelihood and magnitude of effects, no project or projects in combination with the Proposed Oatfield Development are likely to result in significant cumulative effects on the ecological receptors within the receiving environment.

3.2.18 Solar Farms

The sections below provide a cumulative effects assessment of other projects (i.e. not wind farm projects).

3.2.18.1 Drummin Solar Farm- Harmony Solar Care Ltd.

The Drummin Solar Farm Development is located 2.07km West from the nearest works related to the Proposed Oatfield Development. An EIA Screening Report, Appropriate Assessment (AA) Screening Report and Natura Impact Statement has been caried out for the Drummin Solar Farm and these have concluded that, following the identification of European sites with potential pathways for effects (Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA) and implementation of biodiversity species mitigation and enhancement measures, no or negligible effects on biodiversity and European sites are anticipated during the construction, operation and decommissioning phases of the Drummin Solar Farm Development.

The Drummin Solar Farm Development contains embedded mitigation which include the implementation of a CEMP to ensure measures detailed within the Environmental Constraints Report (ECR) and NIS are fulfilled. An ECoW will be employed to ensure mitigation measures within the ECR and NIS are carried out appropriately. There is hydrological connectivity between the Proposed Oatfield Development and the Drummin Solar Farm Development via the Glenlon South River which flows into the Blackwater (Clare) River located downstream. Therefore, there is potential for significant negative effects to aquatic habitats and species such as Lamprey, Salmon and Otter. The Drummin Solar Farm NIS and CEMP contains detailed mitigation measures to prevent pollution as well as controls and contingency measures to be implemented during construction. These measures account for surface water management and ground water monitoring and ensure that there will be no cumulative effects.

Mitigation measures provided for the Proposed Oatfield Development in relation to impacts to water quality for aquatic habitats and species will ensure no cumulative effects are anticipated.

The Drummin Solar Farm Development identified other sensitive receptors in common with the Proposed Oatfield Development that require consideration for further impact assessment. These sensitive receptors include Otter, avifauna (non-specified) and invasive species. Mitigation measures for Otter and Invasive species are listed below.

Otter

- pre-construction surveys along watercourses by an ECoW;
- in-stream works will follow best practice such as '*Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes'* (NRA 2008) and '*Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes'* (TII, 2008);
- exclusion zones for breeding and/or resting Otter (TII, 2008);
- vehicle speed restrictions (10km/hr max speed); and
- buffer zones around watercourses (20m buffer for the West Roo Stream and 10m buffer for the Lakyle Stream and Glenlon South River).

With the above mitigation measures in place, no significant effects to Otter are considered likely to occur.

Avian species

Disturbance to bird species was identified for consideration during construction and/or decommissioning. Mitigation measures include:

- normal working hours will comply with minimal disturbance to roosting birds (08:00-17:30 Monday to Friday from November to January);
- artificial light will be minimised;
- plants used on the site will comply with the EC Directive on Noise Emissions for Outdoor Equipment (2000/14/EC);
- acoustic enclosures and silencers on plants used on the Solar Farm Development site will be regularly maintained;
- shut down machinery not in use or used in intervening periods between work or throttled down to a minimum;
- drop heights of materials from lorries and other plant will be kept to a minimum;
- construction working and piling given will follow codes of practice outlined in BS 5228; and
- ensure mitigation measures are being implemented during the works.

No significant effects through disturbance to birds is anticipated due to an abundance of similar habitat within the surrounding landscape and the extent of distance between the Proposed Oatfield Development and this solar farm site.

Invasive species

- Invasive Species Management Plan (ISMP) will be prepared for the control, treatment and removal of invasive species with an appointed ECoW to oversee the implementation of the ISMP; and
- pre-construction surveys to be carried out during optimal surveying period (April-October) within the site boundary.

No cumulative effects relating to Invasive Species are anticipated as this project does not overlap with the Proposed Oatfield Development at any point.

In summary, due to the identified potential impacts associated with the Drummin Solar Farm Development, the adoption of appropriate mitigation measures and the separation distance between the projects nearest respective element. No cumulative significant effects are likely to occur.

3.2.18.2 Ballyglass Solar Array- Reeve Wave Ltd.

The Ballyglass Solar Array is located 5km southeast from the Proposed Oatfield Development site and within 350m of TDR works. An Ecological Impact Assessment, Aquatics Ecological Impact Assessment and NIS have been carried out for the Ballyglass Solar Array to include mitigation measures to protect identified sensitive receptors. These sensitive receptors in common with the Proposed Oatfield Development include: aquatic habitats and species (including amphibians and reptiles), Otter, Badger, invasive species and avifauna (non-specified). Mitigation measures are as follows.

The Ballyglass Solar Array Development has connectivity to the Blackwater (Clare)_020 River. The Proposed Oatfield Development is connected to the Blackwater (Clare)_010 river. The crossing by the Ballyglass Solar farm is upstream of the nearest confluence where the Proposed Oatfield Development's crossing is located. Therefore, due to the absence of a clear pathway for in-combination interactions to occur, there is no potential for significant cumulative effects to aquatic habitats and species such as Lamprey, Salmon and Otter. Mitigation measures for the Ballyglass Solar Array are outlined below.

Aquatic habitats and species

- fish removal during instream works under a Section 14 licence;
- duration of works (1st to September 30th);
- timing restrictions on instream works as per IFI guidance;
- sequenced culvert insertion to minimise disturbance;
- dewatering techniques as outlined in the CEMP (silt-laden water treatment via silt bags, settlement tanks;
- IFI to be notified begore HDD works;
- use of settling systems to remove suspended solids and treatment of water before discharge;
- emergency response to frack-outs as outlined in the CEMP;
- culverted reaches to be restored both upstream and downstream, to their previous form;
- soil excavated to be stored no less than 10m form any aquatic features and reinstated;
- stockpiles surrounded by silt fencing;

- appropriate storage of polluting chemicals, designated parking and refuelling areas at least 50m from watercourses;
- biosecurity measures to prevent the spread of pathogens or invasive species; and
- Site Environmental Manager (SEM) /ECoW to oversee the implementation of the above mitigations during the construction phase; and
- surface water monitoring.

No cumulative effects relating to aquatic habitats and species are anticipated due the absence of identifiable pathway for project impacts to work in in-combination.

The mitigation measures are described in more detail in Section 5 of the Ballyglass Solar Array Aquatics Ecological Impact Assessment.

Otter

- pre-construction surveys of suitable habitat (Blackwater (Clare) River);
- removal of holts only under a Section 25 derogation license;
- no works within 150m of breeding holts;
- no vehicles within 20m of active, non-breeding holts; and
- fencing off of restricted areas associated with Otter holts (NRA, 2008).

No cumulative effects relating to aquatic habitats and species are anticipated due the absence of identifiable pathway for project impacts to work in in-combination.

Badger

- pre-construction surveys to identify potential new badger setts;
- 10m buffer from sett entrances during light works;
- 20m buffer from sett entrances for machinery;
- exclusion of works within 50m of active setts from 1st December to 31st of June; and
- works required within the above-mentioned buffer distances are outlined in '*Guidelines for the Assessment of Ecological Impacts of national Road Schemes*' (NRA, 2009).

No cumulative effects relating to Badger are anticipated based the limited interaction between the projects to the R463 access road to the Solar farm and the Proposed Oatfield Development TDR vehicles passing this same point.

Invasive species

No invasive species were recorded within areas of the proposed works, however a pre-construction survey will be carried out as a precaution.

Avifauna

- vegetation clearance to be undertaken outside of the breeding season (March to August);
- clearance works to be undertaken under supervision by an ECoW; and
- installation of bird boxes.

No cumulative effects relating to avifauna are anticipated.

Site management prescriptions will be implemented which include habitat management prescriptions such as hedgerow cutting and grazing practices and hibernacula for amphibians.

In summary, due to the identified potential impacts associated with the Ballyglass Solar Array Development, the adoption of appropriate mitigation measures and the separation distance between the projects, no cumulative significant effects are likely to occur.

3.2.18.3 Ballymorris Solar Array- Terra Solar Ltd.

The Ballymorris Solar Array is located 9km southwest from the Proposed Oatfield Development site. No EIAR or NIS documents were available on the Clare County Council or An Bord Pleanála websites at the time of review, as a result, the Inspectors Report was instead reviewed. It states that significant effects were identified through surface water pathways via the Brickhill stream which has a significant intervening distance between the Ballymorris Solar Array Development with no evidence of direct hydrological connectivity, and is mitigated for in the form of setback measures and silt fencing which is deemed adequate to prevent pollution and degradation of surface water during construction. The Proposed Oatfield Development has no terrestrial or hydrological connectivity to the Ballymorris Solar Array. The Ballymorris Solar Array is located within a separate hydrological catchment and ground waterbody and no surface water pathways exist between the two developments..

In summary, despite to potential impacts associated with the Ballymorris Solar Array, due to the absence of terrestrial and hydrological connectivity and intervening distance between the projects (9km), No cumulative effects are likely to occur.

3.2.18.4 Firgrove Solar Farm

A Planning and Environmental Report was carried out for the Firgrove Solar Farm Development, aquatic habitats were the only sensitive receptor in common with the Proposed Oatfield Development that was identified to be potentially negatively impacted by the Firgrove Solar Farm Development. There is a significant intervening distance between the Firgrove Solar Farm and the Proposed Oatfield Development site boundary (10.2km). The Firgrove Solar Farm Development is located within a separate hydrological catchment area and ground waterbody to the Proposed Oatfield Development. There is also no hydrological connectivity via surface water pathways. The Firgrove Solar Farm and the Proposed Oatfield Development both have hydrological connectivity to the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA, therefore, there is potential for cumulative effects of low/negligible magnitude to occur. Mitigation measures provided within the Firgrove Planning and Environmental Report for the prevention of impacts to water quality are provided below.

Mitigation measures proposed are as follows:

- no direct discharges into watercourses;
- vehicle washing will be conducted offsite;
- construction materials will be stored away from watercourses and fenced off;
- excavated topsoil will be reused;
- fuel bowsers to be bunded to 110% capacity;
- plant refuelling to be undertaken using fuel bowsers; and

- plant inspection, maintenance and repairs to be undertaken, with repair and maintenance works to be carried out offsite.

No other sensitive receptors are anticipated to be negatively affected in-combination of both developments, although best practice measures will be employed.

In summary, despite to the identified potential impacts associated with the Firgrove Solar Farm Development, due to the absence of direct connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19 Residential Developments

3.2.19.1 Residential Development- 22959 Limerick County Council; 317626-23ABP

There is no potential for cumulative effects in regard to the Residential Development due to the intervening distance (4km) between the development site and the Proposed Oatfield Development's nearest element, the small-scale nature or the works and lack of hydrological pathways for both surface and ground water, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.2 Residential Development- 221114 Limerick County Council

There is no potential for cumulative effects in regard to the Residential Development due to the intervening distance (4km) between the development site and the Proposed Oatfield Development's nearest element, the small-scale nature or the works and lack of hydrological pathways for both surface and ground water.

In summary, due to the lack of identified potential impacts associated with this Residential Development, the absence of connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.3 Residential Development- 2360951 Limerick County Council

There is no potential for cumulative effects in regard to the Residential Development due to the intervening distance (4.2km) between the development site and the Proposed Oatfield Development's nearest element, the small-scale nature of the works and lack of hydrological pathways between the development and the Proposed Oatfield Development for both surface and ground water. An NIS was undertaken for the development and subsequent mitigation measures were provided for the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA to ensure potential significant impacts are avoided. The EIA Screening concludes that no species or habitats of ecological significance was identified within the development site.

In summary, due to the identified potential impacts associated with this Residential Development, the absence of connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.4 Residential Development- 2460032 Limerick County Council

There is no potential for cumulative effects in regard to the Residential Development due to the intervening distance (3.5km) between the development site and the Proposed Oatfield

Development's nearest element, the small-scale nature of the works and lack of hydrological pathways between the Residential Development and the Proposed Oatfield Development for both surface and ground water. An NIS was undertaken for the development and subsequent mitigation measures were provided for the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA to ensure potential significant impacts are avoided. An EIAR has been carried out for the development and states that no significance negative effects are anticipated following mitigation measures during construction and operation of the development. These measures include a Biodiversity Management Plan which will improve habitat quality and result in a biodiversity net gain. Mitigation measures during the construction and operational phases for sensitive receptors in common with the Proposed Oatfield Development such as aquatic habitats (drainage ditch), Badger, Otter, Bats and general birds have also been proposed within the EIAR. These measures include mitigation by avoidance, prevention and reduction for sensitive receptors.

In summary, despite to the identified potential impacts associated with this Residential Development, the absence of connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.5 Residential Development- 2460570 Limerick County Council

An AA Screening was carried out for the Residential Development and found that there is no potential for significant effect on any nearby SAC or SPAs and an Appropriate Assessment was not required. Furthermore, the Residential Development by nature of its scale is not included under Schedule 5 of the Planning and Development Regulations (as amended), therefore, an EIA is not required. There is potential for the site to contain a bat roost and the developer is obligated to cease works if a roost is found and inform the NPWS and follow subsequent mitigation measures as advised by the Department of Housing, Heritage and Local Government.

In summary, due to the lack of identified potential impacts associated with this Residential Development, the absence of connectivity between the Sites, the intervening distance (3.5km) between the development site and the Proposed Oatfield Development's nearest element (TDR) and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.6 Residential Development- 247103 Limerick County Council

This application is an extension of duration application, and an EIA and AA were not required. The development by its nature is not a type of development included for under Schedule 5 of the Planning and Development Regulations (as amended). There is no potential for significant effects or cumulative effects given the development's urban setting. The AA Screening concluded that no significant effects are anticipated for any SAC or SPA due to the intervening urban land uses and lack of connections via the source-pathway-receptor model.

In summary, due to the lack of identified potential impacts associated with this Residential Development, the absence of connectivity between the Sites, the intervening distance (0.3km) between the development site and the Proposed Oatfield Development's nearest element and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.7 Residential Development- 211152 Limerick County Council

The Residential Development is located 0.3km from the Proposed Oatfield Development. An NIS was prepared for the development application and identified the Lower River Shannon SAC for consideration for significant effects. The Residential Development and the Proposed Oatfield Development both have downstream hydrological connectivity with the Lower River Shannon SAC which could result in a cumulative effect. Appropriate mitigation measures have been provided to prevent adverse effects to the Lower River Shannon SAC within the NIS for both developments, alone and in-combination with other projects. The accompanying EIAR for the Residential Development has identified potential significant effects to sensitive receptors in common with the Proposed Oatfield Development, these include aquatic habitats, birds and bats. Mitigation measures have been provided to reduce and avoid significant effects to these species. Works along the TDR for the Proposed Oatfield Development are short-term, sparse and minimal compared to the Residential Development works and will not occur in close proximity to the Residential Development site boundary.

In summary, due to the lack of identified potential impacts associated with this Residential Development, the adoption of appropriate mitigation measures, the absence of direct in-combination interactions between the projects and the unlikelihood for cumulative hydrological effects, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.8 Residential Development- 191236 Limerick County Council

An NIS and EIAR have been prepared which provide mitigation measures to designated sites and sensitive receptors respectively. The TDR for the Proposed Oatfield Development is located 0.3km from the Residential Development and is unlikely to interact with this project's impact sources or pathways to sensitive Biodiversity receptors due to the limited, small-scale potential works associated with the nearest works related to the Proposed Oatfield Development and the intervening distance between these works and the Residential Development.

In summary, due to the identified potential impacts associated with this Residential Development, the absence of connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.9 Residential Development- 19547 Limerick County Council

The Residential Development is located 0.3km from the Proposed Oatfield Development TDR. The Residential Development is assessed as being sub-threshold in accordance with Schedule 7 and 7A of the Planning and Development Regulations (as amended). The NIS states that the Residential Development will not adversely affect any European site alone or in-combination of other developments. The EIA states that the development site is situated in an area of low ecological significance and no significant effects are anticipated during construction and operation of the development. Works along the TDR for the Proposed Oatfield Development are short-term, sparse and minimal compared to the Residential Development works.

In summary, due to the identified potential impacts associated with this Residential Development, the absence of connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.10 Residential Development- 21350 Limerick County Council

The Residential Development is located 0.3km from the Proposed Oatfield Development TDR. An NIS and EIA screening report was carried out for the Residential Development. The NIS considers significant effects to the Lower River Shannon SAC, specifically the Salmon QI via water pollution during construction and appropriate mitigation is provided to avoid significant effects alone and in-combination with other projects. The EIA screening states that the Residential Development is not located within or adjacent to nationally or internationally designated sites, the site itself is predominantly a grassy meadow with traditional hedgerow boundaries, an Oak tree of bat roosting potential was identified within the site. The site is located close to the Mulkear River which is hydrologically connected to the Lower River Shannon SAC. Mitigation measures such as Sustainable drainage systems (SuDS) for the protection against surface water run-off to the Mulkear River, additional landscaping to improve the biodiversity of the site and the retention of the Oak tree and hedgerow will result in no significant effects.

In summary, due to the identified potential impacts associated with Residential Development, the absence of connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.11 Residential Development- 22313124 Limerick County Council

The Residential Development is located 0.4km from the Proposed Oatfield Development TDR. An EIAR and NIS have been carried out for the Residential Development. The EIAR has identified significant effects such as loss of linear connecting habitat including hedgerows and loss of nesting habitat for birds (non-specified). Mitigation measures include a replanting scheme which will result in a non-significant residual effect. The NIS considers the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA and proposes appropriate mitigation measures preventing surface water contamination during construction and operation of the development, preventing adverse effects to the designated sites both alone and in-combination with other projects.

The TDR works for the Proposed Oatfield Development do not directly overlap with the Residential Development. The nearest works involve road surface changes to the roundabouts on the West bound side of Junction 2 of the M7. No significant works will occur along the TDR to constitute a cumulative effect due to the short duration and small-scale nature of the works.

In summary, due to the identified potential impacts associated with Residential Development, the absence of connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are likely to occur.

3.2.19.12 Road Works- 238002 Limerick County Council

The Residential Development is located 4.4km from the Proposed Oatfield Development TDR. An AA screening report and EIA were carried out for the Development. The AA screening report concluded that no significant effects are anticipated on any European designated site. The EIA screening concluded that effects on the environment will be temporary and not significant as measures to prevent significant effects are included within the Road Works Development plans. No significant works will occur along section of the Proposed Oatfield Development TDR, which is located within the footprint of the Road Works to constitute a cumulative effect due to the short duration and small-scale nature of the works.

In summary, due to the identified potential impacts associated with the Road Works Development and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.13 Road Works- 238004 Limerick County Council

The Residential Development is located 1.2km from the Proposed Oatfield Development TDR. An AA screening and EIA screening have been conducted for the Road Works Development. The EIA screening has concluded that the Road Works are sub-threshold under Schedule 5 of the Planning and Development Regulations 2001 (as amended) and no significant effects to biodiversity were identified. The AA screening concluded that the Road Works are not likely to have a significant effect alone or in-combination with other projects on any European Site. No significant works will occur along the section of the Proposed Oatfield Development TDR, which is located within the footprint of the Road Works to constitute a cumulative effect due to the short duration and small-scale nature of the works.

In summary, due to the identified potential impacts associated with Road Works Development, the absence of connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.14 Residential Development- 22471 Limerick County Council

The Residential Development is located 1.9km to the nearest element of the Proposed Oatfield Development TDR. An NIS has been carried out for the Development. The NIS identifies potential pathways for significant effect to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA through negative impacts to water quality during construction and operation of the Development. Appropriate mitigation measures are provided to ensure there are no residual direct or indirect impacts to the water quality and therefore, no significant effects are likely for the European Sites alone or in-combination with other projects. The Residential Development site is of limited ecological significant predominantly consisting of improved agricultural grassland. Mitigation measures provided in the NIS ensure the protection of any high value habitat such as treelines and hedgerows adjacent to and delineating the site boundaries and timing of works to protect nesting birds, pre-construction badger and bat surveys. The Proposed Oatfield Development TDR does not occur within the footprint of the Residential Development and does poses no risk for in-combination interactions due to the short duration and small-scale nature of the works.

In summary, due to the identified potential impacts associated with Residential Development, the absence of connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.19.15 Residential Development- 2461282 Limerick County Council

The Residential Development is located 1.8km from the Proposed Oatfield Development TDR. An AA screening and Ecological Impact Statement (EIS) was carried out for the Residential Development. The EIS identified potential significant effects in common with the Proposed Oatfield Development: loss of habitat (hedgerow), disturbance to birds (non-specified) and water pollution during construction. No significant effects are anticipated for foraging or roosting bat populations associated with the Residential Development site. Mitigation measures include:

- landscaping measures to provide a net gain of biodiversity, including native hedgerow planting;
- vegetation removal to be undertaken outside of the breeding season or a qualified ecologist to carry out a pre-construction survey;
- protection of fish habitat following IFI guidance (IFI, 2016);
- storing of substances with potential to causes pollution events within a bunded zone;
- silt-trap or other attenuation measures; and
- all measures to be adhered to as outlined in the CEMP.

No significant effects to biodiversity are anticipated as a result of the Development.

Similarly to the Proposed Oatfield Development, the NIS for the Residential Development considered the potential for likely significant effects to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA as a precautionary measure via pollution during construction resulting from surface water run-off. Appropriate mitigation measures are provided to ensure no significant effects are likely, these measures include but not are limited to monitoring during and post construction of groundwater, appropriate storage of waste materials and the management of sediment-laden run-off and appropriate discharge of surface water. These mitigation measures ensure there will be no likely significant effects to European sites alone, or in-combination with other projects. No significant works will occur along the TDR for the Proposed Oatfield Development to constitute a cumulative effect due to the short duration and small-scale nature of the works. No cumulative effects are anticipated.

In summary, due to the identified potential impacts associated with Residential Development, the absence of connectivity between the Sites and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.20 Road Works Projects

3.2.20.1 Road Works- 306199 APB

Minor modification of the 306146 ABP project approved the same time as the original project. The Road Works Development is accompanied with an NIS and EIAR. The Proposed Oatfield Development TDR is partially located within the footprint of the Road Works Development and is considered for potential cumulative effects. The NIS stated there is potential for significant effects to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. As such, the NIS provided proven mitigation measures which will result in no adverse effects to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA both alone and in-combination with other developments.

The EIAR for the Road Works Development identified sensitive receptors in common with the Proposed Oatfield Development that could be subject to significant effects. These include Badger, Otter, fish, Lamprey species, birds (general), aquatic habitats invasive species and bats, including Lesser Horseshoe Bat. Mitigation measures during construction and operation of the development are provided within the EIAR and no significant effects are anticipated.

Based on the short term nature of the Proposed Oatfield Development's works with connectivity to this project, the identified potential impacts associated with these works and the adoption of

appropriate mitigation measures for both projects as provided, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.20.2 Road Works- 306146 An Bord Pleanála

The Residential Development is located 6.5km from the nearest related to the Proposed Oatfield Development TDR. An EIAR and NIS were carried out for the Road Works. The EIAR identified potential significant effects to IEFs in common with the Proposed Oatfield Development. These include: aquatic habitat and species, invasive species, Otter, Badger, bats (including Lesser Horseshoe Bat) and birds (non-specified). The Proposed Oatfield Development is not located within the vicinity of the Road Works Development and no cumulative effects are anticipated in relation to the Oatfield Windfarm. The Proposed Oatfield Development TDR is partially located within the footprint of the Road Works Development and is considered for potential cumulative effects. Mitigation measures for the Road Works Development include:

- water quality protection measures as per Environmental Operating Plan (EOP);
- pre-construction surveys for Otter, Badger and bats;
- post-monitoring surveys for Badger;
- mammal pass culverts;
- sett monitoring, protection and exclusion practices;
- mammal fencing; derogation licenses;
- timing of works;
- ECoW supervision;
- connection of linear habitats for Lesser Horseshoe Bat;
- invasive species management and prevention (EOP);
- and
- alternative nesting and foraging habitat for birds.

With the above mitigation measures provided, no significant effects are anticipated.

The NIS for the Roads Works Development considered the potential for likely significant effects to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA which were also considered for the Proposed Oatfield Development. The NIS provides appropriate mitigation to prevent the deterioration of water quality of the receiving Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. Landscaping measures to maintain habitat connectivity along the Development for the Lesser Horseshoe Bat is provided such that no significant effects are anticipated. The NIS demonstrates that there will be no likely significance effects alone or in-combination with other projects. No significant works will occur along the sections of the Proposed Oatfield Development TDR that overlap with the Road Works Development to constitute a cumulative effect due to the short duration and small-scale nature of the works.

In summary, due to the lack of identified potential impacts associated with this Residential Development, the adoption of appropriate mitigation measures, the absence of direct in-combination interactions between the projects and the unlikelihood for works to occur simultaneously, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

3.2.21 Other Projects

3.2.21.1 Land Disturbance- 2337 Clare County Council

The Residential Development is located adjacent to works at a culvert watercourse crossing related to the Proposed Oatfield Development IPP cable route. This project has a more extensive proximity with the Knockshanvo and Carrownagowan windfarm grid connection routes. An NIS was carried out for the Land Disturbance Development. The site is of limited ecological value as it consists of agricultural fields. Similarly to the Proposed Oatfield Development, it does have hydrological connectivity with the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. Appropriate mitigation measures have been provided to prevent the degradation of water quality via pollution of aquatic habitats and species. No other significant effects to designated sites and biodiversity were identified. No significant works will occur instream related to the Proposed Oatfield Development, which is located adjacent to the Land Disturbance Development along the R471 to constitute a cumulative effect due to the short duration and nature of the works.

In summary, due to the identified potential impacts associated with Residential Development, the absence of connectivity between the Sites for impacts to interact and cause in-combination effects and the adoption of appropriate mitigation measures, no cumulative impacts with the Proposed Oatfield Development are considered likely to occur.

4 HYDROLOGY AND HYDROGEOLOGY

4.1 Statement of Authority

The Hydrology and Hydrogeology Chapter was completed by RSK (Ireland) Ltd. (RSK), part of RSK Group. RSK Ireland is a consultancy providing environmental services in the hydrological, hydrogeological, geological and other environmental disciplines.

The principal member of the RSK EIA team involved in this assessment is Jayne Stephens (B.Sc., PhD) a Senior Environmental Consultant with RSK with extensive water microbiology experience.

4.2 Do-Nothing Scenario

Should the Proposed Oatfield Development not proceed, the existing land-use practices at the proposed windfarm site will continue. Current land use practices include agricultural (pastures and extensive drainage) and commercial afforestation activities.

If the Proposed Oatfield Development did not go ahead, excavation along the grid connection route and IPP connection would not be required nor any road widening and surface upgrading along the Turbine Delivery Route (TDR). Therefore, there would be no potential cumulative impact with other developments.

4.3 Construction Phase

EIAR **Vol II Chapter 9 Hydrology and Hydrogeology** Section 9.3.7 outlines the surface water catchment that the Proposed Oatfield Development and its GCR and TDR falls into, as mapped by the EPA. The associated groundwater bodies are outlined in EIAR **Vol II Chapter 9 Hydrology and Hydrogeology,** Section 9.3.13.

Table 4.1 below lists the catchments, sub catchments, river subbasins and groundwater bodies associated with the Proposed Oatfield Development site.

Table 4.1: Catchments, sub catchment and river subbasins and groundwater bodies associated with the Proposed Oatfield Development

Catchment	Lower Shannon (ID 25)		Shannon Estuary North (ID 27)		
Sub catchment	Shannon [Lower] _SC _100 (ID 25D_3)		Owenogarney _SC _010 (ID 27_12)		Owenogarney _SC _020 (ID 27_13)
River subbasin	Mountrice _010	Blackwater [Clare]_010	Broadford _030	Owenogarney _030	Gourna _010
Groundwater Body	Lough Graney		Tulla-Newmarket on Fergus		

Table 4.2 below list all projects within 10km of the Proposed Oatfield Development which have been scoped in for assessment and also provides conclusions on whether there are any cumulative impacts to the hydrology and hydrogeology receptors.

Table 4.2: Existing, planned and proposed projects scoped in for cumulative impact assessment for Hydrology and Hydrogeology

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
Solar Farm Harmony Solar Clare Ltd.	2360249 Clare County Council	Approximately 4.5km West from the proposed windfarm site	No significant cumulative effects on hydrological or hydrogeological receptors.	This development is present in the same sub Catchment as the Proposed Oatfield Development Shannon [Lower]_SC_100, however it lies within the River subbasin; North Ballycannan_010. There is no hydrological connectivity with the Proposed Oatfield Development, until waters enter Limerick dock. Part of this development lies over the same groundwater body as the Proposed Oatfield Development - Lough Graney, however there is no significant effects on groundwater associated with this development to add to a cumulative impact.
Residential Development	2023065 EIAR Portal Reference 22959 Limerick County Council 317626-23 ABP	Approximately 8.8km South from the proposed windfarm site	No significant cumulative effects on hydrological or hydrogeological receptors.	This development lies over two of same sub Catchments as the Proposed Oatfield Development Shannon [Lower]_SC_100 and Owenogarney_SC_020, however it lies within two River subbasin; North Ballycannan_010 and Crompaun (East)_010. There is no hydrological connectivity with the Proposed Oatfield Development, until waters enter Limerick dock. The development lies over the groundwater body Limerick City

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
				Northwest, there is no hydrogeological connection to the Proposed Oatfield Development.
Residential Development	2023143 EIAR Portal Reference 221114 Limerick County Council	Approximately 8.8km South from the proposed windfarm site	No significant cumulative effects on hydrological or hydrogeological receptors.	This development lies over two of same sub Catchments as the Proposed Oatfield Development Shannon [Lower]_SC_100 and Owenogarney_SC_020, however it lies within two River subbasin; North Ballycannan_010 and Crompaun (East)_010, which are different to those of the Proposed Oatfield Development. There is no hydrological connectivity with the Proposed Oatfield Development, until waters enter Limerick dock. The development lies over the groundwater body Limerick City Northwest, there is no hydrogeological connection to the Proposed Oatfield Development.
Ballyglass Solar Farm	22591 Clare County Council	Approximately 5km Southeast from the proposed windfarm site and within 350m of TDR	Without appropriate mitigation measures, this development has the potential to have a slight cumulative impact on hydrological receptors but not hydrogeological receptors. Given the mitigation measures recommended such as SUDS, there is no significant cumulative effects on	This development is present in the same sub Catchment as the Proposed Oatfield Development Shannon [Lower]_SC_100, it lies within the River subbasin; Blackwater (Clare)_020, which is a different river sub basin to the Proposed Oatfield Development. There is a hydrological connectivity with the Proposed Oatfield Development as this lies downstream of the river subbasin

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
			hydrological or hydrogeological receptors.	Blackwater (Clare)_010 and the Mountrice_010, both then enter the River Blackwater (Clare)_020 and then the River Shannon (Lower)_060. Part of this development lies over the same groundwater body as the Proposed Oatfield Development Lough Graney, however there is no significant effects on groundwater associated with this development to add to a cumulative impact.
Solar Farm	16368 Clare County Council ABP Ref. 247632	Approximately 9km South West from the proposed windfarm site	No significant cumulative effects on hydrological or hydrogeological receptors.	This development is present in the same sub Catchment as the Proposed Oatfield Development Owenogarney_SC_020, however it lies within the River subbasin; Owenogarney_060. There is no hydrological connectivity with the Proposed Oatfield Development, until waters enter Upper Shannon Estuary. This development lies over the same groundwater body as the Proposed Oatfield Development Tulla-Newmarket on Fergus, however there is no significant effects on groundwater associated with this development to add to a cumulative impact.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
Solar Farm Terra Solar	1731 Clare County Council	Approximately 9.1km South West from the proposed windfarm site	No significant cumulative effects on hydrological or hydrogeological receptors.	This development is present a different sub Catchment as the Proposed Oatfield Development Ballygriffin_SC_010, and a different River subbasin; Urlanbeg_010. There is no hydrological connectivity with the Proposed Oatfield Development. This development lies over the same groundwater body as the Proposed Oatfield Development Tulla-Newmarket on Fergus, however there is no significant effects on groundwater associated with this development to add to a cumulative impact.
Residential Development	2360951 Limerick County Council	Approximately 4.9km South from the proposed windfarm site	No significant cumulative effects on hydrological or hydrogeological receptors.	This development lies over two of same sub Catchments as the Proposed Oatfield Development Shannon [Lower]_SC_100 and Owenogarney_SC_020, however it lies within two River subbasin; North Ballycannan_010 and Crompaun (East)_010, which are different to those of the Proposed Oatfield Development. There is no hydrological connectivity with the Proposed Oatfield Development, until waters enter Limerick dock. The development lies over the groundwater bodies Limerick City Northwest and Limerick City North, there is no hydrogeological

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
				connection to the Proposed Oatfield Development.
Residential Development	2460032 Limerick County Council	Approximately 5.5km South from the proposed windfarm site	No significant cumulative effects on hydrological or hydrogeological receptors.	This development is present in the same sub Catchment as the Proposed Oatfield Development Shannon [Lower]_SC_100, however it lies within the River subbasin; North Ballycannan_010. There is no hydrological connectivity with the Proposed Oatfield Development, until waters enter Limerick Dock. The development lies over the groundwater body Limerick City Northwest, there is no hydrogeological connection to the Proposed Oatfield Development.
Residential Development	2460570 Limerick County Council	Approximately 7.8km South from the proposed windfarm site	No significant cumulative effects on hydrological or hydrogeological receptors.	This development is present a different sub Catchment as the Proposed Oatfield Development Shannon[Lower]_SC_090, and a different River subbasin; Shannon (Lower)_060. There is no hydrological connectivity with the Proposed Oatfield Development. The development lies over the groundwater body Limerick City East, there is no hydrogeological connection to the Proposed Oatfield Development.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
Residential Development	247013 Limerick County Council	Approximately 10.6km South-East from the proposed windfarm site	No significant cumulative effects on hydrological or hydrogeological receptors.	This development is present a different sub Catchment as the Proposed Oatfield Development Shannon[Lower]_SC_090, and a different River subbasin; Mulkear (Limerick)_050. There is no hydrological connectivity with the Proposed Oatfield Development. The development lies over the groundwater body Limerick City East, there is no hydrogeological connection to the Proposed Oatfield Development.
Residential Development	211152 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Residential Development	191236 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Residential Development	19547 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
				minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Road Works	306146 An Bord Pleanála (ABP)	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Road Works	306199 ABP	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Residential Development	20256 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Residential Development	21350 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
				minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Residential Development	22313124 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Land Disturbance	2337 Clare County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Road Works	238002 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Road Works	238004 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
				minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Residential Development	Limerick County Council 22471 314013 ABP	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Road Works	2019214 EIAR Portal Reference 306146 ABP	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.
Residential Development	2461282 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471). No new Watercourse crossings are proposed for the Turbine Delivery Route.

The effects of the construction phase to the hydrology at the Proposed Oatfield Development (wind farm, grid connection route and turbine delivery route) are direct, adverse, neutral to slight and temporary with some potentially beneficial, and no significant residual effects. There are no significant cumulative effects anticipated from other projects during the construction phase of the Proposed Oatfield Development.

The effects of the construction phase to the hydrogeology at the Proposed Oatfield Development are indirect, adverse, neutral to slight, temporary not significant residual effects. Construction effects of the grid connection route and the TDR will also be localised and no significant cumulative effects are anticipated.

Without appropriate mitigation measures, if any other development within the same catchment, sub-catchment, or river sub-basin as the Proposed Oatfield Development (included in the cumulative impact assessment - see **Table 4.2**) were to be constructed during the same period, there could be slight but significant cumulative effects on surface water (hydrology) and potentially on groundwater (hydrogeology), with possible impacts on human health. However, it is anticipated that all permitted developments would be required to follow site specific construction stage environmental management measures. This would reduce the potential for slight significant cumulative effects on surface and groundwaters to not significant.

In the case of the proposed Knockshanvo Wind Farm, which is most proximal to the site of the Proposed Oatfield Development, it lies within different catchment/sub catchments so there can be no cumulative effects on hydrology or hydrogeology receptors and therefore no potential for effects on hydrology or hydrogeology.

4.4 Operational Phase

Residual cumulative effects from other nearby wind farms during the operational phase in terms of surface water and groundwater effects which is generally localised, is expected to have a not significant to slight residual effect, provided mitigation measures are implemented and monitored in line with the relevant guidelines and legislation. There are no significant cumulative effects anticipated from other projects during the operational phase of the Proposed Oatfield Development.

4.5 Decommissioning Phase

There are no significant cumulative impacts anticipated from other projects during the decommissioning phase of the Proposed Oatfield Development.

However, while unmitigated simultaneous decommissioning activities in the same catchment could result in slight but significant cumulative effects on surface and groundwater with possible human health impacts, such risks are expected to be mitigated through standard environmental management measures.

5 LAND, SOILS AND GEOLOGY

5.1 Statement of Authority

The Land, Soils and Geology Chapter were completed by RSK (Ireland) Ltd. (RSK), part of RSK Group. RSK Ireland is a consultancy providing environmental services in the hydrological, hydrogeological, geological and other environmental disciplines.

The principal member of the RSK EIA team involved in this assessment include Deirdre Walsh (B.Sc., M.Sc., PhD) who is an Environmental Consultant with RSK with extensive geoscience experience.

5.2 Do-Nothing Scenario

Should the Proposed Oatfield Development not proceed, the existing land-use practices at the proposed windfarm site will continue. Current land use practices include agricultural (pastures and extensive drainage) and commercial afforestation activities.

If the Proposed Oatfield Development did not go ahead, excavation along the grid connection route and IPP connection would not be required nor any road widening and surface upgrading along the Turbine Delivery Route (TDR) and there would be no cumulative impact with other proposed projects from the Proposed Oatfield Development.

5.3 Construction Phase

Table 5.1 below list all projects within 10km of the Proposed Oatfield Development which have been scoped in for the assessment and if there are any cumulative impacts to the land, soils and geology.

Table 5.1: Existing, planned and proposed projects scoped in for cumulative impact assessment for Land, Soils and Geology

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
Solar Farm Harmony Solar Clare Ltd.	2360249 Clare County Council	Approximately 4.5km West from the proposed windfarm site	No significant cumulative effects	The likely residual effects of the Proposed Oatfield Development to the land, soils and geology are localised to the development footprint.
Residential Development	2023065 EIAR Portal Reference 22959 Limerick County Council 317626-23 ABP	Approximately 8.8km South from the proposed windfarm site	No significant cumulative effects	The likely residual effects of the Proposed Oatfield Development to the land, soils and geology are localised to the development footprint.
Residential Development	2023143 EIAR Portal Reference 221114 Limerick County Council	Approximately 8.8km South from the proposed windfarm site	No significant cumulative effects	The likely residual effects of the Proposed Oatfield Development to the land, soils and geology are localised to the development footprint.
Ballyglass Solar Farm	22591 Clare County Council	Approximately 5km Southeast from the proposed windfarm site and within 350m of TDR	No significant cumulative effects	The likely residual effects of the Proposed Oatfield Development to the land, soils and geology are localised to the development footprint.
Solar Farm	16368 Clare County Council ABP Ref. 247632	Approximately 9km South West from the proposed windfarm site	No significant cumulative effects	The likely residual effects of the Proposed Oatfield Development to the land, soils and geology are localised to the development footprint.

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
Solar Farm Terra Solar	1731 Clare County Council	Approximately 9.1km South West from the proposed windfarm site	No significant cumulative effects	The likely residual effects of the Proposed Oatfield Development to the land, soils and geology are localised to the development footprint.
Residential Development	2360951 Limerick County Council	Approximately 4.9km South from the proposed windfarm site	No significant cumulative effects	The likely residual effects of the Proposed Oatfield Development to the land, soils and geology are localised to the development footprint.
Residential Development	2460032 Limerick County Council	Approximately 5.5km South from the proposed windfarm site	No significant cumulative effects	The likely residual effects of the Proposed Oatfield Development to the land, soils and geology are localised to the development footprint.
Residential Development	2460570 Limerick County Council	Approximately 7.8km South from the proposed windfarm site	No significant cumulative effects	The likely residual effects of the Proposed Oatfield Development to the land, soils and geology are localised to the development footprint.
Residential Development	247013 Limerick County Council	Approximately 10.6km South-East from the proposed windfarm site	No significant cumulative effects	The likely residual effects of the Proposed Oatfield Development to the land, soils and geology are localised to the development footprint.
Residential Development	211152 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
Residential Development	191236 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)
Residential Development	19547 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)
Road Works	306146 An Bord Pleanála (ABP)	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)
Road Works	306199 ABP	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)
Residential Development	20256 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)
Residential Development	21350 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
Residential Development	22313124 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)
Land Disturbance	2337 Clare County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)
Road Works	238002 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)
Road Works	238004 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471)
Residential Development	Limerick County Council 22471 314013 ABP	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471).
Road Works	2019214 EIAR Portal Reference 306146	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for

Project	Planning / Project Ref.	Nearest Distance to the Proposed Oatfield Development Site	Significant cumulative effects	Comment
	ABP			minor temporary land take (turn from R463 to R471).
Residential Development	2461282 Limerick County Council	Within 350m of TDR	No significant cumulative effects	The majority of the TDR traverses existing roadways and only one location has been identified for minor temporary land take (turn from R463 to R471).

The effects of the construction phase on the land, soils and geology at the Proposed Oatfield Development are localised to the development footprint. With the implementation of mitigation measures, there are no likely effects to the land soils and geology outside of the red line boundary. Construction of the grid connection route and the TDR will also be localised and generally to existing roadways with minimal temporary land take.

On completion of reinstatement works, following the construction phase, it is expected that the wind farm will be returned as close to its present condition as possible. In particular, areas of peat and current drainage regimes will be reinstated and left to revegetate naturally with the passage of time and the Proposed Oatfield Development site will revert over time to a more natural drainage regime. It is expected that the long-term residual effects associated with the wind farm Proposed Oatfield Development will therefore be insignificant, adverse and permanent effect on the soils and geology.

There are no significant cumulative effects anticipated from other projects during the construction phase of the Proposed Oatfield Development. The residual effects from other construction projects would be similar to this development with appropriate mitigation measures.

5.4 Operational Phase

Considering the effect on land in terms of land take, the residual cumulative effects from other nearby wind farms and developments is generally localised. Provided mitigation measures are implemented and monitored in line with the relevant guidelines and legislation there are no significant cumulative effects anticipated during the operational phase of the Proposed Oatfield Development.

5.5 Decommissioning Phase

There are no significant cumulative effects anticipated from other projects during the Decommissioning Phase of the Proposed Oatfield Development.

6 TELECOMMUNICATIONS AND AVIATION

6.1 Statement of Authority

Ai Bridges Limited:

Ai Bridges Limited has been a contributor to this report to manage the Telecommunications and Aviation assessments and conduct both telecommunications assessments and aviation statement reviews in respect of the Proposed Oatfield Development. Ai Bridges has been supplying telecommunications and aviation assessment solutions to the wind farm industry throughout the Republic of Ireland, Northern Ireland and the UK since 2007. The Ai Bridges Engineering Department has more than 170-man years of experience in the delivery of Aviation, Telecommunications, Broadcast & EMI\EMC Impact Assessments for the Wind Farm industry.

The Engineering Team at Ai Bridges takes the role of Project Manager responsible for overseeing project progress and deliverables for the Telecommunications and Aviation Impact Assessments. This role takes responsibility, along with other team members, for day-to-day running of the projects including co-ordination of project team, sub-contractors and achieving agreed milestones.

The team responsible has extensive experience in the areas of software modelling of communications networks. This includes extensive working knowledge of software modelling and of telecommunications and aviation networks and systems. This role also includes the ongoing development of 3D modelling software techniques used to predict wind farm impacts on aviation safeguarding surfaces and infrastructure.

Cyrrus Limited:

Cyrrus Limited were contracted by Ai Bridges on behalf of the applicant to address the IAA request for detailed technical IFP and Radar Assessments. Cyrrus Limited is an IAA Approved Procedure Designer Organisation. Cyrrus provides specialized Radar Engineering & Consultancy Services and IFP Assessments and IFP Procedure Design Services. Cyrrus have relevant experience in the areas of UK Civil Aviation and MoD Radar Assessments. Shaun Gouvera conducted the IFP Assessments and Kevin Sissons completed the Radar Assessments.

6.2 Do-Nothing Scenario

If the Proposed Oatfield Development were not to proceed, there would be no effect on existing telecommunications and aviation operations in the area, other than that of normally arising from the existing agricultural activity, forestry operations, road maintenance activities and industrial activities in the general area or would arise from any new consented developments in the area. The ‘do-nothing’ scenario would result in no cumulative impacts to telecommunications or aviation.

6.3 Construction Phase

6.3.1 Telecommunications

The potential effects to telecommunications that may arise during the construction phase are likely to be caused by cranes used to assemble the turbines. These cranes will be temporarily located beside the proposed turbines. Any interference effects are likely to be similar to those arising during the operational phase of the Proposed Oatfield Development, which can include reflection,

diffraction, blocking and radio frequency interference. It should be noted that these effects are temporary in nature and will completely disappear once the cranes are removed from the site. The potential cumulative impacts to telecommunications for the construction phase is not significant and is short-term only.

6.3.2 Aviation

During the later stages of construction and prior to commissioning, the constructed turbines (and associated cranes used for construction) could be considered obstacles to low flying aircrafts. With the recommended mitigation measures, this will not result in an impact to aviation safeguarding.

Even if the proposed Knockshanvo Wind Farm and the Proposed Oatfield Development were being constructed at the same time, any mitigation measures required to accommodate the constructed height of operational turbines would have to be agreed and implemented for each development respectively prior to any construction works.

It should be noted that a cumulative impact assessment of the adjacent Knockshanvo Wind Farm has been considered but the modelling results show a negligible impact. There are no cumulative impacts for consideration in the event that the proposed Ballycar Wind Farm were being constructed at the same time as the Proposed Oatfield Development. The consented wind farm developments at Carrownagowan and Fahybeg have no impacts on aviation thus there would be no cumulative impacts should the Proposed Oatfield Development go into construction at the same time of these consented developments.

Also, the proposed Lackareagh Wind Farm is sufficiently far away from the Proposed Oatfield Development to avoid any cumulative impact effect. In addition, it would be a requirement to notify all relevant aviation stakeholders of the construction schedule in advance of any works. There are no potential cumulative impacts to aviation during the construction phase.

6.4 Operational Phase

6.4.1 Telecommunications

A detailed telecommunications assessment carried out by Ai Bridges demonstrated that no impacts are predicted to occur to any telecommunications radio links, with the exception of an Enet PTP microwave radio link between Kilseily and ESB Kilonan. Enet have been contacted in relation to the potential impact to this radio link, and are open to the mitigation proposal option of using an alternative POP site to feed the Kilseily site.

There are no cumulative impacts to telecommunications due to the proposed turbines, or due to the proposed mitigation measure solution put forward to Enet. In addition, if the Proposed Oatfield Development would be constructed at the same time as the proposed Knockshanvo wind farm, the proposed Ballycar or other consented wind farm developments, there would be no cumulative impacts nor would there be any requirements for additional mitigation measures other than the pre-agreed mitigation measures with Enet.

6.4.2 Aviation

There are a number of proposed wind farms at various stages in the planning process within the vicinity of the Proposed Oatfield Development. These wind farms, along with a description of their impacts on aviation are listed below in **Table 6.1.**

Table 6.1: Wind farm planning reference and aviation impacts

Wind Farm	Planning Status	Planning Reference	Wind Farm Description
Carrownagowan	Consented	Planning Application: 229000 (Clare County Council) https://www.eplanning.ie/ClareCC/AppFileRefDetails/229000/0	Permitted 19-Turbine Wind Farm (No Impacts on Instrument Flight Procedures or Radar Surveillance Facilities)
Fahy Beg	Consented	https://www.pleanala.ie/en-ie/case/317227	Permitted 8-turbine Wind Farm (No Impacts on Instrument Flight Procedures or Radar Surveillance Facilities)
Lackareagh	In Planning	https://www.eplanning.ie/ClareCC/AppFileRefDetails/2360219/0	Proposed 7-Turbine Wind Farm (No Impacts on Instrument Flight Procedures or Radar Surveillance Facilities)
Knockshanvo	In Planning	https://www.pleanala.ie/en-ie/case/319151	Proposed 9-Turbine Wind Farm In Planning (No Impacts on Instrument Flight Procedures with appropriate Mitigation Measures . No Impacts on Radar Surveillance Facilities with appropriate Mitigation Measures.)
Ballycar	In Planning	https://www.pleanala.ie/en-ie/case/318943	Proposed 12-Turbine Wind Farm In Planning (No Impacts on Instrument Flight Procedures. No Impacts on Radar Surveillance Facilities with appropriate Mitigation Measures.)

The Instrument Flight Procedures (IFP) Assessment (see Appendix 1 of the Memorandum Response on Aviation which was submitted to An Bord Pleanála in June 2024 and entitled “IFP Safeguarding Oatfield Windfarm”) carried out against the the Proposed Oatfield Development showed an impact to the Instrument Approach and Standard Departure procedures at Shannon Airport, however mitigation measures have been proposed by the Applicant that would ensure that the Proposed Oatfield Development would not have an effect on the Instrument Flight Procedures for Shannon Airport (i.e. Raising the Minimum Vectoring Altitude and Creating a new IFP Sector). These mitigation measures were drafted in response to on observation made by AirNav Ireland and were presented as part of Appendix 1 of the Memorandum Response on Aviation which was submitted to An Bord Pleanála in June 2024 and entitled “ATCSMAC Concept Designs”.

The implementation of the proposed mitigation measures would have no adverse or cumulative effects on the wind farms listed above in **Table 6.1**, even if both Knockshanvo Wind Farm and the Proposed Oatfield Development were to be constructed at the same time. As the proposed Ballycar Wind Farm and other consented wind farm developments in East Clare do not have any cumulative

impacts on Instrument Flight Procedures, there would be no additive effects or cumulative impacts from the construction of the Proposed Oatfield Development.

The Radar Assessment carried out against the Proposed Oatfield Development shows a potential impact to the Secondary Surveillance Radar (MSSR) system at Woodcock Hill. The proposed mitigation measure to offset the potential impacts of the proposed turbines would involve an upgrade to the existing radar station at Woodcock Hill (Thales RSM970 MSSR). This upgrade would include a software configuration which would incorporate the mapping of all existing wind turbines in the area. Once the Radar upgrade is implemented, any constructed wind turbines would be operationally acceptable and any impacts of the Proposed Oatfield Development (e.g. radar reflection, deflections, shadowing) would be fully mitigated. Even if both Knockshanvo Wind Farm and the Proposed Oatfield Development were to be constructed at the same time, there would be no cumulative impacts or additive effects, as any mitigation, if required, would be specific to each wind farm development. In section 10.3 of the revised Mitigations Options Study (see **Appendix 1 to the Main Response Document of this RFI Response**), it is noted that there is adequate horizontal secondary surveillance radar coverage in the vicinity of both the Proposed Oatfield Development and Knockshanvo Wind Farm and within them, minimal cumulative impact.

6.5 Decommissioning Phase

6.5.1 Telecommunications

During decommissioning of the Proposed Oatfield Development, effects will be similar to those assessed for the construction phase (i.e. the potential cumulative impacts to telecommunications for the decommissioning phase would not be significant and would be short-term only).

6.5.2 Aviation

During decommissioning of the Proposed Oatfield Development, effects will be similar to those assessed for the construction phase (i.e. the potential cumulative impacts to aviation for the decommissioning phase would not be significant and would be short-term only).

7 SHADOW FLICKER

7.1 Statement of Authority

This work has been undertaken by Dr Thomas Burke and reviewed by Ben Hockridge, both of RSK ADAS Ltd. Thomas Burke is a GIS (Geographic Information Systems) Consultant with expertise in the evaluation, analysis, and visualisation of geospatial data to investigate and solve environmental management issues. Thomas uses these skills and experience to manage and deliver projects for a range of clients, including in the area of onshore renewables development. Thomas joined ADAS in 2022, prior to which he spent four years as a graduate researcher in geography and GIS following completion of his MSci in Earth and Environmental Science.

Ben Hockridge is Principal GIS and Remote Sensing Consultant at RSK ADAS. He has over 10 years' experience in providing GIS and Remote Sensing expertise in a range of projects and services. Ben first joined ADAS in 2012 following his studies in Physical Geography (BSc) and Environmental Monitoring, Modelling and Management (MSc). Ben returned to work for RSK ADAS in 2017 after spending a year providing GIS solutions for the Ministry for Primary Industries in New Zealand. This range of experience has provided him with an in depth understanding on the use of GIS and Remote Sensing and their application in environmental management.

7.2 Do-Nothing Scenario

In the 'do-nothing' scenario, the Proposed Oatfield Development would not be consented and no turbines would be constructed. Therefore, there would be no cumulative shadow flicker effects.

7.3 Construction Phase

As outlined in Section 12.1 of EIAR **Vol II Chapter 12 Shadow Flicker**, shadow flicker can only occur when the turbine blades are moving. This requires the turbine to be operational. As such, there will be no shadow flicker effects during the construction phase of the Proposed Oatfield Development.

7.4 Operational Phase

As detailed in Section 12.3 of EIAR **Vol II Chapter 12 Shadow Flicker**, Wind Energy Development Guidelines (2006) (Department of Environment Heritage and Local Government (DoEHLG), 2006) note that at distances greater than 10 rotor diameters from a turbine, the potential for shadow flicker is very low. For the purposes of this assessment, it is therefore considered that if the 10-rotor diameter study area of the Proposed Oatfield Development overlaps with the 10-rotor diameter study area of any other existing or approved project, there is the potential for cumulative shadow flicker effects.

As described in **Section 1.1.2** of this Report, planning research was conducted in relation to all wind farms within 20km of the project site. The wind farm Projects which are scoped in for cumulative assessment for shadow flicker are listed in **Table 1.2**.

The following operational and granted wind farms were identified within 20km, and were considered further:

- Carrownagowan Wind Farm (granted) 5.1km to the northeast, comprising 19 turbines with a maximum rotor diameter of 136m. As the 10-rotor diameter study area of this project does not overlap with that of the Proposed Oatfield Development, there is no potential for cumulative effects.
- Fahybeg Onshore Wind Farm (granted) 6.0km to the east, comprising 8 turbines with a maximum rotor diameter of 138m. As the 10-rotor diameter study area of this project does not overlap with that of the Proposed Oatfield Development, there is no potential for cumulative effects.
- Parteen Turbine (operational) 9.4km to the south, comprising 1 turbine with a maximum rotor diameter of 53m. As the 10-rotor diameter study area of this project does not overlap with that of the Proposed Oatfield Development, there is no potential for cumulative effects.
- Vision Care Turbine (operational) 13.7km to the southeast, comprising 1 turbine with a maximum rotor diameter of 80m. As the 10-rotor diameter study area of this project does not overlap with that of the Proposed Oatfield Development, there is no potential for cumulative effects.

It is therefore considered that there is no potential for the cumulation of effects with other existing and/or granted projects.

In addition to these, the following wind farms in planning were identified within 20 km, and were considered further:

- Knockshanvo Wind Farm (planning), adjacent, comprising 9 turbines with a maximum rotor diameter of 163m. The 10-rotor diameter study area of this project overlaps with that of the Proposed Oatfield Development, such that there is potential for cumulative effects.
- Ballycar Wind Farm (planning) 4.2km to the south, comprising 12 turbines with a maximum rotor diameter of 136 m. As the 10-rotor diameter study area of this project does not overlap with that of the Proposed Oatfield Development, there is no potential for cumulative effects.
- Lackareagh Wind Farm (planning) 6.07km to the northeast, comprising 7 turbines with a maximum rotor diameter of 155m. As the 10-rotor diameter study area of this project does not overlap with that of the Proposed Oatfield Development, there is no potential for cumulative effects.

These developments, and their maximum 10 rotor diameter study areas, are shown in **Figure 7.1** below.

There is therefore a possibility for cumulative shadow flicker effects from the proposed Knockshanvo development. A cumulative impact assessment was undertaken previously in EIAR **Vol II Chapter 12 Shadow Flicker** for the Proposed Oatfield Development, to assess potential cumulative shadow flicker effects from the Proposed Oatfield Development in combination with the proposed Knockshanvo development. At that time, the Knockshanvo development was at the pre-planning stage. Since then, the planning application for Knockshanvo Wind Farm has been submitted and additional details are now available. An updated cumulative impact assessment for shadow flicker considering the proposed Knockshanvo Wind Farm is therefore presented below.

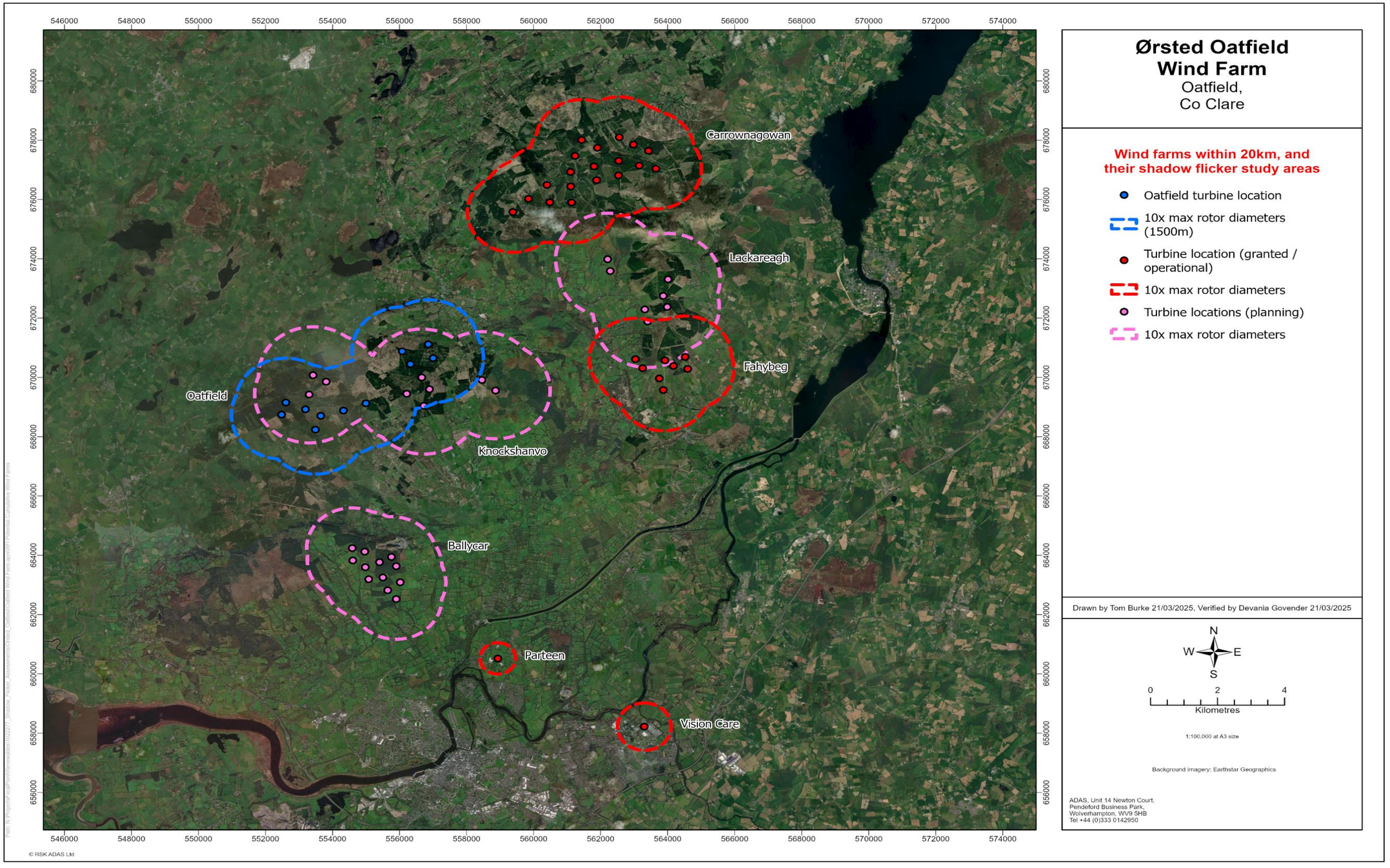


Figure 7.1: Wind farms within 20km of the Proposed Development, and their maximum 10x rotor diameter shadow flicker study areas

7.4.1 Methodology

The full methodology used in assessing shadow flicker is provided Section 12.4 of EIAR **Vol II Chapter 12 Shadow Flicker**. The methodology used in the cumulative assessment presented in the EIAR for the Proposed Oatfield Development is provided in Section 12.9.1 of EIAR **Vol II Chapter 12 Shadow Flicker**. Since the EIAR was submitted, additional details regarding the Knockshanvo development have become available. The turbine locations provided in the Knockshanvo planning submission[8] differ slightly from those used in the original cumulative assessment (**Table 7.1**). See also **Figure 9.1** for visual aid. Turbine locations from the planning submission are used for this assessment.

Table 7.1: Locations of Knockshanvo turbines used in the previous assessment and this assessment

Previous Assessment		This Assessment	
Easting (ITM)	**Northing (ITM)**	**Easting (ITM)**	**Northing (ITM)**
553369	670112	553422	670076
553298	669432	553306	669420
553810	669899	553812	669851
556211	669447	556212	669444
556662	670008	556663	670001
556727	669047	556727	669042
556895	669603	556896	669601
558465	669920	558463	669913
558870	669562	558864	669557

The proposed turbine envelope for the Knockshanvo development is unchanged from the original assessment[3]. This is:

- Rotor diameter: 149m – 163m
- Hub height: 102.5m – 110.5m
- Tip height: 179.5m – 185m

Specific combinations of hub height and rotor diameter have not been made available. In the original cumulative assessment, two scenarios were therefore assessed to consider a potential range of shadow flicker effects. The first of these assumed the hub height (110.5m) and rotor diameter (163m) of the Knockshanvo turbines was the largest of the ranges provided. This resulted in a tip height of 192m, slightly larger than the provided turbine envelope. The second assumed the hub height (102.5m) and rotor diameter (149m) of the Knockshanvo turbines was the smallest of the ranges provided. This resulted in a tip height of 177m, slightly smaller than the provided turbine envelope.

In this assessment, two scenarios are again presented assessing the largest and smallest potential rotor diameters. In the first of these updated scenarios, the largest rotor diameter is used in combination with the highest hub height that can be used without exceeding the maximum tip height. In the second, the smallest rotor diameter is used in combination with the lowest hub height that can be used while still meeting the minimum tip height. A range of potential effects are

[8] https://www.pleanala.ie/publicaccess/EIAR-NIS/320705/Volume%201%20-%20NTS%20and%20EIAR%20Chapters/Ch%204%20Description.pdf?r=732438

therefore again assessed, while remaining within the defined turbine envelope that is now confirmed in the Knockshanvo planning submission.

The methodology used in identifying sensitive receptors for use in this assessment is detailed in EIAR **Vol II Chapter 2 EIA Methodology.** Following revisions made to the receptor database, described in the Response to Submissions Received, house 4 is no longer labelled as an involved landowner in this assessment.

7.4.2 Updated Cumulative Shadow Flicker Assessment

The proposed turbine envelope for the Knockshanvo development is[9]:

- Rotor diameter: 149m – 163m
- Hub height: 102.5m – 110.5m
- Tip height: 179.5m – 185m

Specific combinations of hub height and rotor diameter have not been made available for Knockshanvo turbines. For the Proposed Oatfield Development, planning permission is being sought for an envelope with three turbine models of differing dimensions. These are detailed in Section 12.4.1 of EIAR **Vol II Chapter 12 Shadow Flicker**.

To consider a potential range of cumulative shadow flicker effects, two scenarios are therefore assessed here:

- Cumulative scenario 1: For Knockshanvo turbines, this uses the largest rotor diameter of 163m, with a hub height of 103.5m, resulting in a tip height of 185m (the maximum tip height in the provided turbine envelope). This represents the largest rotor diameter, with the highest hub height that can be used while staying within the turbine envelope. For the Proposed Oatfield Development turbines, candidate turbine 1 (largest rotor diameter and tip height) is used.
- Cumulative scenario 2: For Knockshanvo turbines, this uses the smallest rotor diameter of 149m, with a hub height of 105 m, resulting in a tip height of 179.5m (the minimum tip height provided in the turbine envelope). This represents the smallest rotor diameter, with the lowest hub height that can be used while staying within the turbine envelope. For the Proposed Oatfield Development turbines, candidate turbine 3 (smallest rotor diameter and tip height) is used.

As detailed in EIAR **Vol II Chapter 12 Shadow Flicker**, it is considered that an assessment of potential shadow flicker at receptors within 10-rotor diameters of the turbine locations is appropriate to provide a robust assessment of shadow flicker. For the cumulative assessment, it is therefore considered that receptors within 10-rotor diameters of both the Proposed Oatfield Development and Knockshanvo turbines have the potential to experience cumulative shadow flicker effects. These have therefore been included in the cumulative assessment.

7.4.2.1 Cumulative Scenario 1

Figure 7.2 below presents the Proposed Oatfield Development and Knockshanvo turbines and assumed 10-rotor diameter buffers for cumulative scenario 1. Sensitive receptors within both 10-rotor diameter buffers are displayed. **Table 7.2** presents the modelled 'worst-case' scenario

[9] https://www.pleanala.ie/publicaccess/EIAR-NIS/320705/Volume%201%20-%20NTS%20and%20EIAR%20Chapters/Ch%204%20Description.pdf?r=732438

shadow flicker durations for these receptors. The table also presents the 'likely' shadow flicker durations when taking into account estimated sunshine probability (30%). Calculation of this estimated sunshine probability is provided in Section 12.4.6.1 of EIAR **Vol II Chapter 12 Shadow Flicker**. Shaded cells indicate exceedances of Wind Energy Development Guidelines (2006) thresholds of 30 hours per year or 30 minutes per day.

Twenty-one receptors are within 10-rotor diameters of both the Proposed Oatfield Development and Knockshanvo turbines, and therefore have the potential to experience cumulative shadow flicker effects. Of these, three are predicted to experience no shadow flicker, while eighteen may experience some shadow flicker. Of these, two would experience effects from the Proposed Oatfield Development turbines only, three from Knockshanvo turbines only, and thirteen from both the Proposed Oatfield Development and Knockshanvo turbines.

In cumulative scenario 1, sixteen sensitive receptors may potentially exceed the Wind Energy Development Guidelines (2006) thresholds of 30 hours per year or 30 minutes per day. Of these, two would experience effects from the Proposed Oatfield Development turbines only, one from Knockshanvo turbines only, and thirteen from both the Proposed Oatfield Development and Knockshanvo turbines. With the incorporation of average annual sunshine data in the cumulative assessment to identify the more 'likely' hours per year, five receptors are predicted to exceed the guideline of 30 hours per year. Of these, four would experience effects from both the Proposed Oatfield Development turbines and Knockshanvo turbines, and one from Knockshanvo turbines only.

The modelled cumulative area over which shadows may be cast (and therefore there is potential for shadow flicker to occur) for cumulative scenario 1 is shown in **Figure 7.3.**

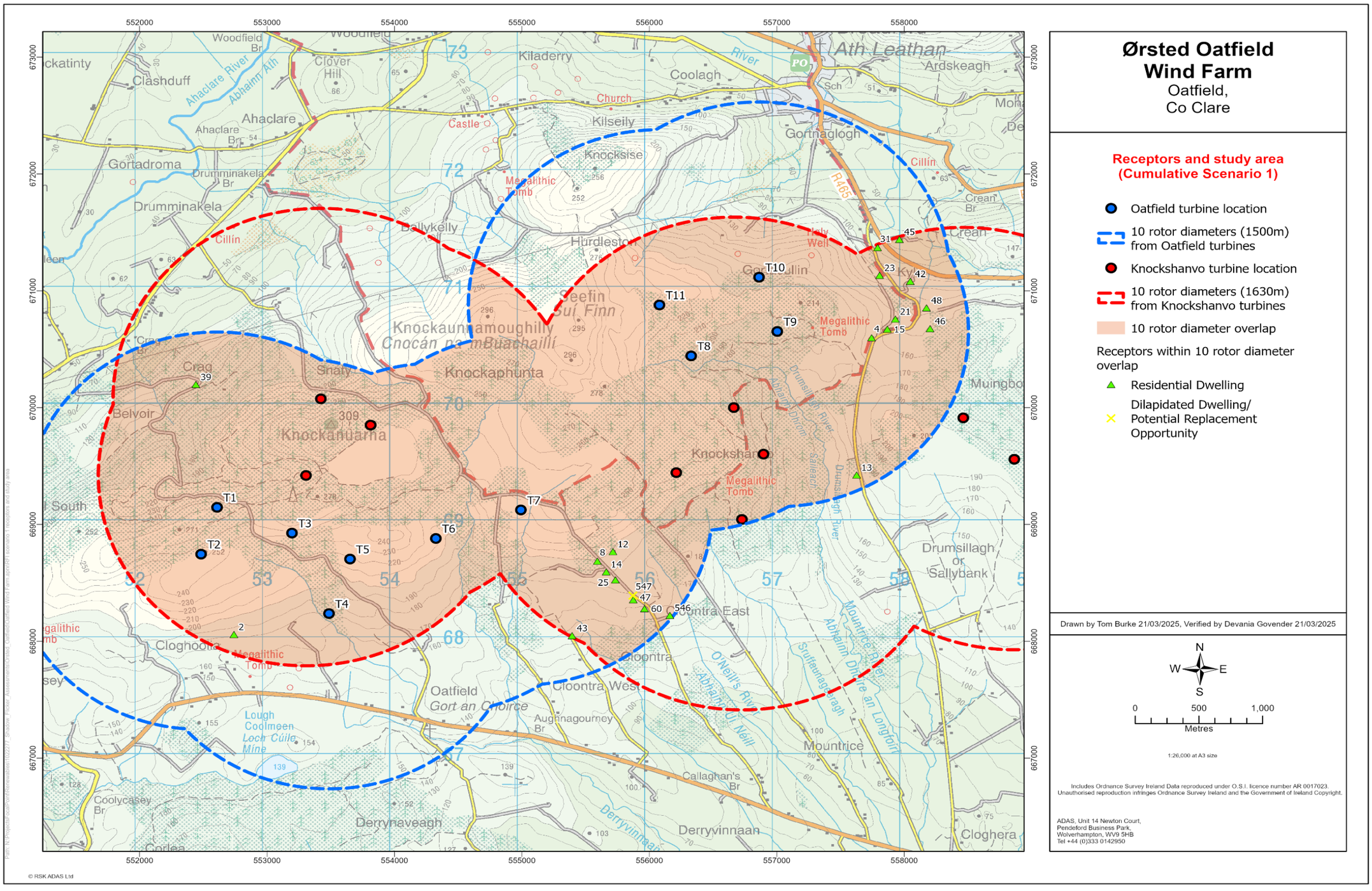


Figure 7.2: Receptors and study area (cumulative scenario 1)

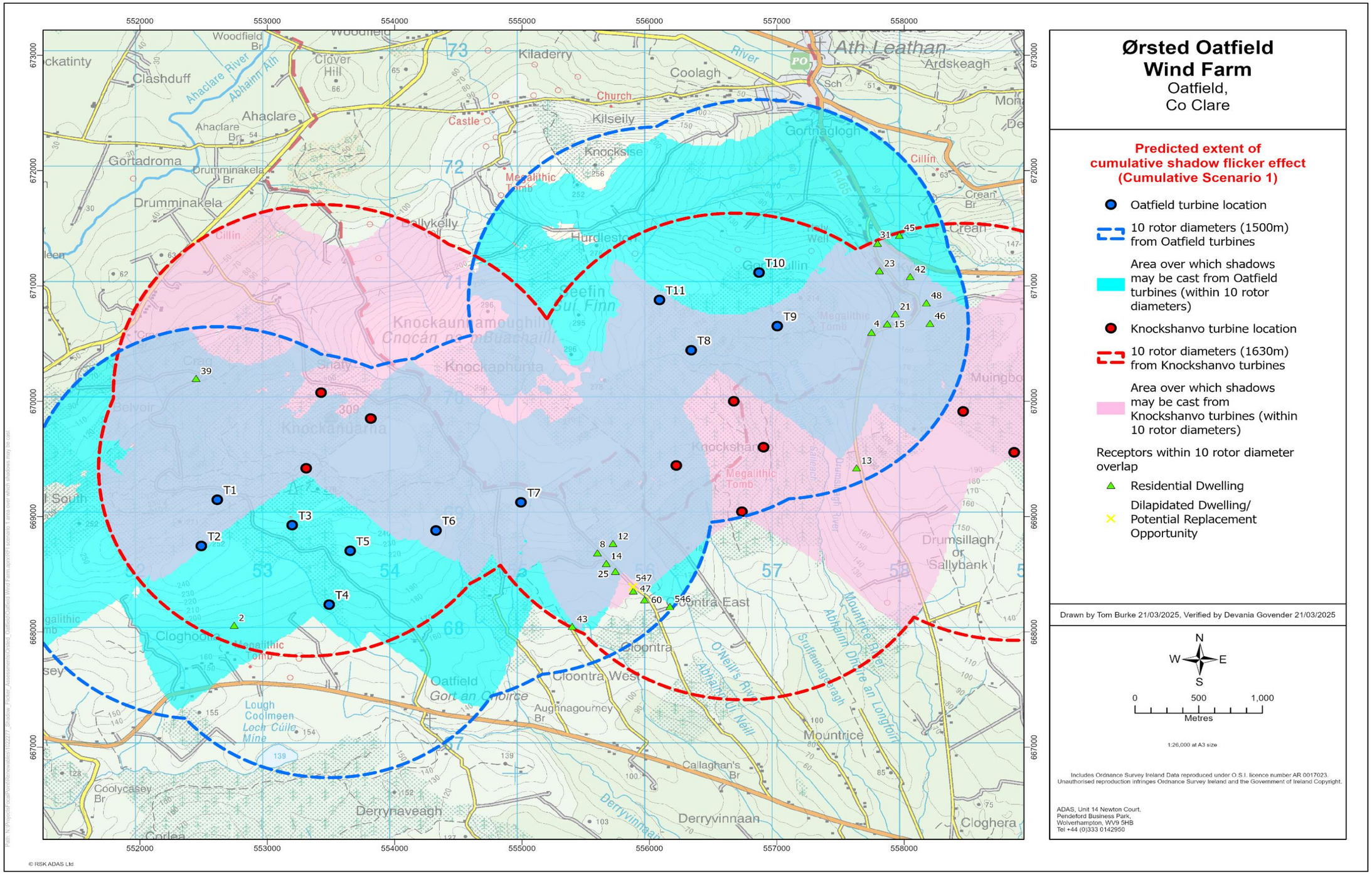

Ørsted Oatfield
Wind Farm
Oatfield,
Co Clare
Predicted extent of
cumulative shadow flicker effect
(Cumulative Scenario 1)
Oatfield turbine location
10 rotor diameters (1500m)
from Oatfield turbines
Area over which shadows
may be cast from Oatfield
turbines (within 10 rotor
diameters)
Knockshanvo turbine location
10 rotor diameters (1630m)
from Knockshanvo turbines
Area over which shadows
may be cast from
Knockshanvo turbines (within
10 rotor diameters)
Receptors within 10 rotor diameter
overlap
Residential Dwelling
Dilapidated Dwelling/
Potential Replacement
Opportunity
Drawn by Tom Burke 21/03/2025, Verified by Devania Govender 21/03/2025
N
W
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Metres
1:26,000 at A3 size
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Drumminakela
Gortadroma
Kiladerry
Coolagh
Kilseily
Knocksise
Gortnaglogh
Ardskeagh
Ath Leathan
Hurdleston
Ballykelly
Knockaunnamoughill
Knockaphunta
Knockshanvo
Cloontra
Cloontra West
Cloontra East
Oatfield
Aughnagourney Br
Mountrice
Drumsillagh or Sallybank
Derryvinnaan
Derryvinnaan
Derryvinnaan
Cloghera
Coolycasey Br
Lough Coolmeen
Megalithic Tomb
Megalithic Tomb
Megalithic Tomb
Church
Castle
Cillin
Cillin
Clover Hill
Belvoir
Shaty
Crean
Crean Br
Callaghan's Br
Ahaclare River
Abhainn Ath
Mountrice River
Abhainn Dhuirte an Longfoirt
O'Neill's River
Abhainn Uí Néill
Sruffeunagreagh
Derryvinnaan
Muingbo
Mon
De
Sch
PO
R465
Well
Tomb
Tomb
Tomb

Table 7.2 Cumulative scenario 1 shadow flicker assessment results by receptor

Receptor ID	Description	Max hours per day	Total hours per year	'Likely' hours per year (30% sunshine hrs)	Contributing turbines (O = Oatfield, K = Knockshanvo)
2	Residential Dwelling	0.81	58.6	17.58	O
4	Residential Dwelling	1.01	154.3	46.29	O, K
8	Residential Dwelling	0.87	69.4	20.82	O, K
12	Residential Dwelling	1.31	129.4	38.82	O, K
13	Residential Dwelling	1.21	175.7	52.71	K
14	Residential Dwelling	0.67	58.4	17.52	O, K
15	Residential Dwelling	1.34	170.9	51.27	O, K
21	Residential Dwelling	1.43	145.6	43.68	O, K
23	Residential Dwelling	0.64	54	16.2	O, K
25	Residential Dwelling	0.63	65	19.5	O, K
31	Residential Dwelling	0.62	34.5	10.35	O, K
39	Residential Dwelling	0.7	70.4	21.12	O, K
42	Residential Dwelling	0.54	40.3	12.09	O, K
43	Residential Dwelling	0	0	0	
45	Residential Dwelling	0.53	28.7	8.61	O
46	Residential Dwelling	1.25	95.5	28.65	O, K
47	Residential Dwelling	0.23	4.8	1.44	K
48	Residential Dwelling	0.86	56.5	16.95	O, K
60	Residential Dwelling	0	0	0	
546	Residential Dwelling	0	0	0	
547	Dilapidated Dwelling/Potential Replacement Opportunity	0.5	16.2	4.86	K

***Note: Shaded cells indicate exceedances of Wind Energy Development Guidelines (2006) thresholds of 30 hours per year or 30 minutes per day.**

7.4.2.2 Cumulative Scenario 2

Figure 7.4 below presents the Proposed Oatfield Development and Knockshanvo turbines and assumed 10-rotor diameter buffers for cumulative scenario 2. Sensitive receptors within both 10-rotor diameter buffers are displayed.

Table 7.3 below presents the modelled 'worst-case' scenario shadow flicker durations at these receptors. The table also presents the 'likely' shadow flicker durations when taking into account estimated sunshine probability (30%). Shaded cells indicate exceedances of Wind Energy Development Guidelines (2006) thresholds of 30 hours per year or 30 minutes per day.

Sixteen receptors are within 10 rotor diameters of both the Proposed Oatfield Development and Knockshanvo turbines, and therefore have the potential to experience cumulative shadow flicker effects. Of these, one is predicted to experience no shadow flicker, while 15 may experience some shadow flicker. Of these, one would experience effects from the Proposed Oatfield Development

turbines only, four from Knockshanvo turbines only, and 10 from both the Proposed Oatfield Development and Knockshanvo turbines.

In cumulative scenario 2, 13 sensitive receptors may potentially exceed the Wind Energy Development Guidelines (2006) thresholds of 30 hours per year or 30 minutes per day. Of these, one would experience effects from the Proposed Oatfield Development turbines only, two from Knockshanvo turbines only, and 10 from both the Proposed Oatfield Development and Knockshanvo turbines. With the incorporation of average annual sunshine data in the cumulative assessment to identify the more 'likely' hours per year, three receptors are predicted to exceed the guideline of 30 hours per year. Of these, all would experience effects from both the Proposed Oatfield Development turbines and Knockshanvo turbines.

The modelled cumulative area over which shadows may be cast (and therefore there is potential for shadow flicker to occur) for cumulative scenario 2 is shown in **Figure 7.5** below.

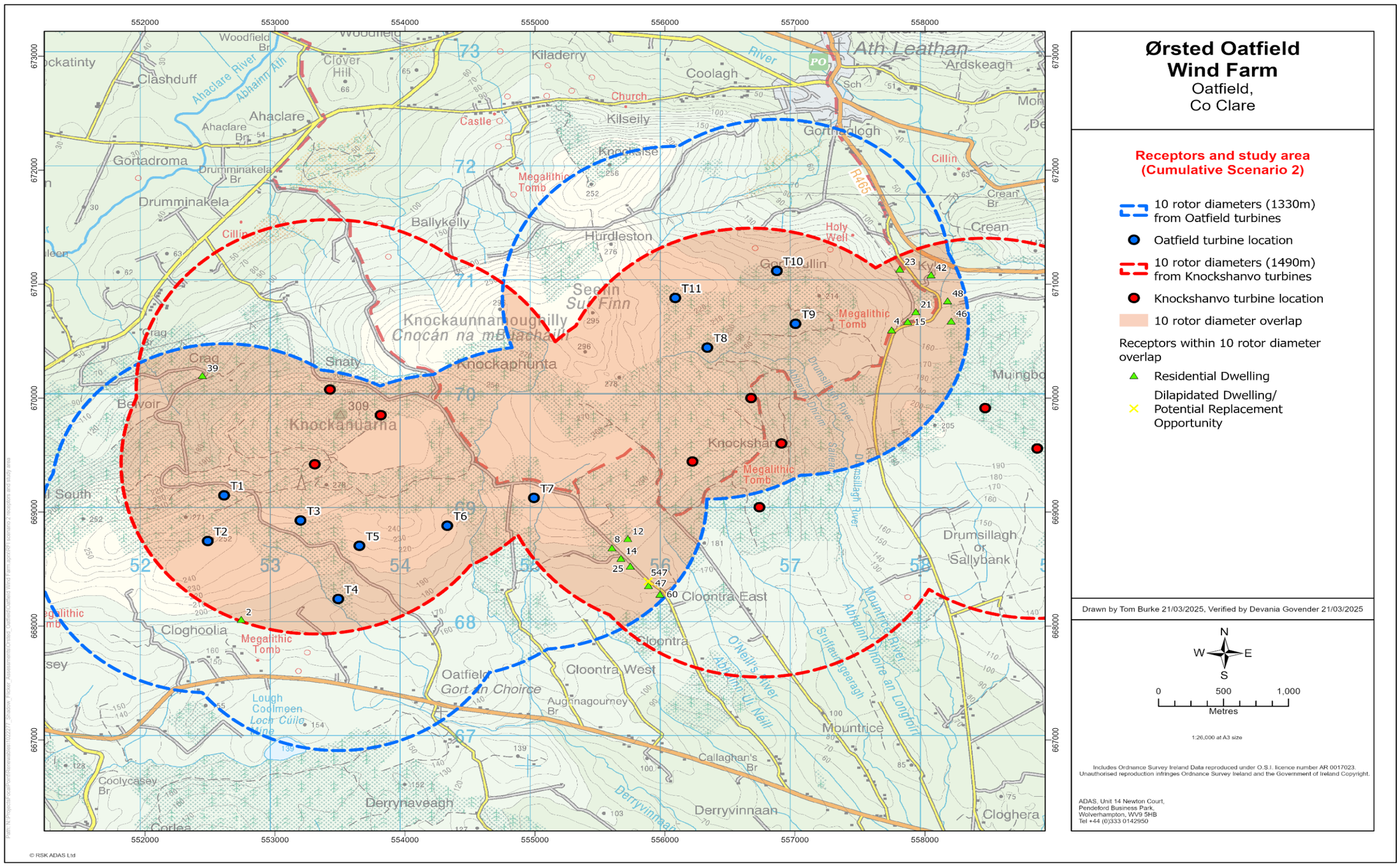


Figure 7.4:Receptors and study area (cumulative scenario 2)

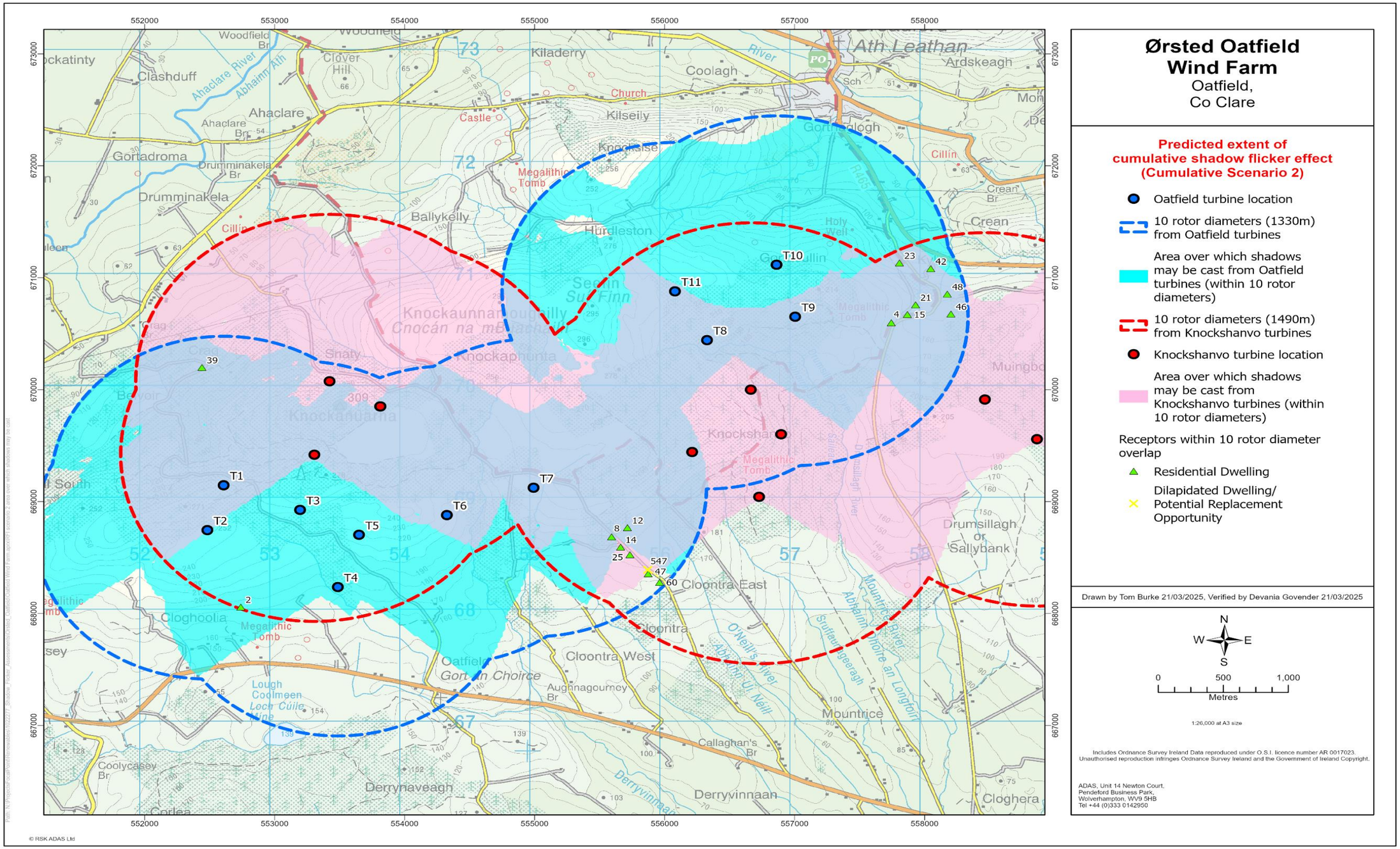


Figure 7.5: Predicted extent of cumulative shadow flicker effect (cumulative scenario 2)

Table 7.3: Cumulative scenario 2 shadow flicker assessment results by receptor

Receptor ID	Description	Max hours per day	Total hours per year	'Likely' hours per year (30% sunshine hrs)	Contributing turbines (O = Oatfield, K = Knockshanvo)
2	Residential Dwelling	0.72	41.7	12.51	O
4	Residential Dwelling	0.9	130.6	39.18	O, K
8	Residential Dwelling	0.76	33.2	9.96	O, K
12	Residential Dwelling	1.19	100.8	30.24	O, K
14	Residential Dwelling	0.56	26.9	8.07	K
15	Residential Dwelling	1.05	137.3	41.19	O, K
21	Residential Dwelling	0.59	88.6	26.58	O, K
23	Residential Dwelling	0.58	46.2	13.86	O, K
25	Residential Dwelling	0.58	44.9	13.47	K
39	Residential Dwelling	0.63	61.8	18.54	O, K
42	Residential Dwelling	0.48	32.6	9.78	O, K
46	Residential Dwelling	1.17	69.2	20.76	O, K
47	Residential Dwelling	0.18	3.1	0.93	K
48	Residential Dwelling	0.73	32.3	9.69	O, K
60	Residential Dwelling	0	0	0	
547	Dilapidated Dwelling/Potential Replacement Opportunity	0.46	13.9	4.17	K

***Note: Shaded cells indicate exceedances of Wind Energy Development Guidelines (2006) thresholds of 30 hours per year or 30 minutes per day**

7.4.3 Mitigation measures

Criteria for significance is outlined in Section 12.4.4 of EIAR **Vol II Chapter 12 Shadow Flicker**. Due to predicted 'worst-case' scenario shadow flicker effects from the combination of the Proposed Oatfield Development and Knockshanvo turbines exceeding 30 minutes per day or 30 hours per year at 13 (cumulative scenario 1) or 10 (cumulative scenario 2) receptors, it is considered that in the absence of mitigation, the cumulative shadow flicker that would be experienced at these receptors is significant and adverse.

Section 12.7.1 of EIAR **Vol II Chapter 12 Shadow Flicker** details mitigation measures that will be employed at the Proposed Oatfield Development. Mitigation strategies will be employed by both developments to prevent significant shadow flicker effects on nearby sensitive receptors. Section 5.9.3.6 of the Knockshanvo Wind Farm EIAR, Chapter 5 (Population and Human Health) sets out mitigation strategies that will be employed by the proposed Knockshanvo development. The control system described for the Proposed Oatfield Development includes a module to detect when the conditions which are likely to result in shadow flicker in excess of WEDG 2006 thresholds are present. When these are detected, the responsible turbine(s) would be curtailed, and will come to a stop. Therefore, there will be no cumulative shadow flicker with Knockshanvo that will give rise to a significant effect. Should guidelines with revised limitations on shadow flicker be adopted

during the planning application process for this Development, the technical solutions described above can be adapted and applied to adhere to these (allowing for a short period for shadow conditions to be confirmed and for the turbines to come to a stop).

7.4.4 Residual cumulative effects

With the application of this mitigation, it is considered that there would be no significant cumulative effects relating to shadow flicker from the Proposed Oatfield Development.

7.5 Decommissioning Phase

As outlined in Section 12.1 of EIAR **Vol II Chapter 12 Shadow Flicker**, shadow flicker can only occur when the turbine blades are moving. This requires the turbine to be operational. As such, there will be no shadow flicker effects during the decommissioning phase of the Proposed Oatfield Development.

8 NOISE

8.1 Statement of Authority

This assessment was undertaken by Matthew Cand of Hoare Lea LLP (HL). Matthew (Dipl. Eng., PhD, MIOA) is a full member of the UK Institute of Acoustics. He is an Associate Director at Hoare Lea LLP who has responsibility for running the environmental noise group, which has a focus on Environmental Impact Assessments (EIAs). He has over 19 years' experience in the assessment of environmental acoustics and has conducted more than 80 noise assessments for EIA of wind farms. Matthew is an expert in the assessment of wind farm noise and is one of the authors of the UK Institute of Acoustics Good Practice Guide (IOA, 2013). He has also been engaged as expert witness at planning inquiries and noise nuisance cases.

8.2 Do-Nothing Scenario

If the Proposed Oatfield Development does not proceed there will be no cumulative effects.

8.3 Construction Phase

If both the Proposed Oatfield Development and the proposed Knockshanvo Wind Farm are constructed over similar periods, such that the construction activities overlap, there is the potential for cumulative noise increases due to noise from on-site construction activities coinciding and impacting neighbouring properties. However, the distances between the location of the works and most of the activities associated with the Proposed Oatfield Development, associated with work at and around the turbine locations, are distant from noise-sensitive locations, such that predicted noise levels described in section 5.1 of EIAR **Vol III Appendix 13.1** are below 52 dB L_{Aeq}. This is below the threshold of 55 dB for negligible impacts based on the relevant criteria, as set out in Table 1 of EIAR **Vol III Appendix 13.1**. Similarly, Chapter 12 of the Knockshanvo Wind Farm EIAR presents predictions of comparable construction activities which result in similar noise levels at noise-sensitive properties (no more than 52 dB L_{Aeq}. Therefore, even if works were to coincide and result in similar levels at the same properties, which is unlikely, this would only result in total noise levels of up to 55 dB $L_{Aeq,}$ which would still correspond to negligible impacts based on the relevant criteria referenced above.

The only exception would be for activities which may occur in closer proximity to some properties, such as works associated with the site access track or grid connection route, where higher noise levels would be experienced for brief periods of time, as set out in EIAR **Vol II Chapter 13 Noise and Vibration**. However, these works are undertaken in different locations for each of the proposals such that no additional cumulative increases are likely to arise.

Therefore, no significant cumulative effects are likely to arise in relation to the construction of the Proposed Oatfield Development and the proposed Knockshanvo Wind Farm. This is consistent with the conclusions of the Knockshanvo Wind Farm EIAR in this respect.

Given the localised and temporary nature of the noise effects from construction activities, there would be negligible cumulative construction effects from the other cumulative developments considered, given their separation distance of more than 2 km from the noise-sensitive receptors considered.

In addition to construction activities, the effects of road traffic also requires consideration. The construction traffic assessment in EIAR **Vol II Chapter 16 Traffic and Transport** considers that there is a potential for cumulative traffic increases during the construction phase associated with some of the other developments considered, which would result in increased traffic as a worst-case. Based on the predicted worst-case cumulative traffic flows, we can calculate the associated maximum total change in the average day-time traffic noise levels, for properties along the construction route, using the Calculation of Road Traffic Noise'[10] (CRTN) methodology previously described in EIAR **Vol III Appendix 13.1**, where possible. The resulting calculated increases in noise on this basis are presented below in **Table 8.1**, which represents an update of the results previously set out in Table 8 of EIAR **Vol III Appendix 13.1**.

Table 8.1: Traffic Generation

Traffic Generation	
Road	**Maximum Change in Traffic Noise Level, dB(A)**
Site 1	0.1
Site 2	0.1
Site 3	0.1
Site 4	0.1
Site 5a	n/a
Site 5	1.4
Site 5b – Carmody's Cross	0.7
Site 6	1.8
Site 7	0.0
Site 8	0.3
Site 9	0.0
Site 10	0.4
Site 11 & 12	1.5
Site 13	0.1
Site 14	0.1
Site 15	0.0
Site 15*	0.0

At site 5a, traffic levels are lower than a flow volume of 1000 vehicles per day, even when the worst-case construction flows are included. This level of traffic is below the minimum flow volume of 1000 vehicles per day that is required by the CRTN methodology to enable reliable predictions. However, based on the predicted noise levels that CRTN suggests for this lowest flow value of 1000 vehicles per day, it can be deduced that the associated L_{Aeq} over the working day for

10 Calculation of Road Traffic Noise, HMSO Department of Transport, 1988.

properties along this portion of the route would be below 65 dB. According to the construction noise criteria of Table 1 of EIAR **Vol III Appendix 13.1**, a noise level of no more than 65 dB L_{Aeq}, generated (as a worst-case) by the construction traffic, represents a minor adverse impact.

For the other roads considered, as previously discussed in EIAR **Vol III Appendix 13.1** (section 3.4), when considering the impact of such short-term changes in traffic, reference can be made to the criteria set out in the UK Design Manual for Roads and Bridges (DMRB[11]) which is referenced in the National Roads Authority guidelines[12]. **Table 8.1** above indicates a maximum potential temporary increase of just under 2 dB(A) in the day-time average noise level during particular phases of the construction programme at locations adjoining traffic site assessment points 6, 11 and 12, this represents a minor impact based on the DMRB criteria set out in section 3.4 of EIAR **Vol III Appendix 13.1**. At all other locations, the predicted increase is less than 1 dB(A). Based on the criteria set out in the DMRB the predicted short-term change in traffic noise level would correspond to a negligible impact.

Overall, assuming implementation of the construction mitigation measures described in EIAR **Vol II Chapter 13 Noise and Vibration,** cumulative construction effects will remain negligible to minor short-term temporary reversible adverse and therefore not significant.

8.4 Operational Phase

8.4.1 Knockshanvo Wind Farm

EIAR **Vol II Chapter 13 Noise and Vibration** for the Proposed Oatfield Development presented an indicative noise assessment of cumulative operational noise effects with the proposed Knockshanvo Wind Farm, based on the information known at the time. Since then, the Knockshanvo Wind Farm planning application has been submitted. Chapter 12 of the Knockshanvo Wind Farm EIAR considers noise impacts and includes an assessment of cumulative operational noise effects, including the effect of the Proposed Oatfield Development. This assessment concluded that predicted cumulative noise levels were compliant with the noise limits derived in the Knockshanvo Wind Farm EIAR, once the effects of noise propagation in different directions are considered. The Knockshanvo Wind Farm EIAR therefore concluded there were no significant cumulative noise operational noise effects. The present section will undertake a similar assessment of cumulative noise impacts to confirm this.

Each of the proposed wind farms include a substation which represents a source of operational noise. However, the two proposed substations are located more than 3 km from each other, with negligible noise contributions at that distance. There would therefore be no potential for cumulative operational impacts arising from operational noise from the substations and this is not considered further in this chapter.

The indicative noise assessment for the Knockshanvo Wind Farm presented in EIAR **Vol II Chapter 13 Noise and Vibration** was based on a preliminary turbine layout, which was considered likely to be close to the final layout, using a Vestas V162-6.8 MW candidate turbine model. The final proposed wind turbine layout is subsequently confirmed in Table 12-8 of Chapter 12 of the

11 The Highways Agency, Transport Scotland, Transport Wales and The Department for Regional Development (Northern Ireland) (2020). 'Design Manual for Roads and Bridges, LA 111 Noise and vibration', revision 2.

12 National Roads Authority (NRA, 2004), Guidelines for the Treatment of Noise and Vibration in National Road Schemes Revision 1, 25th October 2004.

Knockshanvo Wind Farm EIAR. However, the differences between the turbine layout previously assumed for Knockshanvo Wind Farm and its final turbine layout would only correspond to relatively small differences in predicted noise levels at neighbouring properties, of less than 1 dB.

Chapter 12 of the Knockshanvo Wind Farm EIAR also lists a range of different candidate wind turbine models which are considered representative of the turbine which may be installed at the Knockshanvo Wind Farm: Vestas V150, Siemens Gamesa SG 155, Nordex N149, Vestas V162 and Nordex N163. Of these candidate turbine models, the Nordex N163 is considered the worst-case and resulting in highest predicted noise levels at neighbouring properties. Representative noise emission levels for the turbine, derived in line with current good practice guidelines[13], are set out below in **Table 8.2**. The turbine noise levels do not increase beyond a wind speed of 9 m/s.

Table 8.2: Assumed sound power levels – Knockshanvo Wind Farm – Nordex N163 (LAeq, dB) – as function of standardised 10 m wind speeds (m/s).

Turbine mode	4	5	6	7	8	≥9
Mode 0 (standard)	100.0	104.8	108.9	109.2	109.2	109.2

The resulting revised predicted noise levels for the Knockshanvo Wind Farm, at all properties considered in the detailed operational noise assessment in EIAR **Vol III Appendix 13.1**, are set out in detail in **Table A.1** (See **Appendix 1 of this Report**).

Table A.1 in Appendix 1 of this Report also includes predictions at the Sunyata Buddhist Centre, which was considered in further detail following submission of the EIAR: no property reference was included in the EIAR, as this location was outside the study area, but this is referenced as background noise measurement location A in the Knockshanvo Wind Farm EIAR. **Table A.2 in Appendix 1 of this Report** also then presents the cumulative noise levels that result with the addition of the predicted noise levels for the Proposed Oatfield Development (which are themselves set out in Table 2 of EIAR **Vol III Appendix 13.1**). These cumulative predictions assume that all receptors are downwind of all wind turbines at the same time: therefore, these cumulative noise levels are unlikely to occur in practice, particularly for properties such as H13 which could not be downwind of all the turbines at any one time, as this property is located between two groups of the Knockshanvo Wind Farm turbines. The resulting cumulative predictions of **Table A.2** in **Appendix 1 of this Report** also are more elevated than those previously shown in Table 12 EIAR **Vol III Appendix 13.1**, because of the increased noise levels assumed for the Knockshanvo Wind Farm (see **Table 8.2** above).

The cumulative noise levels of **Table A.2** in **Appendix 1 of this Report** are also, for most properties, below the lowest noise limit of 40 dB L_{A90} considered for day-time periods in the assessment of the Proposed Oatfield Development (or with negligible exceptions). For these properties, cumulative noise levels would therefore comply with the noise limits derived in EIAR **Vol III Appendix 13.1** (Tables 4 and 5). The predictions at the Sunyata Buddhist Centre in particular are lower than the lowest of these noise limits derived in EIAR **Vol III Appendix 13.1.** The exceptions with these conclusions are for properties: H4, H6, H7, H8, H12, H13, H528, H530 and H606. For these properties, a more detailed assessment is presented in **Table A.3 to Table A.6** in **Appendix 1 of this Report**. The assessment in these tables is based on the noise limits

[13] Based on Nordex document 'Noise level, Power curves, Thrust curves, NordexN163/5.X', reference F008_276_A13_EN, 08/07/2021. With +2dB added for uncertainties. Assumes use of serrated trailing edge.

derived in Table 12-12 of the Knockshanvo Wind Farm EIAR, based on representative measurement properties (A, B, C, etc.) of Table 12-12, as the Knockshanvo Wind Farm represents either a dominant or notable contribution to the cumulative noise levels at these properties. For some properties, like H6, the assessment presented is representative of other properties located nearby but further from the turbines (for H6, these are H7, H528, H530, H606).

The assessment set out in **Table A.3 to Table A.6** in **Appendix 1 of this Report** demonstrates that cumulative noise levels do not exceed the noise limits which are defined in the Knockshanvo Wind Farm EIAR. This means that both developments can operate cumulatively within the noise limits derived in the Knockshanvo Wind Farm EIAR. This confirms the conclusions of the Knockshanvo Wind Farm EIAR and is consistent with the conclusions of the indicative cumulative assessment presented in the Proposed Oatfield Development EIAR.

Satisfactory control of cumulative noise emission levels should be achieved through enforcement of individual consent limits for each of the wind farms. **Table A.7 and Table A.8 in Appendix 1 of this Report** present site-specific noise limits for the Proposed Oatfield Development, for day-time and night-time periods respectively. These site-specific limits were determined such that compliance of the Proposed Oatfield Development with these noise limits would allow maintaining the conclusion of the above cumulative operational noise assessment and result in cumulative levels which do not exceed the derived criteria. The Sunyata Buddhist Centre is not included in these tables as it is outside the study area for the Proposed Oatfield Development. The predicted noise levels for the Proposed Oatfield Development do not exceed these site-specific limits.

In conclusion, cumulative operational noise still represent a long-term reversible adverse effect which is not significant.

8.4.2 Other developments

The nearest turbines of the proposed Ballycar Wind Farm are located approximately 3 to 4 km or more from the receptors previously considered in the assessment of the Proposed Oatfield Development, such as H3, H2 and other properties located south of the Proposed Oatfield Development turbines. At this distance, based on the proposed layout of the Ballycar Wind Farm and the Vestas V136 candidate turbine considered in that assessment, predicted noise levels would be clearly below 30 dB L_{A90}. This is more than 10 dB below the lowest criteria of 40 dB L_{A90} considered in the assessment of the Proposed Oatfield Development and therefore represents an acoustically insignificant contribution[14]. Furthermore, the noise-sensitive receptors located south of the Proposed Oatfield Development cannot be downwind from both wind farms simultaneously and therefore, the contributions would not add up in practice: under upwind propagation conditions between turbines and a receiver, the noise level at that receiver can be as much as 10 dB(A) to 15 dB(A) lower than the level predicted. Therefore, cumulative operational effects from the Ballycar Wind Farm are considered negligible.

The nearest turbines of the proposed Lackareagh Wind Farm and Fahybeg Wind Farm are located more than 5 km from the nearest receptors considered in the assessment of the Proposed Oatfield Development. Based on previous experience, and for similar reasons as for the Ballycar Wind Farm, cumulative operational noise effects at these distances are likely to be negligible and do not require further consideration.

[14] The Institute of Acoustics Good Practice Guide suggests that cumulative noise effects need not be considered where differences between existing and proposed wind farm noise levels are 10 dB or more.

For non-wind-farm developments set out in **Table 1.1** above, given the nature of their use and these separation distances, there would not be any potential for cumulative operational noise increases and therefore correspond to negligible effects which do not require further consideration.

8.5 Decommissioning Phase

Decommissioning would still be associated with minor short-term temporary reversible adverse effects at most, which is not significant.

9 LANDSCAPE AND VISUAL

9.1 Statement of Authority

This Landscape and Visual Assessment (LVIA) response was prepared by Cian Doughan, Bachelor of Science in Landscape Architecture and Corporate Member of the Irish Landscape Institute (MILI) with nine years of experience. The response was reviewed by Richard Barker (Masters in Landscape Architecture and MILI) of Macro Works Ltd, who has 20 years of experience in the appraisal of effects from a variety of energy, infrastructure and commercial developments.

9.2 Do-Nothing Scenario

In this instance the do-nothing effect would be that the receiving landscape stays in the same or similar condition as it currently is, managed for a combination of pastoral farmland and forestry.

9.3 Construction Phase

In terms of cumulative construction stage effects, it is unlikely that the construction of more than two wind farm developments within the study area will occur simultaneously. However, should the construction of the Proposed Oatfield Development and another consented or Proposed Oatfield Development take place concurrently, there is the potential for an increase in the intensity of construction activities within the study area. This would include increased movement of heavy goods vehicles (HGVs) along the surrounding road networks, the storage of construction vehicles and machinery, and the erection of tower cranes for the assembly of turbine components.

The most notable potential for cumulative landscape and visual effects during the construction phase arises from the proximity of the proposed Knockshanvo development, which consists of three clusters of turbines located in close proximity to the the Proposed Oatfield Development turbines. Should construction activities of both developments coincide, there would be a noticeable temporary increase in the intensity of development and construction works within the local landscape. This would result in an increase in HGV traffic accessing and leaving the site, and the presence of tower cranes during construction could generate visual impacts. These cranes have the potential to be visible in the surrounding local landscape and further beyond, contributing to the cumulative visual effects.

Despite these potential impacts, it is important to note that the construction phase is short-term in duration. The construction of the proposed turbines will not take place all at once, as it is likely to be phased over time, which would help reduce the intensity of cumulative landscape and visual effects. Indeed, the construction works will be temporary and short-term in duration, and the level of disruption caused by increased construction activity would decrease once the Proposed Oatfield Development is fully operational.

In terms of cumulative construction stage impacts on the landscape and visual environment, it is expected that these effects will be more notable in the immediate landscape context surrounding the site, much of which is comprised of local laneways that present with some sense of remoteness. The heightened activity associated with increased HGV movements and the visual presence of cranes have the potential to impact on the surrounding visual character of the area. However, it should be noted that much of the site context is that of commercial scale forestry plantations where HGV traffic is not uncommon.

Overall, while there is some potential for notable, temporary cumulative effects during the construction phase, it is not considered that the construction-stage effects with other consented or proposed wind farm developments will generate significant cumulative impacts in relation to the Proposed Oatfield Development.

9.4 Operational Phase

In this instance, the study area (20km study area as per the current WEDGs) comprises existing wind farms, consented wind farms, and proposed (in planning) wind farms. As a result, the cumulative assessment of wind farm developments within the study area has been divided into two categories: the current cumulative scenario and the potential future cumulative scenario. The current cumulative scenario will assess the cumulative effect of the Proposed Oatfield Development in relation to existing wind farm developments and consented wind farm developments. The potential future cumulative scenario will assess the Proposed Oatfield Development in relation to existing wind farms, consented wind farms, proposed (in planning) wind farms, and wind farm developments at the pre-planning stage (only where information is publicly accessible).

It should be noted that the submitted LVIA assessment (EIAR **Vol II Chapter 14 LVIA**) included an assessment of all existing, consented, proposed (in-planning) developments, and developments at the pre-planning stage that have publicly accessible information. Since the planning application for the the Proposed Oatfield Development was submitted, some of the pre-planning applications have now become live planning applications (in planning). Nonetheless, the assessment of these developments was still included within the submitted Proposed Oatfield Development LVIA cumulative assessment.

It should also be noted that, while the turbine layouts within both the proposed Knockshanvo Wind Farm and the proposed Ballycar Wind Farm, both of which are now in planning, have been slightly altered since the initial the Proposed Oatfield Development planning application was submitted, the number of turbines in both developments is consistent with what was assessed in the original application. **Figure 9.1** below highlights the locations of the turbines from the Knockshanvo and Ballycar wind farms used for the cumulative landscape and visual assessment of wind farm developments in the submitted the Proposed Oatfield Development planning application, versus the fixed locations of the proposed turbines that formed part of the respective submitted wind farm applications. As highlighted in the figure below, there is very little change in the locations of the turbines used in the assessment of cumulative landscape and visual impacts with respect to the proposed Knockshanvo development. For the purposes of a comprehensive cumulative appraisal, new cumulative Zone of Theoretic Visibility mapping has been generated in respect of the fixed turbines locations, whilst a sample set of some of the nearest representative viewpoints to the Proposed Oatfield Development used in the submitted LVIA have also been included with the updated locations both Knockshanvo and Ballycar turbines.

The updated locations of the cumulative turbines have also been included within updated photomontages (see **Photomontage Booklet submitted as part of the RFI Response**).

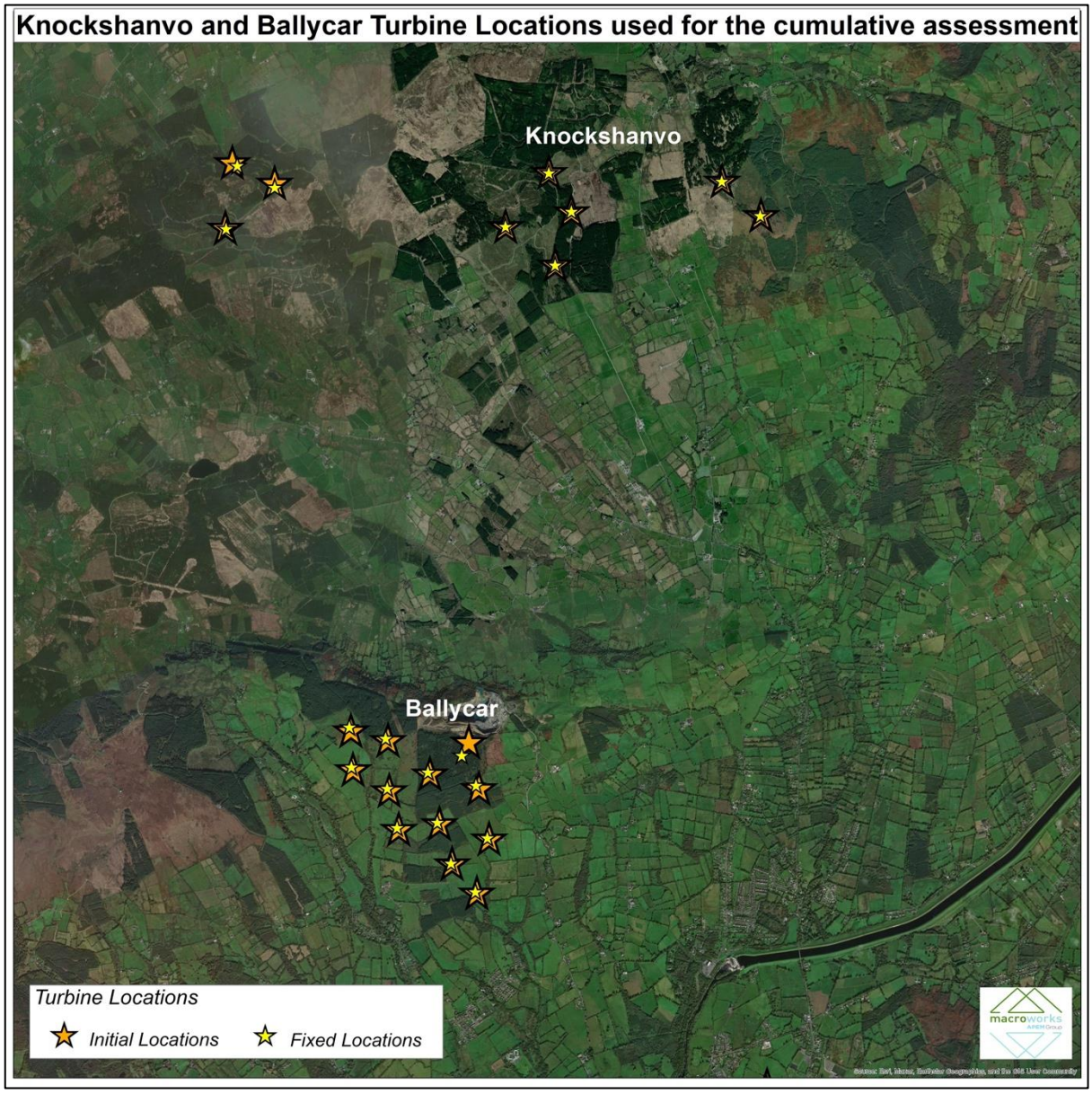


Figure 9.1: Originally assessed locations of cumulative turbines for both Knockshanvo and Ballycar Wind Farms versus the fixed locations of the turbines submitted within their respective planning applications

A summary of the potential cumulative effects in respect of the updated fixed turbine locations for Knockshanvo and Ballycar Wind Farm, and all other existing and Proposed Developments within the study area (outlined in **Table 1.1** above) is provided below in respect of the current cumulative scenario and the potential future cumulative scenario.

Current Cumulative Scenario

Although the analysis of the Cumulative Zone of Theoretical Visibility (ZTV) map in **Appendix 2 of this Report** relates principally to cumulative visual effects (i.e. utilising the selected VP set), it also informs the closely related assessment of cumulative landscape effects, particularly those relating to cumulative effects on the overall landscape character of the study area. The assessment below, therefore, relates to both cumulative visual effects and cumulative landscape effects. As there has

been no change to the current cumulative landscape and visual context since the application was submitted, this assessment remains the same to that as the submitted current cumulative scenario – refer to section 14.10.1.2 of EIAR **Vol II Chapter 14 Landscape and Visual**.

Potential Future Cumulative Scenario

The potential future baseline scenario relates to all existing, consented, proposed and developments (in planning). In contrast to the submitted the Proposed Oatfield Development cumulative landscape and visual assessment, both Knockshanvo Wind Farm located immediately adjacent to the Proposed Oatfield Development, and Ballycar Wind Farm located some 3km south of the Proposed Oatfield Development, are now live applications and thus, fall under the heading of in-planning developments.

Fahy Beg Wind Farm development (refused – and under appeal to ABP) is located some c. 5.8km east of the site and is also a live planning application, which remains unchanged from the submitted assessment. As per the cumulative ZTV for the potential future baseline scenario (**Figure 9.2** below refers), one of the most notable differences is the clear reduction in the potential for isolated views of the Proposed Oatfield Development to be afforded. In the potential future baseline scenario, visibility of the Proposed Oatfield Development in isolation only has the potential to occur within 0.7% of the study area, which has changed by 0.1% in comparison to the submitted cumulative assessment. This relates to a small area to the west of the site and is principally associated with the proposed Knockshanvo Windfarm development, which is situated immediately adjacent to the Proposed Oatfield Development.

The Proposed Oatfield Development and Knockshanvo windfarm developments are likely to be perceived as one larger-scale development situated across the underlying elevated hills to the west of the settlement of Broadford. While the combined developments will result in a marked intensification of development in the local landscape and on the surrounding hillsides, the addition of the proposed Knockshanvo development will fill the existing gaps between the western and eastern aspects of the Proposed Oatfield Development turbine layout. As a result, the two developments will likely appear as one consolidated wind farm along the broad ridge. The turbines in both the Proposed Oatfield and Knockshanvo developments will be of a similar scale, which reduces the potential for any sense of scale conflict and results in a more coherent combined view of the two developments. Nevertheless, the combination of both the Proposed Oatfield and Knockshanvo developments will lead to wind farm development becoming one of the more dominant features in this elevated landscape context.

The proposed Ballycar development is also located along sloping lands facing north towards the Proposed Oatfield Development and will often be viewed in combination with it, particularly from receptors located within the valley between the proposed site and Woodcock Hill. While the surrounding mature hedgerow vegetation and areas of conifer forest will provide a notable degree of screening for local community receptors, there is potential for some local dwellings to have views of turbines to both the north and south. This could create the perception that the dwellings are situated within a wind farm. Nevertheless, both the Proposed Oatfield and Ballycar developments are located on elevated lands with lower population densities and are offset from more populated areas, such as the R471.

The proposed Fahy Beg and Lackareagh Wind Farms are situated to the east of the site and are afforded a clear degree of separation from the Proposed Oatfield Development. They are located along the Slieve Bearnagh foothills, some 5.5km east of the site. Nonetheless, there will still be some clear opportunities to afford combined views of the Proposed Oatfield Development and the

proposed Fahy Beg and Lackareagh developments. They will contribute to a notable increase in the intensity of wind farm development in this aspect of the study area, albeit they will present as distinctly separate developments to the Proposed Oatfield Development turbines.

In terms of the sequential cumulative effects identified in the existing baseline scenario outlined above, there will be a notable increase in the intensity of these effects in the potential future baseline scenario. Nevertheless, as the proposed Knockshanvo development is located adjacent to the Proposed Oatfield Development, the effects are not considered to further disperse notably across the study area. Instead, they remain localised to the elevated uplands that contain the Proposed Oatfield Development.

Overall, it is considered that there will be a notable sense of wind farm proliferation within the central study area and in the wider eastern half of the study area. Wind farm development will become one of the more prominent built developments within the surrounding landscape, albeit these perceptual effects are slightly diminished as a result of the siting of the Knockshanvo development immediately adjacent to the Proposed Oatfield Development. This results in the combined development being perceived as one larger consolidated layout of turbines. Indeed, it should be noted that there are no material changes to the outcomes of the submitted cumulative landscape and visual assessment, with respect to the fixed turbine locations from both Knockshanvo and Ballycar Wind Farms. Overall, should all of the Proposed developments within the study area be permitted and constructed, it is considered that the Proposed Oatfield Development will contribute to a cumulative effect in the order of High-medium in the potential future baseline scenario, which is not considered to be significant.

Figure 9.2 below provides a ZTV map identifying the potential intervisibility of the Proposed Oatfield Development and all other existing, consented, proposed and pre-planning stage wind farm developments within the study area. See **Appendix 2 of this Report** for a larger version of this map.

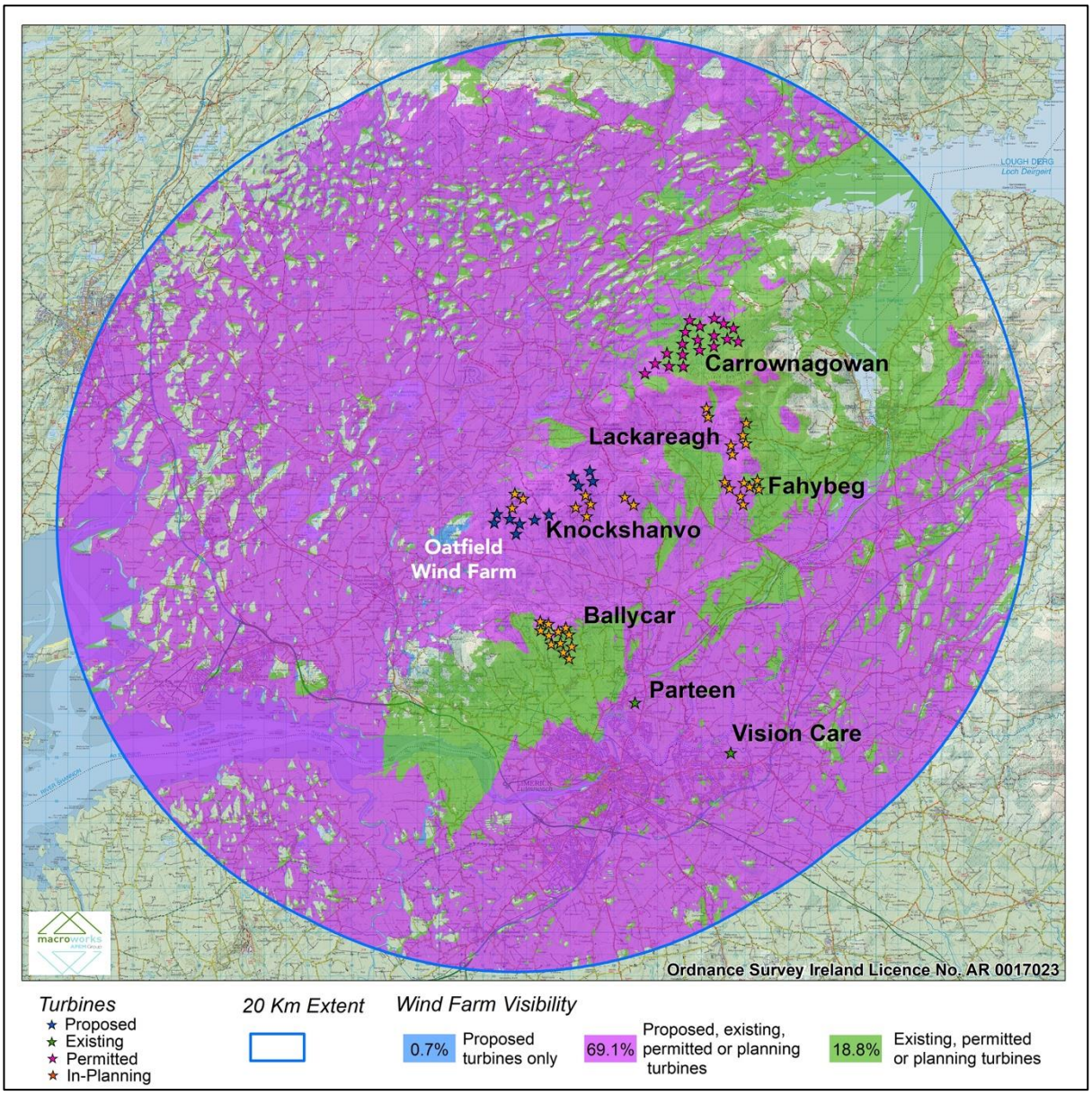


Figure 9.2: Cumulative ZTV Map - Tip Height (180m)

9.5 Decommissioning Phase

Cumulative landscape and visual effects at the decommissioning stage will be very similar to the construction stage. Indeed, it is not considered that the decommissioning of two developments are likely to occur in tandem. Overall, while there is some potential for notable cumulative effects during the decommissioning phase, much of which relates to the use of tower cranes to deconstruct the turbines, it is not considered that the decommissioning stage effects with other consented or proposed wind farm developments will generate significant cumulative impacts in relation to the Proposed Oatfield Development.

10 ARCHAEOLOGY AND CULTURAL HERITAGE

10.1 Statement of Authority

This Archaeology and Cultural Heritage response was prepared by Greg Bowen BA (Hons.)

Greg has a Bachelor of Arts (Hons) in Ancient Greek & Roman Studies from Trent University (2016) and Master of Arts in Archaeology of the Ancient Mediterranean from Sheffield University (2018). Greg has seven years of experience and has produced numerous desk-based assessments for renewable energy projects and grid connection schemes, including Tullacondra Wind Farm, Dublin Airport Solar Park, and Portarlington Flood Relief Scheme.

The response was reviewed by Diarmuid O'Seaneachain BA PhD MCIfA. Diarmuid has 19 years of experience and leads the ADAS Archaeology and Historic Buildings Team. He is a licensed eligible archaeologist and a Member of the Chartered Institute of Archaeologists. ADAS is a Registered Organisation with the Chartered Institute of Archaeologists and is a member of the Institute for Historic Building Conservation (IHBC). Dr O'Seaneachain has previously worked on several large-scale infrastructure schemes in Ireland including the N8 Fermoy/Mitchelstown road scheme, the N18 Gort/Crusheen road scheme and the A4/A5 Dungannon/Ballygawley road project in Northern Ireland. In 2008/2009 Diarmuid worked as a heritage consultant on the route determination and cultural heritage assessment of the EIA for the A5 Derry to/Ballygawley motorway scheme. Dr O'Seaneachain has produced dozens of historic environment desk-based assessments, heritage statements and cultural heritage chapters for Environmental Statements and EIA reports for wind energy developments across the UK, including large-scale wind farm developments at Llangurig and Hendy Bank in Wales and multiple turbine developments (between 1-5 turbines in size) across England and Scotland.

10.2 Do-Nothing Scenario

In this instance, the do-nothing effect would be that the receiving historic environment stays in the same or similar condition as it currently is, farmland and forestry land.

10.3 Construction Phase

In terms of cumulative construction stage effects, it is unlikely that the construction of two wind farm developments within the study area will occur simultaneously. However, should the construction of the Proposed Oatfield Development and another proposed or consented project take place concurrently, due to the fact that none of the other consented and proposed developments considered in this chapter intersect with the Proposed Oatfield Development site boundary, there will be no additional direct cumulative effects on archaeology, historic buildings, and cultural heritage within the site boundary.

In terms of cumulative indirect construction stage effects on the setting of archaeology and cultural heritage, it is unlikely that the construction of two wind farm developments within the study area will occur simultaneously. However, should the construction of the Proposed Oatfield Development and another proposed or consented project take place concurrently, there is the potential for an increase in the intensity of construction activities within the local landscape. This would include

increased movement of heavy goods vehicles (HGVs) along the surrounding road networks, the storage of construction vehicles and machinery, and the erection of tower cranes for the assembly of turbine components.

The most notable potential for cumulative indirect effects on the setting of archaeology, historic buildings, and cultural heritage during the construction phase arises from the proximity of the proposed Knockshanvo development, which consists of three clusters of turbines located close to the Proposed Oatfield Development turbines. Should construction activities of both developments coincide, there would be a noticeable increase in the intensity of development and construction works within the local landscape. This would result in a significant increase in HGV traffic accessing and leaving the site, and the presence of tower cranes during construction could generate visual impacts. These cranes have the potential to be visible in the surrounding local landscape and further beyond, contributing to the cumulative visual effects (see **Section 9.3**).

Despite these potential impacts, it is important to note that the construction phase is short-term in duration. The construction of the proposed cumulative projects will not take place all at once, as it is likely to be phased over time, which could help reduce the intensity of cumulative indirect effects on the setting of archaeology, historic buildings, and cultural heritage. Indeed, the construction works will be short-term in duration, and the level of disruption caused by increased construction activity would decrease once the Proposed Oatfield Development is fully operational (see **Section 9.3**).

Given the landscape and visual cumulative effects identified, in terms of cumulative indirect effects on the setting of archaeology, historic buildings, and cultural heritage, it is expected that these effects will be more notable in the immediate historic landscape context surrounding the site. The heightened activity associated with increased HGV movements and the visual presence of cranes have the potential to impact on the setting of archaeology and historic buildings in the wider landscape. However, it should be noted that much of the site context is that of commercial scale forestry plantations where HGV traffic is not uncommon. It should also be noted that the immediate landscape around the site contains relatively few upstanding monuments or buildings of historic interest, therefore the potential for cumulative indirect effects on the setting of archaeology, historic buildings and cultural heritage in this landscape is limited.

Overall, while there is some potential for notable cumulative effects during the construction phase, it is not considered that the construction-stage effects with other consented or proposed wind farm developments will generate significant cumulative indirect effects on the setting of archaeology, historic buildings, and cultural heritage in relation to the Proposed Oatfield Development.

10.4 Operational Phase

Due to the fact that none of the other consented and proposed developments considered in this chapter intersect with the Proposed Oatfield Development site boundary, there will be no additional direct cumulative effects on archaeology, historic buildings, and cultural heritage within the site boundary during the operational phase.

The study area assessed by the LVIA (**Section 9.4**) for cumulative indirect effects during the operational phase comprises existing wind farms, consented wind farms, and proposed (in planning) wind farms. As a result, the cumulative assessment of wind farm developments within the study area has been divided by the LVIA assessment into two categories: the current cumulative scenario and the potential future cumulative scenario. The current cumulative scenario assesses the cumulative effect of the Proposed Oatfield Development in relation to existing wind

farm developments and consented wind farm developments. The potential future cumulative scenario assesses the Proposed Oatfield Development in relation to existing wind farms, consented wind farms, proposed (in planning) wind farms, and wind farm developments at the pre-planning stage (only where information is publicly accessible).

For the purposes of a comprehensive cumulative appraisal, a new cumulative Zone of Theoretic Visibility mapping has been generated in respect of the fixed turbines locations (See **Appendix 2 of this CIA Report**), whilst the updated locations of the cumulative turbines have also been included within updated photomontages (see **Photomontage Booklet submitted as part of the RFI Response**).

A summary of the potential cumulative effects in respect of the updated fixed turbine locations for Knockshanvo and Ballycar Wind Farm, and all other existing and proposed developments within the study area (outlined in **Section 1.1.2** above) is provided in the landscape and visual cumulative assessment (see **Section 9.4**) in respect of the current cumulative scenario and the potential future cumulative scenario.

Overall, the landscape and visual cumulative assessment notes that there will be a notable sense of wind farm proliferation within the central study area and in the wider eastern half of the study area. Wind farm development will become one of the more prominent built developments within the surrounding landscape, albeit these perceptual effects are slightly diminished as a result of the siting of the Knockshanvo development immediately adjacent to the Proposed Oatfield Development. The landscape and visual cumulative assessment identified that this results in the combined development being perceived as one larger consolidated layout of turbines. Thus, there are no material changes to the outcomes of the submitted cumulative indirect effect on the setting of archaeology, historic buildings, and cultural heritage, with respect to the fixed turbine locations from both Knockshanvo and Ballycar Wind Farms.

Overall, should all of the proposed developments within the study area be permitted and constructed, it is considered that the Proposed Oatfield Development will contribute to a cumulative indirect effect on the setting of archaeology, historic buildings, and cultural heritage in the potential future baseline scenario, which is not considered to be significant.

10.5 Decommissioning Phase

Due to the fact that none of the other consented and proposed developments considered in this chapter intersect with the Proposed Oatfield Development site boundary, there will be no additional direct cumulative effects on archaeology, historic buildings, and cultural heritage within the site boundary during decommissioning.

Cumulative indirect effects on the setting of archaeology, historic buildings, and cultural heritage at the decommissioning stage will be very similar to the construction stage. Indeed, it is not considered that the decommissioning of two developments are likely to occur in tandem.

Overall, while there is some potential for notable cumulative indirect effects on the setting of archaeology, historic buildings, and cultural heritage during the decommissioning phase, much of this relates to the use of tower cranes to deconstruct the turbines. It is not considered that the decommissioning phase effects with other consented or proposed wind farm developments will generate significant cumulative effects in relation to the Proposed Oatfield Development.

11 TRAFFIC AND TRANSPORT

Section 16.12 of EIAR **Vol II Chapter 16 Traffic and Transport** identified a number of sites which could potentially be built and operated over similar time periods to the Proposed Oatfield Development where cumulative effects could be likely.

Table 16.1 of **EIAR Vol II Chapter 16 Traffic and Transport** outlined a planning search that was undertaken at the time of EIAR preparation of possible developments that may have a cumulative effect on the surrounding road network. An analysis of the likelihood of there being a cumulative effect was also provided.

The following sites were identified as unlikely to cause cumulative effects during both the construction and operational phases, as they had not yet received planning permission:

- Knockshanvo Wind Farm
- Ballycar Wind Farm
- Lackareagh Wind Farm

The Lackareagh Wind Farm was identified as potentially having a cumulative effect.

All data included in Table 16.1 of **EIAR Vol II Chapter 16 Traffic and Transport** was correct at the time of submitting the EIAR. Since then, the status of some projects has changed. At the request of An Bord Pleanála as part of the RFI received from the Proposed Oatfield Development, an updated assessment has been undertaken and is provided in the sections below.

Table 11.1 below provides an updated summary of the likely cumulative effects resulting from the Proposed Oatfield Development with other identified projects.

Newly identified sites with potential cumulative effects are highlighted in orange, while previously identified sites (in the original cumulative assessment in EIAR **Vol II Chapter 16 Traffic and Transport**) are highlighted in green.

Table 11.1: Projects considered for cumulative effects in traffic and transport assessment

Cumulative Effects				
Cumulative Development Project	**Construction**		**Operation**	
	Cumulative Effects Likely?	**Reason**	**Cumulative Effects Likely?**	**Reason**
Ballycar Wind Farm	Yes	Located close to site with an expected similar planning and construction phases. Likely to have overlapping haulage route/TDR/GCR.	Yes	Located close to site with an expected similar operational phase.
Boolynagleragh Lissycasey	No	Outside 20km radius of site.	No	Outside 20km radius of site.
Boolynagleragh-Boolybrien, Knockatunna and Rathcroney	No	Outside 20km radius of site.	No	Outside 20km radius of site.
Carrownagowan Wind Farm	No	Granted in 2022 with an 18-month construction program. With limited overlap in haul routes/TDR/GCR it is considered that there will be limited interaction during the construction phase.	No	It is considered that there will be limited interaction during the operational phase.
Castlewaller	No	Planning permission expired in 2022	No	Planning permission expired in 2022
Fahybeg Onshore Wind Farm	Yes	Located close to site with an expected similar planning and construction phases. Likely to have overlapping haulage route/TDR/GCR.	Yes	Located close to site with an expected similar operational phase.
Knockshanvo Wind Farm	Yes	Located close to site with an expected similar planning and construction phases. Likely to have overlapping haulage route/TDR/GCR.	Yes	Located close to site with an expected similar operational phase.
Lackareagh Wind Farm	Yes	Located close to site with an expected similar planning and construction phases. Likely to have overlapping haulage route/TDR/GCR.	Yes	Located close to site with an expected similar operational phase.

Cumulative Effects				
Cumulative Development Project	**Construction**		**Operation**	
	Cumulative Effects Likely?	**Reason**	**Cumulative Effects Likely?**	**Reason**
Loughaun North	No	Application refused	No	Application refused
Unknown Windfarm No. 1	No	Outside 20km radius of site.	No	Outside 20km radius of site.
Unknown Windfarm No. 1	No	Outside 20km radius of site.	No	Outside 20km radius of site.
Parteen Turbine	No	Site is operational.	No	Background traffic included in survey flows.
Vision Care Turbine	No	Site is operational.	No	Background traffic included in survey flows.

11.1 Statement of Authority

This section was authored by Ronan Kearns of Pinnacle Consulting Engineers. Ronan Kearns, BA, BAI, MSc, MBA, CEng MIEI, is a Chartered Engineer with 19 years' post graduate experience. Projects worked on include roads, drainage and civil infrastructure design and project management for residential, retail, data centres, commercial and wind farm developments from feasibility through to construction.

Ronan has led numerous planning applications and infrastructure designs for a variety of developments. These developments have ranged from small scale residential projects to multimillion Euro retail, data centre and wind farm projects. Ronan specialises in transportation planning and site assessment, preliminary design and detailed design of development. Ronan has completed a number of Traffic and Transport assessments for sites throughout Ireland.

11.2 Do-Nothing Scenario

If the Proposed Oatfield Development does not proceed there will be no cumulative effects.

11.3 Construction Phase

Where no traffic data is available in the Traffic and Transport Chapters of the cumulative development projects in consideration i.e. Knockshanvo Wind Farm, Ballycar Wind Farm and Lackareagh Wind Farm, trips have been estimated on a pro rata basis based on the Proposed Oatfield Development.

11.3.1 Cumulative Trip Generation

Reference has been made to available information relating to the proposed haulage routes of the cumulative development projects relative to the haulage route of the Proposed Oatfield Development. The haulage route, which may or may not coincided with the Turbine Delivery Route, will be the source of trips to/from the Proposed Oatfield Development during the construction stage.

Figure 11.1 to **Figure 11.3** below show the haulage routes of each of the 3 no. additional Cumulative Development Projects being considered in this assessment (i.e. Knockshanvo Wind Farm, Ballycar Wind Farm and Lackareagh Wind Farm). Nodes that overlap with the Proposed Oatfield Development have been identified and are discussed below.

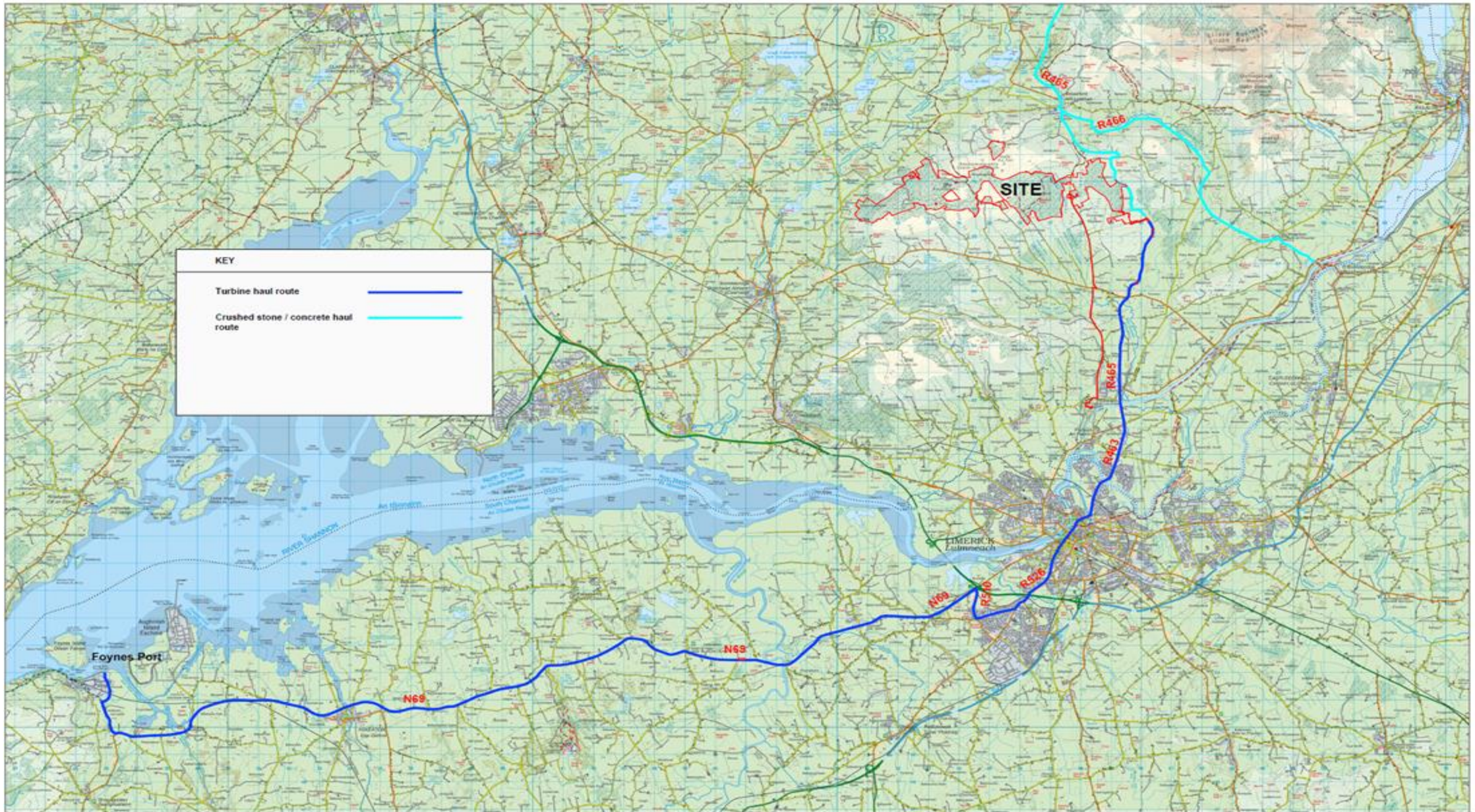


Figure 11.1: **Knockshanvo Wind Farm Haulage Route**

Based on **Figure 11.1** above, extracted from the Appendix 15-2 of the Knockshanvo Wind Farm EIAR, there is an overlap at Node 6 between the Knockshanvo Wind Farm haulage route and the Proposed Oatfield Development's haulage route.

Peak numbers employed during the construction stage of the development will be around 60 no. and a worst-case scenario of 1 personnel per vehicle has been considered in the analysis within this report. It is therefore assumed that staff trips will contribute 60 no. vehicular AM trips into the development and 60 no. vehicular PM trips out of the development. Although staff are expected to arrive outside peak traffic hours, in line with the precautionary principle and to ensure a robust assessment, these trips have been considered to occur at peak public traffic AM and PM hours.

Based on information from the Knockshanvo EIAR (see Table 1.1 – Proposed Construction Programme of Traffic and Transport Assessment), it is anticipated that the peak daily construction stage traffic to the site will be 252 no. HGV movements.

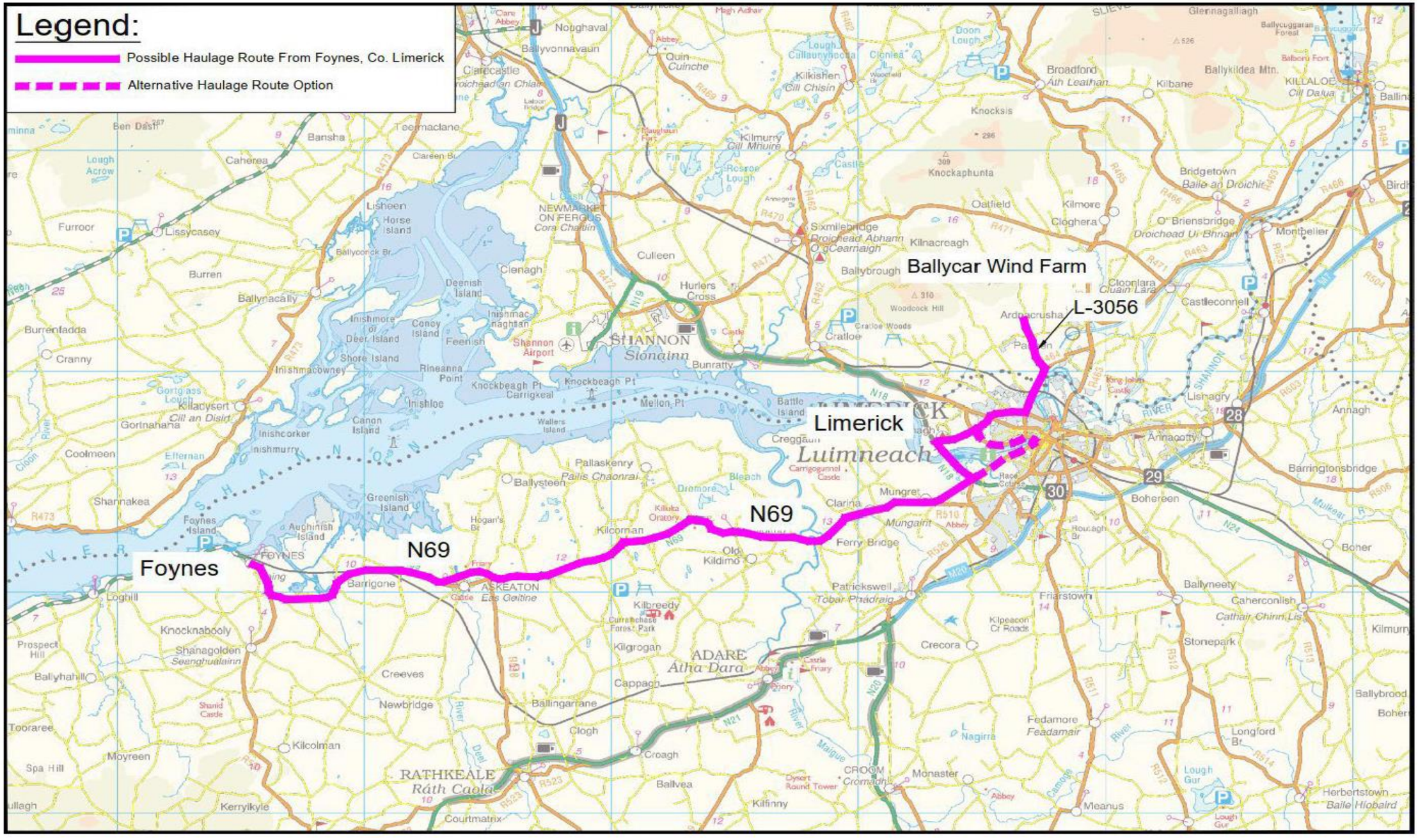
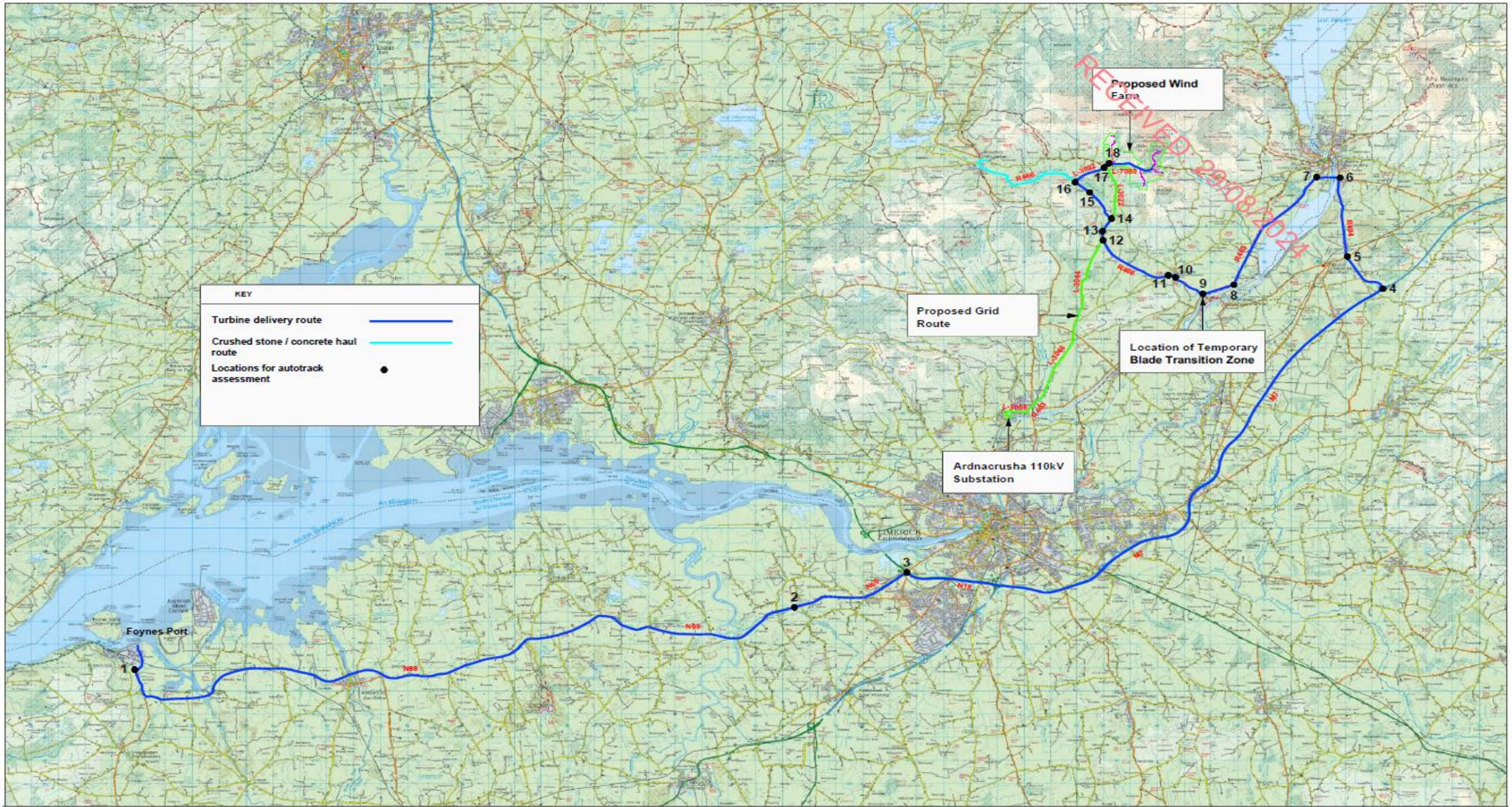


Figure 11.2: **Ballycar Wind Farm Haulage Route**

Based on **Figure 11.2** above, extracted from the Traffic and Transport Report of the Ballycar Wind Farm EIAR, there is no commonality between the Turbine Delivery Route for Ballycar Wind Farm and the Proposed Oatfield Development.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-2 Turbine delivery route autotrack assessment locations

PROJECT: Lackareagh Wind Farm, Co Clare			ALAN LIPSCOMBE TRAFFIC & TRANSPORT CONSULTANTS
CLIENT: EDF Renewables Ireland Ltd		SCALE: NTS	
PROJECT NO: 10350	DATE: 25.06.24	DRAWN BY: AL	

Figure 11.3: Lackareagh Wind Farm Haulage Route

Based on **Figure 11.3** above, extracted from the Traffic Management Plan of the Lackareagh Wind Farm EIAR, there is an overlap at Node 8, 10 and 11&13 between the Lackareagh Wind Farm haulage route and the Proposed Oatfield Development's haulage route.

With respect to the traffic volumes that will be generated during the construction of the Proposed Grid Connection Route, it is estimated that there will be approximately 14 daily return trips made by a truck transporting materials, and a further trip made by minibus to transport construction staff to and from the point of construction.

11.3.2 Cumulative Flows

As stated above, the trip rates from each development have been calculated on a pro-rata basis, based on the trips generated by the Proposed Oatfield Development.

The flows from each of the cumulative developments have been assigned to the network using the same proportions as the Proposed Oatfield Development. The flows that reach each site are outlined in Table 11.2 below.

The relevant nodes can be referenced on Figure 11.4 "Traffic Survey Locations" in EIAR **Vol II Chapter 16 Traffic and Transport.**

Table 11.2: Cumulative Flows

Location		Construction Phase				
		Survey Flows	Development Flows	% Impact	Cumulative Flows	Cumulative Impact %
Site 1	Junction 5 N18	3292	7	0.21%	7	0.43%
Site 2	Junction 5 N18	3131	7	0.22%	7	0.45%
Site 3	R471/R462	10100	21	0.21%	21	0.42%
Site 4	R462/L3016	7068	14	0.20%	14	0.40%
Site 5a	R471/Eastern Site Access	780	49	6.29%	49	12.57%
Site 5	R471/Western Site Access	1550	65	4.98%	65	9.97%
Site 5b	Carmody's Cross	2602	55	2.11%	55	4.23%
Site 6	R471/R463	5873	55	0.94%	427	8.21%
Site 7	R466/R463	9257	2	0.02%	2	0.04%
Site 8	R466/An Tsraid Mhor	6309	2	0.03%	62	1.01%
Site 9	R466/N7	5525	2	0.04%	2	0.07%
Site 10	R494/N7	8955	53	0.59%	113	1.85%
Site 11 & 12	N7/M7 Junction 27	2298	53	2.31%	113	7.22%
Site 13	R445/R525	11736	53	0.45%	53	1.41%
Site 14	R445	14049	53	0.38%	53	0.75%
Site 15	TMU M07 180.0 E	66018	53	0.08%	53	0.16%
Site 16	R445/Grangewood	37095	53	0.14%	53	0.29%

11.3.3 Cumulative Impact

Table 11.3 below illustrates the impact that the cumulative flows will have on the local road network, in terms of sites that interact between the cumulative projects considered. This is calculated as the total flows generated by the Proposed Oatfield Development and cumulative development projects.

Table 11.3: Cumulative impact on traffic and transport during construction

Location		Construction Phase				
		Survey Flows	Development Flows	% Impact	Cumulative Flows	Cumulative Impact %
Site 1	Junction 5 N18	3292	7	0.21%	7	0.43%
Site 2	Junction 5 N18	3131	7	0.22%	7	0.45%
Site 3	R471/R462	10100	21	0.21%	21	0.42%
Site 4	R462/L3016	7068	14	0.20%	14	0.40%
Site 5	R471/Eastern Site Access	780	49	6.29%	49	12.57%
Site 6	R471/Western Site Access	1550	65	4.98%	65	9.97%
Site 7	R471/R463	2602	55	2.11%	55	4.23%
Site 8	R466/R463	5873	55	0.94%	427	8.21%
Site 9	R466/An Tsraid Mhor	9257	2	0.02%	2	0.04%
Site 10	R466/N7	6309	2	0.03%	62	1.01%
Site 11 & 2	R494/N7	5525	2	0.04%	2	0.07%
Site 13	N7/M7 Junction 27	8955	53	0.59%	113	1.85%
Site 14	N7/M7 Junction 27	2298	53	2.31%	113	7.22%
Site 15	R445/R525	11736	53	0.45%	53	1.41%
Site 15	R445	14049	53	0.38%	53	0.75%
Site 1	Junction 5 N18	66018	53	0.08%	53	0.16%
Site 2	Junction 5 N18	37095	53	0.14%	53	0.29%

In accordance with the IEMA Guidelines, the assessment would focus on the highway network where a potential increase in traffic of greater than 30% has been identified. As shown in **Table 11.3**, there is a maximum uplift of 12.57% as a result of the cumulative flows. Where this is less than a 30% increase, it is considered to result in imperceptible changes in the environmental effects of traffic. The effect will be temporary, lasting the duration of the construction program with a moderate impact.

In accordance with IEMA Guidelines, projected changes in traffic flows of less than 10% create no discernible environmental effect. Therefore, the effects to transport and access during construction would be temporary, slight and adverse in EIAR terms for:

- Pedestrian severance, delay, amenity, fear and intimidation; and
- Driver delay.

For accidents and safety, the effects to transport and access during construction would be temporary, moderate-significant, adverse and not significant in EIA terms.

11.4 Operational Phase

Once the Proposed Oatfield Development is operational, it is estimated that there will be approximately 6 - 8 staff members employed per Development Project with a similar number of vehicle trips.

Assuming a worst-case scenario where each operative travels to each Cumulative Development Project on the same day, there would be an uplift of up to 80 two-way trips on the local roads. Should all these trips travel through each node analysed as part of this submission, there would be a net uplift of 10.26%. An uplift of less than 10% has no perceptible environmental impact and given how unlikely the above scenario is likely to occur, it is concluded that there will be no perceptible environmental impact.

11.4.1 Cumulative Impact

During the operational phase the effect on the surrounding local highway network will be adverse and long term but will be imperceptible based on a projected maximum of 80 trips to and from the site per day generated by maintenance staff.

Whilst there would be an increase in traffic resulting from the cumulative schemes during the operational phase, overall, no significant cumulative impacts are anticipated.

11.5 Mitigation Measures

The mitigation measures identified in EIAR **Vol II Chapter 16 Traffic and Transport** remain relevant and appropriate.

The successful completion of the Proposed Oatfield Development will require significant coordination and planning, and a comprehensive set of mitigation measures will be put in place before and during the construction phase to minimise the effects of the additional traffic generated by the Proposed Oatfield Development.

A detailed Construction Traffic Management Plan (CTMP – see EIAR **Vol III Appendix 5.2**), incorporating all the mitigation measures set out in the TMP submitted as part of the CTMP, will

be finalised and agreed with the relevant road authorities and An Garda Síochána prior to construction works commencing on site. The detailed TMP will include the following:

- Traffic Management Coordinator – a competent Traffic Management Co-ordinator will be appointed for the duration of the project and this person will be the main point of contact for all matters relating to traffic management.
- Delivery Programme – a programme of deliveries will be submitted to Clare County Council in advance of the delivery of the turbine components to site.
- Communications: Local residents in the area will be informed of any upcoming traffic related matters e.g., temporary lane/road closures (if required) or any night deliveries of turbine components, via letter drops and door knocks. Information will include the contact details of the Contract Project Co-ordinator, who will be the main point of contact for all queries from the public or Local Authority during normal working hours. An "out of hours" emergency number will also be provided.
- Travel Plans – Given the site location, the assessment above has assumed the worst case i.e., that construction workers will drive to the site. The Main Contractor will be required to provide a travel plan for construction staff, which will include the identification of routes to / from the site and identification of an area for parking.

11.6 Decommissioning Phase

Whilst there would be an increase in traffic resulting from the cumulative schemes during the decommissioning phase, overall, there are no significant cumulative impacts are anticipated.

12 AIR QUALITY

12.1 Statement of Authority

This assessment has been prepared by Phoebe Chan (RSK Environment Ltd.). Phoebe Chan is a senior air quality consultant at RSK Environment Limited. She is an associate member of the Institute of Environmental Science (AMIEnvSc) and an associate member of the Institute for Air Quality Management (AMIAQM). Phoebe has three years' experience as a project manager for air quality consultancy and modelling, pollution prevention and development planning applications. She has prepared environmental impact assessment reports for various solar farms and wind farms.

The content of this assessment has been reviewed by Robert Clark, a senior air quality consultant at RSK Environment Limited. Robert is an associate member of the Institute of Environmental Science (AMIEnvSc) and an associate member of the Institute for Air Quality Management (AMIAQM) with seven years' experience of environmental projects relating to infrastructure development, pollution prevention and control, and air quality assessments.

12.2 Do-Nothing Scenario

If the Proposed Oatfield Development does not proceed there will be no cumulative effects.

A comprehensive cumulative impact assessment was undertaken for the Proposed Oatfield Development (Section 17.9 of EIAR **Vol II Chapter 17 Air Quality**). It was concluded that the cumulative construction, operational and decommissioning phases effects were not considered to be significant with the implementation of appropriate mitigation measures.

The below assessment has been prepared to consider relevant projects for which new or additional information is available since the planning application for the Proposed Oatfield Development was prepared and submitted.

12.3 Construction Phase

The phasing/commencement of any other committed (i.e., permitted and proposed) developments in the locality could potentially result in a scenario where a number of other construction sites are in operation at the same time as the Proposed Oatfield Development, and concurrently generating emissions to air.

An updated cumulative impact assessment has been undertaken for the Proposed Oatfield Development which included other projects (as listed in **Section 1.1.2**) at various stages of planning.

The Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction v2.2 states that beyond 250m from a site boundary, the risk of impact from activities carried out on-site during the construction phase can be considered to be negligible. There are nine developments within 250m of the Proposed Oatfield Development site boundary and the proposed turbine delivery route (TDR), which are:

- Ballyglass Solar Farm (Project reference: 22591);
- Road Works (Project reference: 306146);

- Road Works (Project reference: 306199);
- Road Works (Project reference: 238002);
- Road Works (Project reference: 238004);
- Residential Development (Project reference: 22471);
- Road Works (Project reference: 306146 or 2019214);
- Residential Development (Project reference: 2461282); and
- Knockshanvo Wind Farm (ABP-320705);

Whilst there would be an increase in traffic resulting from the cumulative schemes during the construction phase, the traffic effects during the construction phase will be limited to a relatively short period at each phase of the Proposed Oatfield Development and the developments on the above list.

All permitted development is expected to agree and follow site-specific Construction Environmental Management Plans or Dust Management Plans and Construction Traffic Management Plans that will adequately control dust emissions and road traffic and construction plant exhaust emissions from construction. The mitigation measures listed in Section 17.7.1 of EIAR **Vol II Chapter 17 Air Quality** remain relevant and appropriate. Therefore, with appropriate mitigation measures in place, the construction phase cumulative effect is considered to be not significant.

12.4 Operational Phase

The estimated vehicle trips generated by the Proposed Oatfield Development once operational was anticipated to be minimal as the wind farm is planned to be operated remotely. There will be limited movement of vehicles to the site for maintenance. As per construction phase impacts, any other permitted developments are expected to follow best practice mitigation measures to minimise emissions to air. Therefore, exceedance of the relevant air quality standards (AQSs) is considered unlikely and cumulative operational phase effects are considered not significant. Therefore, no specific operational phase mitigation measure is considered to be required.

12.5 Decommissioning Phase

As per construction phase impacts, all permitted developments are expected to agree and follow site specific decommissioning plans, to be agreed with the local authority, that will adequately control emissions from decommissioning. Mitigation measures listed in Section 17.7.1 of EIAR **Vol II Chapter 17 Air Quality** for the construction phase remain relevant and appropriate for the decommissioning phase to control potential dust emissions from the decommissioning works and exhaust emissions from plant and vehicles. Therefore, with appropriate mitigation measures in place, the decommissioning phase cumulative effect is considered to be not significant.

13 CLIMATE

13.1 Statement of Authority

This section was authored by Zack Clarke, a consultant within Nature Positive's Carbon and Sustainability team, who specialises in greenhouse gas (GHG) assessments, and the climate change and carbon balance elements within EIAs. Zack holds a Master's degree with distinction in Environmental Economics and Environmental Management and has a detailed knowledge of EIA, carbon accounting, GHG assessments, climate policy, and adaptation and resilience planning.

This section has been reviewed by Dr. Libby Robinson, a Principal Consultant within Nature Positive's Carbon and Sustainability team. Libby holds a PhD in Climate Science and she leads the GHG assessment and climate-risk workstreams for EIA, Environmental & Social Impact Assessments (ESIA), and a number of other compliance-related projects.

13.2 Assessment of Cumulative Effects – Climate

GHG emissions are inherently cumulative, as all emissions have the same per-unit impact on the same ultimate receptor. The impact is climate change, or global warming, caused by the radiative forcing effects of GHGs in the atmosphere, and the affected receptor is the global atmosphere and all the ecosystems and biomes that depend on it.

The Proposed Oatfield Development would achieve emissions savings by reducing the consumption of fossil fuel generated mains electricity. These savings would outweigh the necessary GHG emissions resulting from manufacturing, constructing, and decommissioning of the Proposed Oatfield Development. Once emissions from these sources are offset, then each subsequent unit of wind generated electricity would displace a unit of conventionally generated electricity, thereby contributing to the overall reduction in emissions into the atmosphere.

In accordance with the IEMA Guidance (2022), "*All global cumulative GHG sources are relevant to the effect on climate change, and this should be taken into account in defining the receptor (the atmospheric concentration of GHGs) as being of 'high' sensitivity to further emissions. Effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other*".

14 SUMMARY OF CUMULATIVE EFFECTS

Table 14.1 to **Table 14.3** below present a summary of findings presented in this CIA Report.

Table 14.1: Summary of potential cumulative construction effects

Discipline	Assessment of cumulative effects during construction
Population and human health	**Population:** During the construction phase, temporary jobs from the Proposed Oatfield Development and other projects are unlikely to affect local population or demographics, resulting in no cumulative effects during construction. **Employment:** If constructed alongside other wind farms and infrastructure projects, the Proposed Oatfield Development would contribute to a significant, positive cumulative impact on employment in the study area and wider region. It would create and sustain skilled jobs and benefit local businesses. Based on national studies, the project alone could generate 112–154 jobs during its construction. Overlapping timelines with other projects would enhance and extend these positive employment and economic effects. **Land Use:** Construction of the Proposed Oatfield Development may cause temporary slight to moderate negative impacts on land use. If built alongside the nearby Knockshanvo Wind Farm, cumulative effects could be moderate to significant but still temporary (18–24 months), with impacts mitigated through coordinated environmental and traffic management measures. **Recreation and Tourism:** If built alongside the Knockshanvo Wind Farm, the Proposed Oatfield Development could temporarily impact local recreation and tourism due to landscape changes and construction traffic. These cumulative effects would be short-term and range from substantial-moderate near the site to slight or imperceptible at greater distances. **Human Health:** Cumulative construction phase effects on human health are expected to be not significant. Potential impacts on hydrology, hydrogeology, air quality, and traffic are localised, temporary, and manageable with standard mitigation measures. As the Knockshanvo Wind Farm lies in a separate catchment, no cumulative effects on water-related receptors or human health are anticipated. **Amenity:** Shadow flicker can only occur when the turbine blades are moving. This requires the turbine to be operational. As such, there will be no shadow flicker effects during decommissioning of the Proposed Oatfield Development and therefore no likelihood of cumulative effects.

Discipline	Assessment of cumulative effects during construction
	Cumulative construction noise from the Proposed Oatfield Development and Knockshanvo Wind Farm is predicted to be negligible, with noise levels remaining below or around 55 dB LAeq. Brief higher noise levels may occur from specific works but are not expected to cause significant impacts. Construction traffic noise is also assessed as negligible to minor, short-term, and not significant. Concurrent construction of the Proposed Oatfield Development and nearby projects, such as Knockshanvo Wind Farm, may temporarily increase visual and landscape impacts due to heightened activity and equipment presence. These effects would be most noticeable near the site but are short-term and not considered significant overall. Cumulative traffic impacts from the Proposed Oatfield Development and nearby wind farms are expected to be temporary and moderate, with a 12.57% increase in traffic which is well below the 30% significance threshold. Effects on pedestrians and drivers are slight and adverse, while impacts on accidents and safety are moderate but not significant in EIA terms.
Biodiversity and ornithology	Following all due consideration of the additional projects within the wider receiving environment for potential in-combination interactions that pose risk for cumulative effects between the Proposed Oatfield Development, based on the absence of direct overlap of works between these non-windfarm projects and the Proposed Oatfield Development, the nearest project elements to these projects being works of small scale and short-term/temporary duration, it is concluded that the above projects are considered not likely to interact with the Proposed Oatfield Development individually or cumulatively to contribute to increased impacts to sensitive receptors within the receiving environment. As such, significant cumulative effects are considered not likely to occur as a result of in-combination pathways.
Hydrology and hydrogeology	During construction of the Proposed Oatfield Development (including the wind farm, grid connection, and turbine delivery route), effects on hydrology are direct, mostly neutral to slight, temporary, and potentially beneficial, with no significant residual or cumulative impacts. Effects on hydrogeology are indirect, also neutral to slight, temporary, and not significant.

Discipline	Assessment of cumulative effects during construction
	While unmitigated simultaneous construction activities in the same catchment could result in slight but significant cumulative effects on surface and groundwater with possible human health impacts, such risks are expected to be mitigated through standard environmental management measures. The nearby Knockshanvo Wind Farm lies in a different catchment, so no cumulative hydrology or hydrogeology effects are expected.
Land, soils and geology	Construction impacts on land, soils, and geology are limited to the site and nearby areas, with mitigation preventing effects beyond boundaries. Grid connection and delivery routes use existing roads, causing minimal temporary disturbance. After construction, reinstatement will restore the site close to its original state, with natural recovery of peat and drainage. Long-term residual effects are expected to be insignificant, adverse, and permanent. No significant cumulative effects from other projects are anticipated with proper mitigation.
Telecommunications and aviation	Telecommunications: During construction, cranes assembling turbines may temporarily cause telecommunications interference such as reflection, diffraction, blocking, and radio frequency disruption. These effects are short-term and disappear once cranes are removed. Cumulative impacts on telecommunications during construction are not significant. Aviation: During late construction stages, turbines and cranes may pose obstacles to low-flying aircraft, but with mitigation measures, no impact on aviation safety is expected. Even if Knockshanvo wind farm and the Proposed Oatfield Development are built simultaneously, required measures will be agreed and implemented separately. Other nearby wind farms pose no cumulative aviation impacts due to distance or lack of effect. All relevant aviation stakeholders will be notified before construction. Overall, no cumulative aviation impacts are anticipated during construction.
Shadow flicker	As outlined in Section 12.1 of EIAR Vol II Chapter 12 Shadow Flicker, shadow flicker can only occur when the turbine blades are moving. This requires the turbine to be operational. As such, there will be no shadow flicker effects during the construction phase of the Proposed Oatfield Development.
Noise	If the Proposed Oatfield Development and Knockshanvo Wind Farm are built simultaneously, there could be cumulative noise from construction. However, predicted noise levels at sensitive locations are below 55 dB LAeq,

Discipline	Assessment of cumulative effects during construction
	considered negligible impact. Some brief higher noise near site access or grid works is unlikely to overlap between projects. Thus, no significant cumulative construction noise effects are expected. Traffic noise from construction may increase temporarily, with the highest rises under 2 dB(A), mostly minor impacts, and negligible elsewhere. Overall, with mitigation measures, cumulative construction noise and traffic effects are expected to be minor or negligible, short-term, and reversible.
Landscape and visual	During the construction phase, simultaneous development of the Proposed Oatfield Development and nearby consented or proposed wind farms, especially Knockshanvo, could temporarily increase construction activity, including more heavy goods vehicles and visible tower cranes, leading to noticeable but short-term cumulative landscape and visual effects. These impacts would be most apparent locally, particularly given the area's remote laneways, though some increase in HGV traffic is typical due to nearby forestry operations. Construction will likely be phased, reducing intensity over time, and effects will lessen once operational. Overall, while temporary cumulative effects may occur, they are not expected to be significant.
Archaeology and cultural heritage	Cumulative construction phase effects on archaeology, historic buildings, and cultural heritage are expected to be limited, as it is unlikely that two wind farms will be built simultaneously. Even if construction of the Proposed Oatfield Development overlaps with another project, there would be no direct cumulative impacts within the site boundary, since none of the other developments intersect it. Indirect cumulative impacts such as increased HGV traffic and the visual presence of tower cranes could affect the setting of nearby cultural heritage, especially if construction coincides with the nearby Knockshanvo development. However, these effects are temporary and likely to be phased, and the area contains few historic structures. Overall, no significant cumulative indirect impacts are expected.
Traffic and transport	Whilst there would be an increase in traffic resulting from the cumulative schemes during the construction phase, overall, no significant effects are anticipated as a result of the cumulative impacts and therefore no additional mitigation measures, other than what has been previously outlined, is proposed. For Accidents and Safety, the effects to transport and access during construction would be temporary, moderate-significant, adverse and not significant in EIAR.

Discipline	Assessment of cumulative effects during construction
Air quality	During the construction phase, nearby permitted and Proposed Oatfield Developments could operate at the same time as the Proposed Oatfield Development, potentially increasing emissions. A cumulative impact assessment identified nine projects within 250 meters of the site or turbine delivery route, where dust impacts could be relevant. However, construction activities will be short-term, and all projects are expected to implement appropriate mitigation through environmental and traffic management plans. With these measures in place, cumulative air quality impacts during construction are considered not significant.
Climate	GHG emissions are cumulative, affecting the global climate system. The Proposed Oatfield Development will reduce fossil fuel use, leading to net emissions savings over its lifetime. After offsetting emissions from construction and decommissioning, ongoing wind energy generation will continue to lower overall emissions. As per IEMA guidance, individual cumulative projects do not require separate GHG assessments since all emissions contribute to the same global receptor.

Table 14.2: Summary of potential cumulative operational effects

Discipline	Assessment of cumulative effects during operations
Population and human health	Population: The Proposed Oatfield Development on its own and when considered cumulatively with other wind farm developments, is not expected to result in changes to population and demographic trends of the study area during its operation. The effects on population and demographic trends would be imperceptible. Employment: The Proposed Oatfield Development is expected to create around 22 long-term operations and maintenance jobs, with cumulative employment rising to 44 if developed alongside Knockshanvo Wind Farm. This would have a long-term beneficial impact, supporting skilled jobs in the local area and wider region. Land Use: For any wind farm, the land excluding that developed for wind farm infrastructure (tracks, hardstands, etc.) can continue to be used for farming and forestry operations throughout the operational lifetime of a wind farm. During operation of the Proposed Oatfield Development, along with the proposed Knockshanvo Wind Farm

Discipline	Assessment of cumulative effects during operations
	, there will be minimal change to existing land uses in the study area, and therefore no significant effects during the operational stage. Recreation and Tourism: The Proposed Oatfield Development, along with nearby wind farms, will form a prominent turbine layout visible within the landscape but is not expected to cause significant negative effects on recreation or tourism. Even cumulative visual impacts on nearby amenities, like the Twelve O'Clock Hills trails, are considered not significant. Human Health: There is no change to the conclusion of the EIAR Vol II Chapter 6 Population and Human Health as there are no impacts on human health or safety from the operational wind farm, and would apply to the cumulative context when considering the most proximal Knockshanvo Wind Farm. Amenity: Without mitigation, combined shadow flicker from the Proposed Oatfield Development and Knockshanvo Wind Farm could significantly affect up to 13 receptors. However, planned mitigation measures for both projects are expected to reduce shadow flicker below threshold levels, making cumulative effects not significant. Cumulative operational noise from the Proposed Oatfield Development and Knockshanvo Wind Farm remains below established limits, resulting in long-term, reversible, and not significant effects. Noise contributions from other nearby wind farms and developments are negligible due to distance or low noise levels, requiring no further consideration. Within the 20 km study area, the combined wind farms, including the Proposed Oatfield Development and Knockshanvo Wind Farm, would form a prominent consolidated turbine layout. This would lead to a high-medium cumulative landscape effect, which is not considered significant in EIA terms. During operation, cumulative traffic from multiple wind farms could increase local trips by about 10.26%, which is below the threshold for perceptible environmental impact. Therefore, no significant cumulative traffic effects are expected.
Biodiversity and ornithology	Following all due consideration of the additional projects within the wider receiving environment for potential in-combination interactions that pose risk for cumulative effects between the Proposed Oatfield Development,

Discipline	Assessment of cumulative effects during operations
	based on the absence of direct overlap of works between these non-windfarm projects and the Proposed Oatfield Development, the nearest project elements to these projects being works of small scale and short-term/temporary duration, it is concluded that the above projects are considered not likely to interact with the Proposed Oatfield Development individually or cumulatively to contribute to increased impacts to sensitive receptors within the receiving environment. As such, significant cumulative effects are considered not likely to occur as a result of in-combination pathways.
Hydrology and hydrogeology	Residual cumulative effects from other nearby wind farms during the operational phase in terms of surface water and groundwater effects which is generally localised, is expected to have a not significant to slight residual effect, provided mitigation measures are implemented and monitored in line with the relevant guidelines and legislation. There are no significant cumulative effects anticipated from other projects during the operational phase of the Proposed Oatfield Development.
Land, soils and geology	Considering the effect on land in terms of land take, the residual cumulative effects from other nearby wind farms and developments is generally localised. Provided mitigation measures are implemented and monitored in line with the relevant guidelines and legislation there are no significant cumulative effects anticipated during the operational phase of the Proposed Oatfield Development.
Telecommunications and aviation	**Telecommunications:** A detailed assessment found no predicted impacts on telecommunications radio links except for one Enet microwave link between Kilseily and ESB Kilonan. Enet is open to mitigation by using an alternative site. There are no cumulative telecommunications impacts from the turbines or mitigation measures. If the Proposed Oatfield Development is built alongside Knockshanvo Wind Farm, Ballycar Wind Farm, or other consented wind farms, no additional cumulative impacts or mitigation beyond the agreed Enet solution are expected. **Aviation:** The proposed IFPs carried out against the Proposed Oatfield Development showed an impact to Shannon Airport, but proposed mitigation (raising vectoring altitude and creating a new sector) will prevent adverse effects, with no cumulative impacts even if Knockshanvo is built simultaneously.

Discipline	Assessment of cumulative effects during operations
	Radar assessments show potential impacts on the Woodcock Hill secondary radar, but planned software upgrades will fully mitigate these effects. Mitigation measures are specific to each wind farm, so no cumulative radar impacts are expected. Overall, there is adequate radar coverage and minimal cumulative impact from these developments.
Shadow flicker	An updated assessment was undertaken to account for Knockshanvo Wind Farm's latest planning details as this development falls within the overlapping study area of 10 rotor diameters from the Proposed Oatfield Development. The updated assessment evaluated two scenarios with different turbine sizes from both wind farms. Scenario 1 found 21 receptors affected, with 5 likely exceeding shadow flicker limits; Scenario 2 found 16 receptors affected, with 3 likely exceeding limits. Without mitigation, 10–13 receptors would face significant adverse effects. Both developments will use control systems to detect and stop turbines when limits are exceeded, preventing significant impacts and allowing adaptation to future guidelines.
Noise	The cumulative operational noise assessment shows that noise from the Proposed Oatfield Development and Knockshanvo Wind Farm remains within acceptable limits, causing no significant effects. The substations are far apart, so they do not add to noise impacts. Updated predictions confirm minor noise changes, with site-specific limits ensuring compliance. Nearby wind farms like Ballycar, Lackareagh, and Fahybeg are too distant to cause meaningful cumulative noise. Overall, cumulative operational noise effects are minor and not significant. Similarly, for other developments listed in Section 1.1.2, given the nature of their use and these separation distances, there would not be any potential for cumulative operational noise increases and therefore correspond to negligible effects which do not require further consideration.
Landscape and visual	The operational phase cumulative assessment for the Proposed Oatfield Development considers existing, permitted, and proposed wind farms within 20 km. Since the initial application, Knockshanvo and Ballycar wind farms have been lodged into the planning system with minor layout changes, resulting in little difference to cumulative visual impacts. The future scenario shows the Proposed Oatfield Development and Knockshanvo Wind Farm blending into a larger consolidated wind farm, intensifying development on local hills, while Ballycar

Discipline	Assessment of cumulative effects during operations
	and other distant farms add to the landscape but remain separate. Overall, wind farms will be prominent but localised features, with cumulative effects rated high-medium yet not significant.
Archaeology and cultural heritage	During the operational phase, no direct cumulative impacts on archaeology, historic buildings, or cultural heritage are expected, as none of the other developments overlap with the Proposed Oatfield Development site. The cumulative assessment considers both current and future scenarios, evaluating the visual impact of existing, consented, and proposed wind farms. Updated turbine locations, including those from Knockshanvo and Ballycar, were included in visibility mapping and photomontages. While a noticeable increase in wind farm presence across the study area is anticipated, the close siting of Knockshanvo Wind Farm next to the Proposed Oatfield Development creates a more unified visual impact. Overall, cumulative indirect effects on the setting of cultural heritage are not considered significant.
Traffic and transport	During the operational phase, the Proposed Oatfield Development is expected to generate around 6 to 8 staff members and a similar number of vehicle trips per project. Even under a worst-case scenario of 80 two-way trips across all cumulative projects, the traffic increase would result in a maximum 10.26% uplift, which is below the threshold for perceptible environmental impact. As such, any traffic effects on the local road network would be adverse and long-term but imperceptible, and no significant cumulative impacts are expected.
Air quality	During the operational phase, vehicle trips to the Proposed Oatfield Development will be minimal due to remote operation, with only occasional maintenance visits. Other permitted developments are also expected to follow best practices to limit emissions. As a result, air quality standards are unlikely to be exceeded, and cumulative air quality impacts are considered not significant. No additional mitigation is required.
Climate	GHG emissions are cumulative, affecting the global climate system. The Proposed Oatfield Development will reduce fossil fuel use, leading to net emissions savings over its lifetime. After offsetting emissions from construction and decommissioning, ongoing wind energy generation will continue to lower overall emissions. As per IEMA guidance, individual cumulative projects do not require separate GHG assessments since all emissions contribute to the same global receptor.

Table 14.3: Summary of potential cumulative decommissioning effects

Discipline	Assessment of cumulative effects during decommissioning
Population and human health	As stated in EIAR Vol II Chapter 6 Population and Human Health, when considered on its own, the potential effects of decommissioning of the Proposed Oatfield Development are the same as those associated with the construction stage, however reduced in magnitude. Given the variable time frames for planning decisions, construction and grid connection availability for the Proposed Oatfield Development and other wind farms, it is highly unlikely that one or more Table 1.2 developments would be decommissioned at the same time as the Proposed Oatfield Development such that significant cumulative effects on population, employment, land use (change), recreation and tourism, human health, and amenity would arise.
Biodiversity and ornithology	Following all due consideration of the additional projects within the wider receiving environment for potential in-combination interactions that pose risk for cumulative effects between the Proposed Oatfield Development, based on the absence of direct overlap of works between these non-windfarm projects and the Proposed Oatfield Development, the nearest project elements to these projects being works of small scale and short-term/temporary duration, it is concluded that the above projects are considered not likely to interact with the Proposed Oatfield Development individually or cumulatively to contribute to increased impacts to sensitive receptors within the receiving environment. As such, significant cumulative effects are considered not likely to occur as a result of in-combination pathways.
Hydrology and hydrogeology	There are no significant cumulative impacts anticipated from other projects during the decommissioning phase of the Proposed Oatfield Development. While unmitigated simultaneous decommissioning activities in the same catchment could result in slight but significant cumulative effects on surface and groundwater with possible human health impacts, such risks are expected to be mitigated through standard environmental management measures.

Discipline	Assessment of cumulative effects during decommissioning
Land, soils and geology	There are no significant cumulative effects anticipated from other projects during the Decommissioning Phase of the Proposed Oatfield Development.
Telecommunications and aviation	During decommissioning of the Proposed Oatfield Development, effects will be similar to those assessed for the construction phase (i.e. the potential cumulative impacts to telecommunications for the decommissioning phase would not be significant and would be short-term only).
Shadow flicker	As outlined in Section 12.1 of EIAR Vol II Chapter 12 Shadow Flicker, shadow flicker can only occur when the turbine blades are moving. This requires the turbine to be operational. As such, there will be no shadow flicker effects during the decommissioning phase of the Proposed Oatfield Development.
Noise	Decommissioning would be associated with minor short-term temporary reversible adverse effects at most, which is not significant.
Landscape and visual	Cumulative landscape and visual effects during decommissioning are expected to be similar to those during construction. Since it is unlikely that two wind farms will be decommissioned at the same time, significant cumulative impacts are not anticipated for the Proposed Oatfield Development.
Archaeology and cultural heritage	During the decommissioning phase, no direct cumulative impacts on archaeology, historic buildings, or cultural heritage are expected because the Proposed Oatfield Development site does not overlap with other developments. Indirect effects, which would be similar to those during construction, may occur primarily due to the visual impact of tower cranes. However, it is unlikely that multiple wind farms will be decommissioned at the same time. Overall, any cumulative indirect effects are expected to be minor and not significant.
Traffic and transport	Whilst there would be an increase in traffic resulting from the cumulative schemes during the decommissioning phase, overall, there are no significant cumulative impacts are anticipated.

Discipline	Assessment of cumulative effects during decommissioning
Air quality	During the decommissioning phase, permitted developments are expected to follow site-specific plans to manage emissions. Construction phase mitigation measures will also apply, effectively controlling dust and exhaust emissions. Therefore, cumulative air quality impacts during decommissioning are considered not significant.
Climate	GHG emissions are cumulative, affecting the global climate system. The Proposed Oatfield Development will reduce fossil fuel use, leading to net emissions savings over its lifetime. After offsetting emissions from construction and decommissioning, ongoing wind energy generation will continue to lower overall emissions. As per IEMA guidance, individual cumulative projects do not require separate GHG assessments since all emissions contribute to the same global receptor.

15 REFERENCES

(IFI, 2016) *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*. Inland Fisheries Ireland.

(NRA, 2009) *Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes.* National Roads Authority.

(TII, 2008) *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes.* Transport Infrastructure Ireland.

DAFM (2019). Standards for Felling and Reforestation. Department of Agriculture, Food and the Marine.

Dark Sky Ireland. Available at: https://www.darksky.ie/wp-content/uploads/2019/04/Toolkits-and-Guidelines.pdf. Accessed on 13/03/2025.

EPA, (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports. Environmental Protection Agency.

Forest Service (2000a). Forest Harvesting and the Environment Guidelines. Department of Agriculture, Fisheries and Food.

Forest Service (2000b). Forest and Water Quality Guidelines. Department of Agriculture, Fisheries and Food.

Goodship, N.M. & Furness, R.W. (2022). NatureScot Research Report 1283 – Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species.

IFI (2004). Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites". Inland Fisheries Ireland.

NRA (2008) *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.* National Roads Authority.

NRA (2008). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes'. National Roads Authority.

NRA (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority.

Percival, S. M., (2003). Birds and wind farms in Ireland: a review of potential issues and impact assessment. Report to S.E.I.

Ruddock, M. and Whitfield, D.P. (2007). A review of disturbance distances in selected bird species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

TII (2009). Guidelines For The Treatment Of Badgers Prior To The Construction Of National Road Schemes' (TII, 2009)

Appendix 1

CIA Noise Tabular Data

Noise Tabular Data

The following tables are also referenced in the assessment of EIAR **Chapter 9 Noise and Vibration.**

Table A.1: Predicted noise levels - Knockshanvo Wind Farm (L_{A90}, dB) – as function of standardised 10 m wind speeds (m/s).

Property	4	5	6	7	8	≥9	Property	4	5	6	7	8	≥9
H1	23	28	32	32	32	32	H33	22	26	31	31	31	31
H2	23	28	32	32	32	32	H34	21	26	30	31	31	31
H3	23	27	31	32	32	32	H35	20	25	29	29	29	29
H4	29	33	37	38	38	38	H37	21	26	30	30	30	30
H5	21	26	30	30	30	30	H38	20	25	29	29	29	29
H6	24	29	33	34	34	34	H39	27	32	36	37	37	37
H7	25	29	33	34	34	34	H40	21	26	30	30	30	30
H8	28	33	37	38	38	38	H41	20	25	29	30	30	30
H9	20	25	29	30	30	30	H42	25	30	34	34	34	34
H10	21	26	30	30	30	30	H43	24	29	33	34	34	34
H11	23	27	32	32	32	32	H44	21	25	29	30	30	30

Property	4	5	6	7	8	≥9	Property	4	5	6	7	8	≥9
H12	30	34	38	39	39	39	H45	23	28	32	32	32	32
H13	32	37	41	41	41	41	H46	29	34	38	38	38	38
H14	28	33	37	37	37	37	H47	28	32	37	37	37	37
H15	28	33	37	37	37	37	H48	27	32	36	36	36	36
H16	21	26	30	30	30	30	H50	19	24	28	28	28	28
H17	22	27	31	31	31	31	H51	20	25	29	29	29	29
H18	22	27	31	31	31	31	H52	20	24	28	29	29	29
H19	21	26	30	30	30	30	H53	20	24	28	29	29	29
H20	21	26	30	30	30	30	H57	19	24	28	28	28	28
H21	28	32	37	37	37	37	H60	27	32	36	37	37	37
H22	20	25	29	29	29	29	H72	22	27	31	32	32	32
H23	24	29	33	34	34	34	H514	20	25	29	29	29	29
H24	20	25	29	29	29	29	H518	21	26	30	30	30	30
H25	28	33	37	37	37	37	H520	22	26	30	31	31	31
H26	20	25	29	29	29	29	H528	25	29	33	34	34	34

Property	4	5	6	7	8	≥9	Property	4	5	6	7	8	≥9
H27	21	26	30	30	30	30	H530	25	29	34	34	34	34
H28	22	27	31	32	32	32	H547	28	33	37	37	37	37
H29	20	25	29	30	30	30	H606	23	28	32	33	33	33
H30	20	25	29	29	29	29	H612	23	28	32	32	32	32
H31	23	28	32	32	32	32	H616	21	26	30	30	30	30
H32	22	27	31	31	31	31	Buddhist centre	27	32	36	37	37	37

Table A.2: Predicted cumulative noise levels – Oatfield and Knockshanvo Wind Farm (L_{A90}, dB) – as function of standardised wind speeds (m/s).

Property	4	5	6	7	8	≥9	Property	4	5	6	7	8	≥9
H1	32	36	39	40	40	40	H33	28	32	36	37	37	37
H2	33	37	40	40	40	40	H34	28	32	36	37	37	37
H3	31	35	38	39	39	39	H35	29	33	36	36	36	36
H4	32	37	40	41	41	41	H37	27	32	35	36	36	36
H5	30	34	37	38	38	38	H38	28	32	35	36	36	36
H6	32	36	40	41	41	41	H39	30	35	38	39	39	39
H7	32	36	40	41	41	41	H40	27	32	35	36	36	36
H8	32	36	40	41	41	41	H41	27	31	35	36	36	36
H9	30	34	37	37	37	37	H42	29	33	37	38	38	38
H10	30	34	37	37	37	37	H43	29	33	37	37	38	38
H11	30	34	38	39	39	39	H44	27	32	35	36	36	36
H12	32	37	41	41	41	41	H45	28	32	36	37	37	37
H13	33	37	41	42	42	42	H46	30	35	39	39	39	39

Property	4	5	6	7	8	≥9	Property	4	5	6	7	8	≥9
H14	31	36	40	40	40	40	H47	30	35	38	39	39	39
H15	31	36	40	40	40	40	H48	30	34	38	38	39	39
H16	29	33	36	37	37	37	H50	27	32	35	35	35	35
H17	29	34	37	38	38	38	H51	28	33	35	36	36	36
H18	29	33	37	38	38	38	H52	28	32	35	36	36	36
H19	30	34	37	37	38	38	H53	28	32	35	36	36	36
H20	30	34	37	38	38	38	H57	27	32	35	35	35	35
H21	31	35	39	40	40	40	H60	30	34	38	38	39	39
H22	28	32	36	37	37	37	H72	27	32	35	36	36	36
H23	30	34	38	39	39	39	H514	29	33	36	36	36	36
H24	28	32	36	36	36	36	H518	31	35	38	38	38	38
H25	31	35	39	40	40	40	H520	32	36	39	39	39	39
H26	28	32	36	36	36	36	H528	32	36	40	40	41	41
H27	30	35	38	38	38	38	H530	32	36	40	41	41	41
H28	28	33	37	37	37	37	H547	30	35	39	39	39	39

Property	4	5	6	7	8	≥9	Property	4	5	6	7	8	≥9
H29	30	34	37	37	37	37	H606	32	37	40	40	41	41
H30	28	32	35	36	36	36	H612	29	33	37	38	38	38
H31	29	33	37	38	38	38	H616	29	33	36	37	37	37
H32	28	33	36	37	37	37	Buddhist centre	29	33	37	38	38	38

Table A.3: Cumulative operational noise assessment with noise limits derived in Knockshanvo Wind Farm EIAR (L_{A90}, dB), property H4 – as function of standardised 10 m wind speeds (m/s), negative margin indicates predictions are below the noise limits.

Description	4	5	6	7	8	≥9
Predictions: Oatfield Wind Farm	30	34	38	38	38	38
Predictions: Knockshanvo Wind Farm	29	33	37	38	38	38
Predictions: Cumulative	32	37	40	41	41	41
Day-time limit, location B	40	40	45	45	45	45
Day-time cumulative margin	-8	-3	-5	-4	-4	-4
night-time limit, location B	43	43	43	43	43	43
Night-time cumulative margin	-11	-6	-3	-2	-2	-2

Table A.4: Cumulative operational noise assessment with noise limits derived in Knockshanvo Wind Farm EIAR (L_{A90}, dB), property H6 (and H7, H528, H530, H606) – as function of standardised 10 m wind speeds (m/s), negative margin indicates predictions are below the noise limits.

Description	4	5	6	7	8	≥9
Predictions: Oatfield Wind Farm	31	35	39	40	40	40
Predictions: Knockshanvo Wind Farm	24	29	33	34	34	34
Predictions: Cumulative	32	36	40	41	41	41
Day-time limit, location B	45	45	45	45	45	45
Day-time cumulative margin	-13	-9	-5	-4	-4	-4
night-time limit, location B	43	43	43	43	43	43
Night-time cumulative margin	-11	-7	-3	-2	-2	-2

Table A.5: Cumulative operational noise assessment with noise limits derived in Knockshanvo Wind Farm EIAR (L_{A90}, dB), property H12 (and H8) – as function of standardised 10 m wind speeds (m/s), negative margin indicates predictions are below the noise limits.

Description	4	5	6	7	8	≥9
Predictions: Oatfield Wind Farm	29	33	36	37	37	37
Predictions: Knockshanvo Wind Farm	30	34	38	39	39	39
Predictions: Cumulative	32	37	41	41	41	41
Day-time limit, location B	45	45	45	45	45	45
Day-time cumulative margin	-13	-8	-4	-4	-4	-4
night-time limit, location B	43	43	43	43	43	43
Night-time cumulative margin	-11	-6	-2	-2	-2	-2

Table A.6: Cumulative operational noise assessment with noise limits derived in Knockshanvo Wind Farm EIAR (L_{A90}, dB), property H13 – as function of standardised 10 m wind speeds (m/s), negative margin indicates predictions are below the noise limits.

Description	4	5	6	7	8	≥9
Predictions: Oatfield Wind Farm	25	29	33	33	34	34
Predictions: Knockshanvo Wind Farm	32	37	41	41	41	41
Predictions: Cumulative	33	37	41	42	42	42
Day-time limit, location B	40	45	45	45	45	45
Day-time cumulative margin	-7	-8	-4	-3	-3	-3
night-time limit, location B	43	43	43	43	43	43
Night-time cumulative margin	-10	-6	-2	-1	-1	-1

Table A.7: **Site-specific day-time noise limits for the Proposed Development (L_{A90}, dB) – as function of standardised 10 m wind speeds (m/s).**

Property	4	5	6	7	8	9	10	11	12
H1	45	45	45	45	45	45	45	48	51
H2	39	39	39	39	39	41	44	47	51
H3	45	45	45	45	45	45	45	48	51
H4	39	39	39	39	39	39	39	42	45
H5	40	40	40	40	41	43	45	48	51
H6	40	40	40	40	40	40	43	46	49
H7	40	40	40	40	40	40	43	46	49
H8	40	40	40	40	40	40	43	46	49
H9	40	40	40	40	40	41	44	48	51
H10	40	40	40	40	41	43	45	48	51
H11	39	39	39	39	39	41	43	45	47
H12	40	40	40	40	40	40	43	46	49
H13	39	39	39	39	39	39	42	45	48

Property	4	5	6	7	8	9	10	11	12
H14	40	40	40	40	40	40	43	46	49
H15	39	39	39	39	39	39	39	42	45
H16	40	40	40	40	41	43	45	48	51
H17	39	39	39	39	39	41	43	45	47
H18	39	39	39	39	39	41	43	45	47
H19	40	40	40	40	41	43	46	48	51
H20	40	40	40	40	40	41	44	48	51
H21	39	39	39	39	39	39	39	42	45
H22	40	40	40	40	40	41	43	45	47
H23	39	39	39	39	39	40	42	44	47
H24	40	40	40	40	41	43	46	48	51
H25	40	40	40	40	40	40	43	46	49
H26	40	40	40	40	41	43	46	48	51
H27	40	40	40	40	40	41	44	48	51
H28	39	39	39	39	39	39	39	42	45

Property	4	5	6	7	8	9	10	11	12
H29	40	40	40	40	40	41	44	48	51
H30	40	40	40	40	41	43	46	48	51
H31	39	39	39	39	39	39	39	42	45
H32	39	39	39	39	39	39	39	42	45
H33	39	39	39	39	39	39	40	42	46
H34	39	39	39	39	39	39	40	42	46
H35	40	40	40	40	41	43	46	48	51
H37	40	40	40	40	40	40	40	42	46
H38	45	45	45	45	45	45	46	48	51
H39	37	37	37	37	38	40	42	44	46
H40	40	40	40	40	40	40	40	42	46
H41	40	40	40	40	40	40	40	42	46
H42	39	39	39	39	39	39	39	41	45
H43	39	39	39	39	39	39	42	45	47
H44	40	40	40	40	41	43	46	48	51

Property	4	5	6	7	8	9	10	11	12
H45	39	39	39	39	39	39	39	42	45
H46	39	39	39	39	39	39	39	42	45
H47	40	40	40	40	40	40	43	46	49
H48	39	39	39	39	39	39	39	42	45
H50	40	40	40	40	41	43	46	48	51
H51	40	40	40	40	41	43	46	48	51
H52	40	40	40	40	41	43	46	48	51
H53	40	40	40	40	41	43	46	48	51
H57	40	40	40	40	41	43	46	48	51
H60	40	40	40	40	40	40	43	46	49
H72	39	39	39	39	39	40	42	45	48
H514	40	40	40	40	40	41	44	48	51
H518	39	39	39	39	39	41	44	47	51
H520	45	45	45	45	45	45	45	48	51
H528	40	40	40	40	40	40	43	46	49

Property	4	5	6	7	8	9	10	11	12
H530	40	40	40	40	40	40	43	46	49
H547	40	40	40	40	40	40	43	46	49
H606	39	39	39	39	39	40	44	47	50
H612	39	39	39	39	39	39	39	42	45
H616	40	40	40	40	41	43	45	48	51

Table A.8: **Site-specific night-time noise limits for the Proposed Development (L_{A90}, dB) – as function of standardised 10 m wind speeds (m/s).**

Property	4	5	6	7	8	9	10	11	12
H1	45	45	45	45	45	45	45	47	50
H2	43	43	43	43	43	43	43	46	49
H3	45	45	45	45	45	45	45	47	50
H4	41	41	41	41	41	41	41	41	41
H5	43	43	43	43	43	43	43	44	46
H6	42	42	42	42	42	42	42	44	46
H7	42	42	42	42	42	42	42	44	46
H8	42	42	42	42	42	42	42	43	45
H9	43	43	43	43	43	43	43	47	50
H10	43	43	43	43	43	43	43	44	46
H11	43	43	43	43	43	43	43	43	43
H12	41	41	41	41	41	41	41	42	44
H13	39	39	39	39	39	39	39	40	42

Property	4	5	6	7	8	9	10	11	12
H14	42	42	42	42	42	42	42	43	45
H15	42	42	42	42	42	42	42	42	42
H16	43	43	43	43	43	43	43	44	46
H17	43	43	43	43	43	43	43	43	43
H18	43	43	43	43	43	43	43	43	43
H19	43	43	43	43	43	43	43	44	46
H20	43	43	43	43	43	43	43	47	50
H21	42	42	42	42	42	42	42	42	42
H22	43	43	43	43	43	43	43	43	43
H23	42	42	42	42	42	42	42	42	42
H24	43	43	43	43	43	43	43	44	46
H25	42	42	42	42	42	42	42	43	45
H26	43	43	43	43	43	43	43	44	46
H27	43	43	43	43	43	43	43	47	50
H28	43	43	43	43	43	43	43	43	43

Property	4	5	6	7	8	9	10	11	12
H29	43	43	43	43	43	43	43	47	50
H30	43	43	43	43	43	43	43	44	46
H31	43	43	43	43	43	43	43	43	43
H32	43	43	43	43	43	43	43	43	43
H33	43	43	43	43	43	43	43	43	43
H34	43	43	43	43	43	43	43	43	43
H35	43	43	43	43	43	43	43	44	46
H37	43	43	43	43	43	43	43	43	43
H38	45	45	45	45	45	45	45	45	46
H39	42	42	42	42	42	42	42	43	44
H40	43	43	43	43	43	43	43	43	43
H41	43	43	43	43	43	43	43	43	43
H42	42	42	42	42	42	42	42	42	42
H43	42	42	42	42	42	42	42	44	46
H44	43	43	43	43	43	43	43	44	46

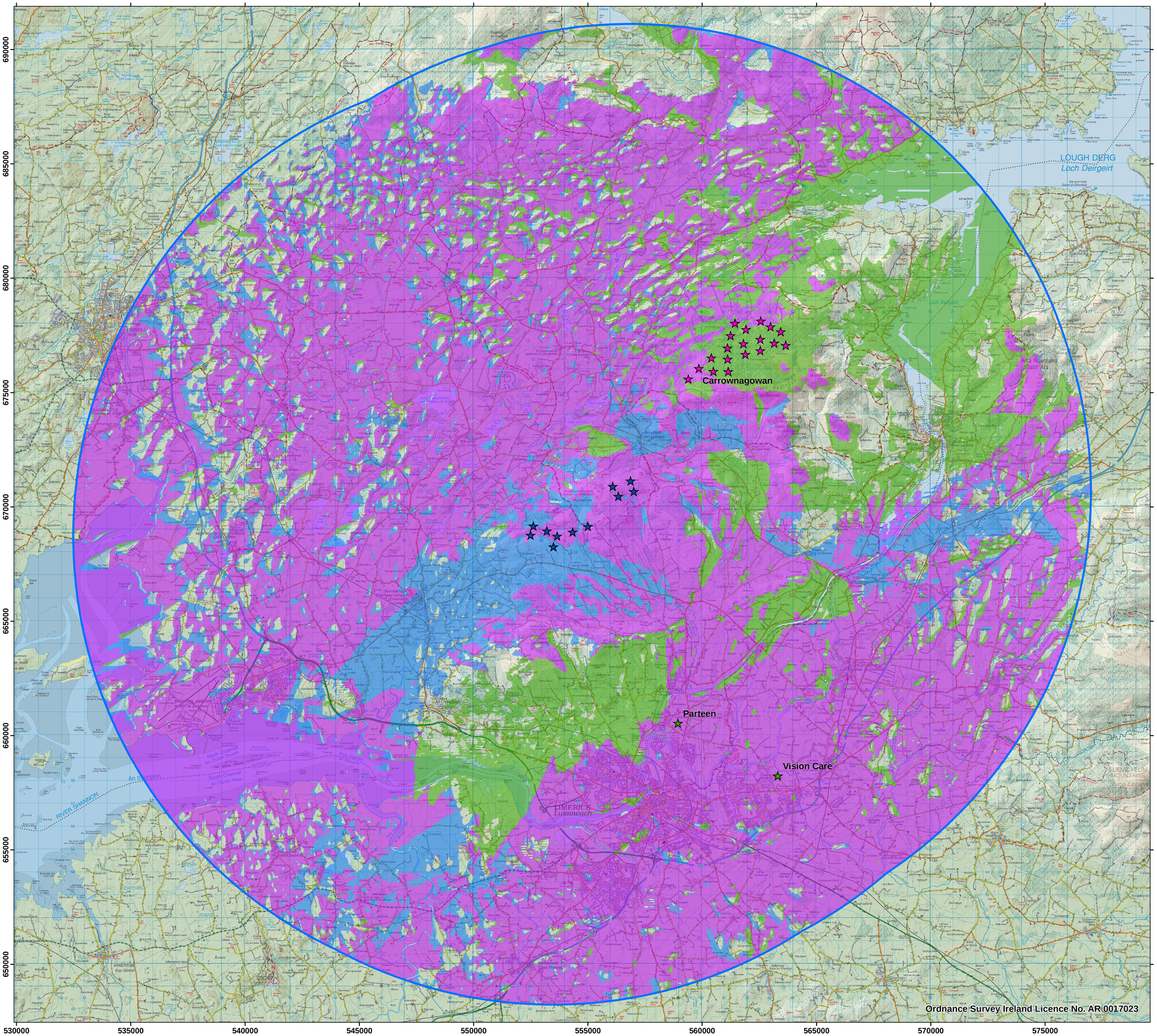
Property	4	5	6	7	8	9	10	11	12
H45	43	43	43	43	43	43	43	43	43
H46	41	41	41	41	41	41	41	41	41
H47	42	42	42	42	42	42	42	43	45
H48	42	42	42	42	42	42	42	42	42
H50	43	43	43	43	43	43	43	44	46
H51	43	43	43	43	43	43	43	44	46
H52	43	43	43	43	43	43	43	44	46
H53	43	43	43	43	43	43	43	44	46
H57	43	43	43	43	43	43	43	44	46
H60	42	42	42	42	42	42	42	43	45
H72	43	43	43	43	43	43	43	44	46
H514	43	43	43	43	43	43	43	47	50
H518	43	43	43	43	43	43	43	47	50
H520	45	45	45	45	45	45	45	47	50
H528	42	42	42	42	42	42	42	44	46

Property	4	5	6	7	8	9	10	11	12
H530	42	42	42	42	42	42	42	44	46
H547	42	42	42	42	42	42	42	43	45
H606	43	43	43	43	43	43	43	46	49
H612	43	43	43	43	43	43	43	43	43
H616	43	43	43	43	43	43	43	44	46

Appendix 2

LVIA Mapping

ZTV indicating the cumulative theoretical visibility of the proposed Oatfield Wind Farm in combination with all other wind farms in the study area



Proposed Turbines

Existing Turbines

Permitted Turbines

Wind Farm Visibility

15.6% *Visibility of existing and/or permitted turbines only*

58.6% *Visibility of proposed turbines as well as existing and/or permitted turbines*

11.2% *Visibility of proposed turbines only*

14.6% of the entire study area to 20km will not have any view of the turbine blades of the proposed Wind Farm or that of any existing or permitted wind farms

20km Extent

This ZTV map has been calculated such that a turbine registrers as been theoretically visible to observers in the surrounding landscape once there is an unobstructed line of sight to its blade tip.

Observer Height assumed: 2m to eye-level height
Blade Tip Heights: Variable

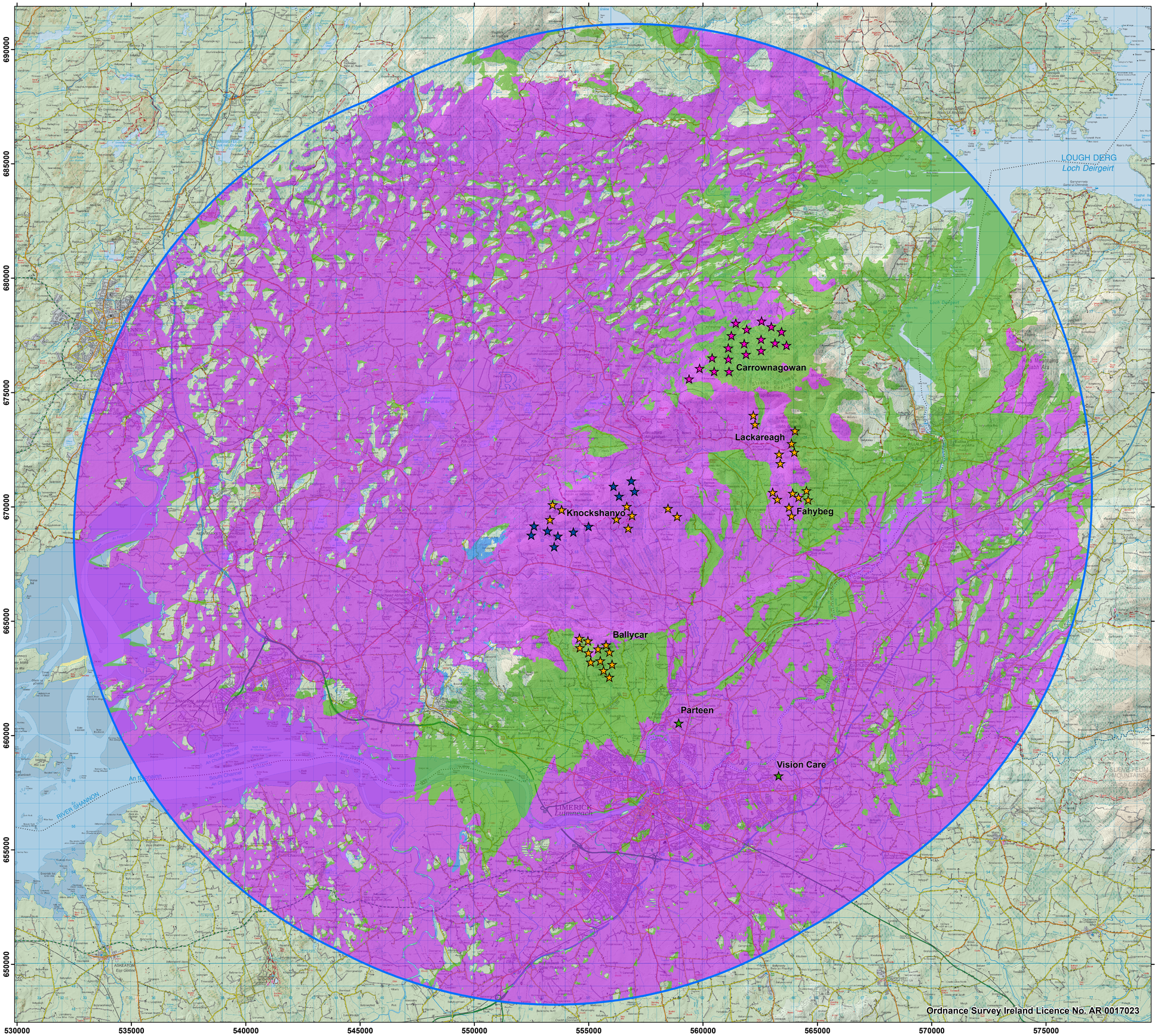
Note: This ZTV map is calculated for landform screening only and does not take account of the significant screening effects of vegetation (hedgerows, trees) and buildings inherent across the study area.

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Scale: 1 : 80,000 if printed @ A1 size

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ZTV indicating the cumulative theoretical visibility of the proposed Oatfield Wind Farm in combination with the potential future cumulative baseline wind farms in the study area



Proposed Turbines

Existing Turbines

Permitted Turbines

In-Planning Turbines

Wind Farm Visibility

18.8%	*Visibility of existing, permitted or In-Planning turbines only*
69.1%	*Visibility of proposed turbines as well as existing, permitted or In-Planning turbines*
0.7%	*Visibility of proposed turbines only*

11.4% of the entire study area to 20km will not have any view of the turbine blades of the proposed Wind Farm or that of any existing, permitted or In-Planning wind farms

20km Extent

This ZTV map has been calculated such that a turbine registrers as been theoretically visible to observers in the surrounding landscape once there is an unobstructed line of sight to its blade tip.

Observer Height assumed: 2m to eye-level height
Blade Tip Heights: Variable

Note: This ZTV map is calculated for landform screening only and does not take account of the significant screening effects of vegetation (hedgerows, trees) and buildings inherent across the study area.

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Scale: 1 : 80,000 if printed @ A1 size

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