EDF RENEWABLES IRELAND LTD.

KELLYSTOWN WIND FARM

CO. LOUTH

GRID CONNECTION ROUTE AND TURBINE DELIVERY ROUTE OPTIONS

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

August 2025

~~**November 2024**~~

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DOCUMENT APPROVAL

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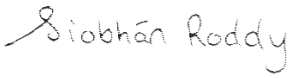
Date November 2024	**Signature** 	**Signature** 	
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KELLYSTOWN WIND FARM

GRID CONNECTION ROUTE AND TURBINES DELIVERY ROUTE OPTIONS

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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1 INTRODUCTION

This Appendix has been reviewed and updated where necessary considering any subsequent modifications, updates and additional information acquired for the Further information Request issued by Louth County Council (LCC) on the 6th February 2025 (Reference No: 2460766). It is noted that for ease of reference all changes from the original chapter are shown in orange. Where text has been removed it is shown as ~~strikethrough~~.

The EIAR for Kellystown Wind Farm has been prepared by Jennings O'Donovan & Partners Limited, on behalf of EDF Renewables Ireland Ltd. The EIAR assesses the Project as a whole, and all direct and indirect effects, cumulative impacts and interactions and all relevant ancillary and subsidiary elements of the Development, including a proposed Grid Connection Route (GCR) and Turbine Delivery Route (TDR)

The Applicant is seeking planning permission for the proposed GCR and TDR as described in Chapter 2 Project Description. The GCR and TDR that are proposed as part of the Project have been assessed in the main EIAR chapters. The Applicant is not seeking any flexibility in respect of this GCR or TDR. This document (Appendix 3.1) presents a complete assessment of the other GCR and TDR options which were considered by the Applicant but were not taken forward. The GCR and TDR options that are assessed in this Appendix 3.1 are referred to as GCR Option 2, TDR Option 2 and TDR Option 3

The purpose of this document is to set out the complete assessment of GCR Option 2, TDR Option 2 and TDR Option 3 which has been carried out in accordance with the EIA Directive and the EPA Guidelines (2022). To avoid duplication, this document relies upon and cross-refers to the assessments set out in the individual EIAR chapters (chapters 5-18) where applicable.'.

Common acronyms used throughout this EIAR can be found in **Appendix 1.3.** This document is supported by the following Appendices, Figures and Tables:

Appendix 3.1a	Kellystown Wind Farm Preliminary Delivery Route and Site Route Analysis
Appendix 3.1b	Swept path analysis drawings (TDR option 2)
Appendix 3.1.c - Technical Note 2	38kV Grid Connection Screening of Chapel Lane Alternative

Figure 1.1	Proposed GCR and GCR option 2
Figure 1.2	Proposed TDR option 2 and 3

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1.1 STATEMENT OF AUTHORITY

Jennings O'Donovan & Partners Ltd. (JOD) have extensive experience in all aspects of wind farm development, from design and planning stages through to construction. JOD have been active as engineering consultants in the wind energy market in Ireland since 1998 and have completed numerous wind farm projects, varying from single wind turbine installations to large-scale, multi-turbine developments with a total of over 2,000 MW generation capacity.

This document has been prepared by Ms. Siobhan Roddy (Bachelors' Degree in Environmental Science and Technology from Dublin City University) and Ms Aisling Layden (PhD research in Global Lake Climatology and MSc in Environmental Sustainability from The University of Edinburgh). Both are experienced in report writing and EIAR chapter writing for wind farm developments in Ireland. This document has been reviewed by Mr. David Kiely of JOD. Mr. Kiely has 42 years' experience in the civil engineering and environmental sector. He has obtained a bachelor's degree in civil engineering and a Master's in Environmental Protection

This **Appendix 3.1.c** was reviewed and updated considering any subsequent modifications, updates and additional information acquired for the Further information Request issued by Louth County Council (LCC) on the 6th February 2025 (Reference No: 2460766) by Mr. Ryan Mitchell an Environmental Scientists at Jennings O'Donovan & Partners Ltd.

Technical input has been provided for many elements of this EIA, refer to Appendix 1.1: Author Qualifications. For information on the qualifications/ experience of the individual

technical input teams, refer to chapter 6; Biodiversity, Chapter 9: Aquatic ecology, Chapter 10 Soils and Geology, Chapter 11: Hydrology and Hydrogeology, Chapter 12 Landscape and Visual Impact, Chapter 13: Noise and Chapter 14 Materials Assets Incl. Roads.

1.2 BACKGROUND

1.2.1 Grid Connection Route

Five cabling route options from Kellystown to Drybridge were initially considered and assessed as part of a civil and structural due diligence to determine which route would be brought forward to the planning stage. These five routes, initially referred to as Option A, B, C, D & E are shown in Figure 1 of the 38kV Grid Connection Feasibility Route Development (Chapter 3: Alternatives Considered - **Appendix 3.2**). It was concluded in the grid route assessment that Option A was the most favourable route (shortest route and least potential impact on the environment).

The initial preferred GCR option A was discussed with Louth County in a pre-planning meeting Council (Date: 15th February 2024). However, due to the utility infrastructure in the road network, the council recommended two alternative routes (modified versions of the Option A route). The GCR assessed in the main EIAR is the 'proposed GCR' and the other GCR option (GCR option 2) is assessed within this report. The proposed GCR and the GCR option 2 are shown in **Figure 1.1**.

A synopsis of the feasibility and assessment work for the five GCRs are shown in **Table 1.1**.

Table 1.1 Summary of Feasibility and assessment of GCR routes

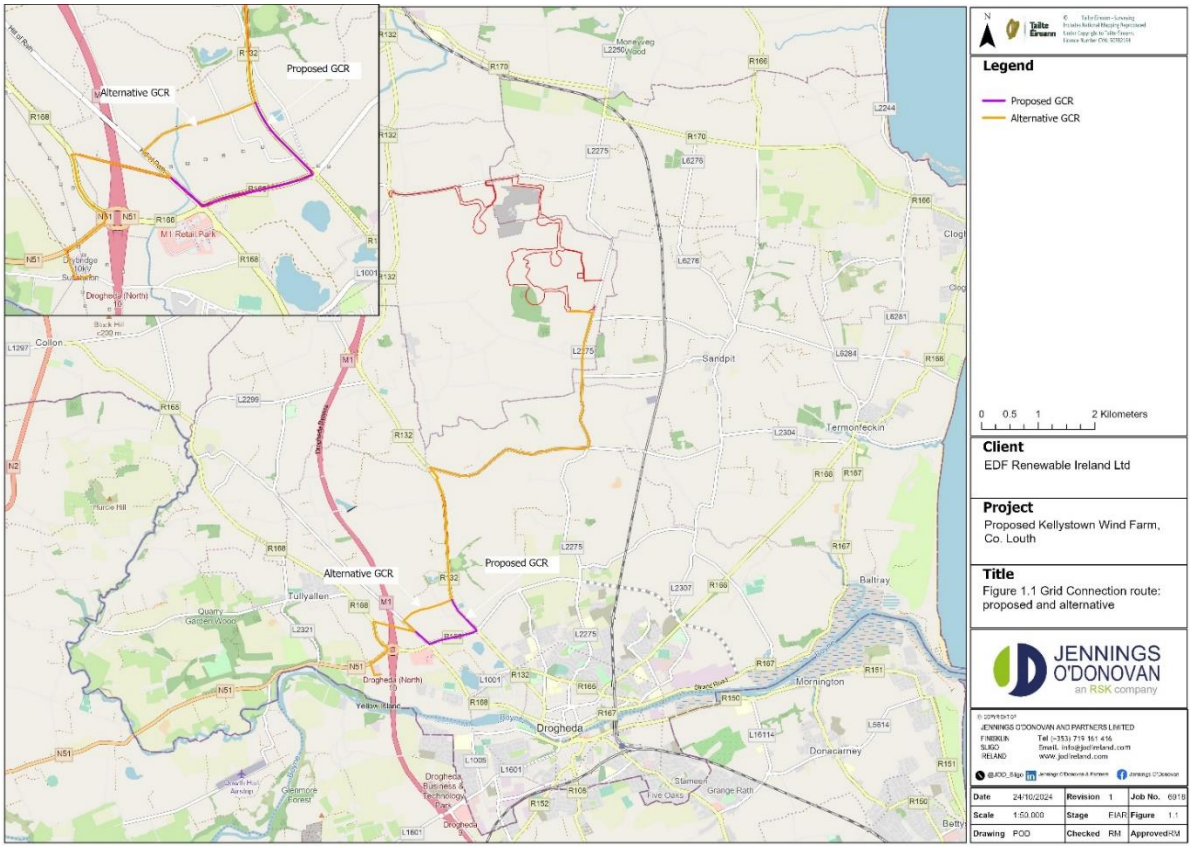
<table>
<tr><th colspan="7">Feasibility assessment of GDRs</th></tr>
<tr><td>GCR name/ numbering</td><td>Route Option A</td><td>Route Option B</td><td>Route Option C</td><td>Route Option D</td><td>Route Option E</td><td rowspan="2">Summary/ Outcome:
Option A selected as best option in feasibility report.

After discussion with Louth County Council – 2 other routes (utilising most of the route of option A) were progressed, these are referred to as
The Proposed GCR and the GCR option 2 (figure 1.1)</td></tr>
<tr><td>Documentation of GCR Feasibility studies</td><td colspan="5">The feasibility of GCR route option A -E are documented in TLI report '38kV Grid Connection Feasibility Report Kellystown Wind Farm' Doc. 05949-R01-01 (Chapter 3: Alternatives Considered - Appendix 3.2)

The GCR route option A -E were assessed in Chapter 3: Alternatives Considered</td></tr>
<tr><th colspan="7">EIA assessment of selected GCR routes</th></tr>
<tr><td>GCR name/ numbering</td><td colspan="2">Proposed GCR</td><td colspan="2">GCR option 2</td><td colspan="2"></td></tr>
</table>

Documentation of GCR EIA assessment	Assessed within main EIA Chapters 1-19	Assessed within this document (**Appendix 3.1)** Consent is not being sought for GCR option 2	Summary/ Outcome: GCR option 2 is being assessed as an alternative option to the Proposed GCR. Both GCR options have been fully assessed. The Proposed GCR and the GCR option 2 are shown in Figure 1.1. Consent is not being sought for GCR option 2

Figure 1.1 Proposed GCR and GCR option 2



As shown in **Figure 1.1**, the differences between the Proposed GCR and the GCR option 2 are limited to one section of the grid route. The proposed GCR is routed along the N51 for approximately 900m, within the townland of Mell. The GCR option 2 departs from the R132 approximately 700m before the proposed GCR meets the N51 and is routed along the L6323 for c. 950m and along L6322 for c. 280m before rejoining the Proposed GCR.

1.2.2 Turbine Delivery Route

Preliminary work carried out by the applicant on the Turbine Delivery Route to the Wind Farm Site is documented in **Appendix 3.1a.** This report focused on local turbine access on junctions/ nodes in the vicinity of the Wind Farm Site. An in-house review of delivery from Belfast Port, Galway port and a local port Greenore Port Co. Louth, was undertaken, as outlined in Chapter 3: Alternatives Considered, resulted in the selection of Galway port as the port of entry.

Following this work, an investigative Swept Path Analysis from Galway port to site was carried out. This work highlighted three viable TDRs outlined in **Appendix 3.1a**, which for the most part share the same route. The difference between the routes are limited to roads (M1, R132 and R169) within a 8km radius to the west of the Wind Farm Site.

The Proposed TDR was selected on the basis that there is only 1 area of third party lands required where TDR works are required (R132 and L6274 junction). The two other TDRs (option 2 and option 3 as shown in **Figure 1.2**) are also considered viable routes however require more than one are of third party lands they have been assessed in this EIAR document. A synopsis of the feasibility and assessment work for the TDR is shown in **Table 1.2**.

Table 1.2 Summary of Feasibility and assessment of TDR routes

<table>
<tr><th colspan="5">Feasibility assessment of TDRs</th></tr>
<tr><td>TDR name/ numbering</td><td>TDR option 1 (265km)</td><td>TDR option 2 (278km)</td><td>TDR option 3 (268km)</td><td rowspan="2">Summary/ Outcome: TDR Option 1 selected as the proposed TDR primarily as there is only 1 additional area where TDR works are required (R132 and L6274 junction). Work at this junction is non-temporary and is included in the Redline Boundary</td></tr>
<tr><td>Documentation of TDR Feasibility studies</td><td colspan="3">Kellystown Wind Farm Preliminary Delivery Route and Site Route Analysis. BOD-EDF-BOD-REF-KWF-A-001 (Appendix 3.1a)

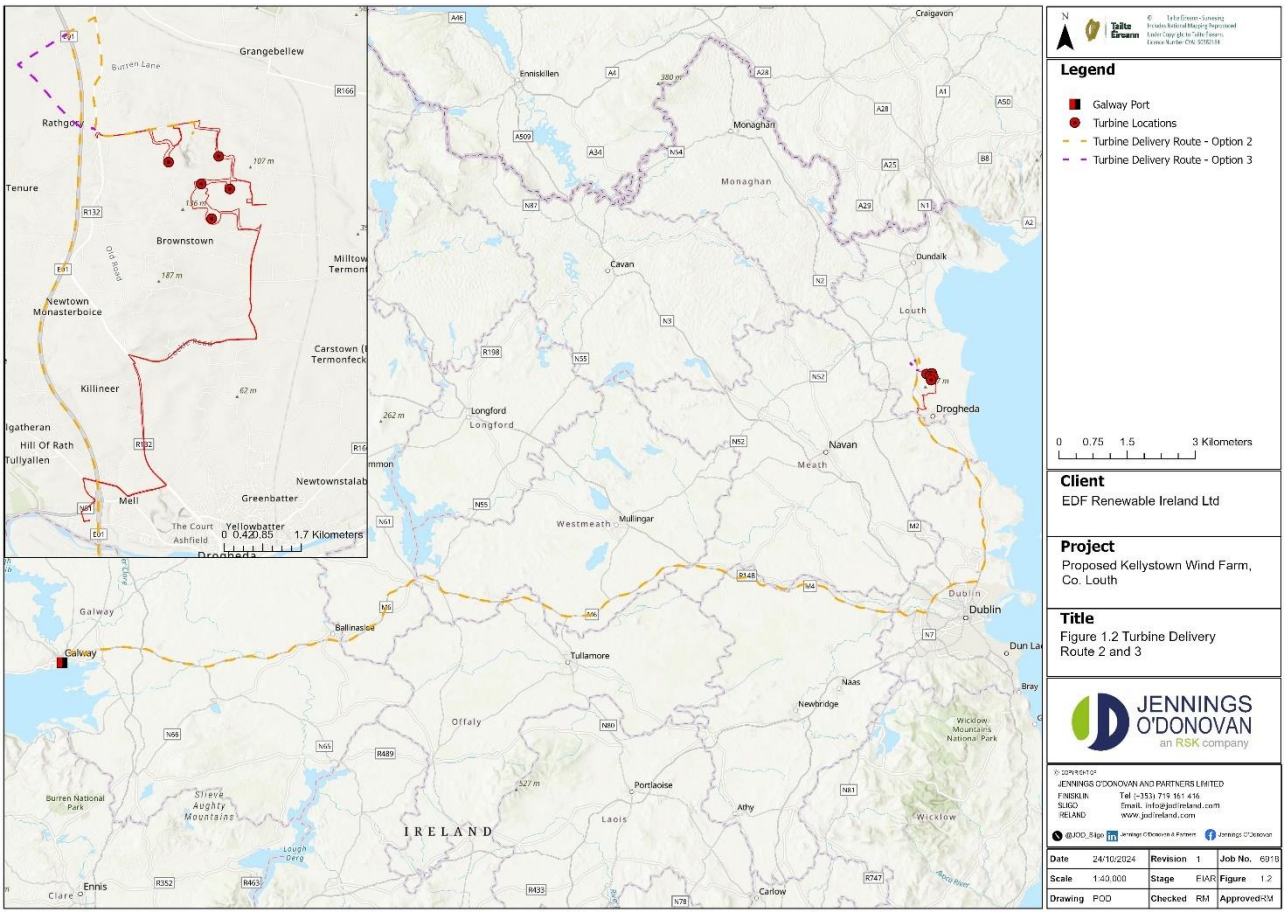
Appendix 3.1b Swept path analysis drawings (TDR option 2)

~~Appendix 16.2~~ ~~(Swept path analysis) for the proposed TDR~~

Appendix 16.3: Swept Path Analysis N162
Appendix 16.3a: Swept Path Analysis N163</td></tr>
<tr><th colspan="5">EIA assessment of TDRs</th></tr>
<tr><td>TDR name/ numbering</td><td>Proposed TDR</td><td colspan="2">TDR option 2 & TDR option 3</td><td rowspan="2">Summary/ Outcome: TDR Option 2 and TDR Option 3 have been assessed and are considered to be feasible routes. However, only one TDR is being brought forward as part of the Project, and that is the</td></tr>
<tr><td>Documentation of TDR EIA assessment</td><td>Assessed within main EIA Chapters 1-19</td><td colspan="2">Assessed within this document (Appendix 3.1)</td></tr>
</table>

			Proposed TDR. Consent is not being sought for TDR Option 2 or TDR Option 3.. All three TDRs have been fully assessed. The three routes are shown in Figure 1.2

Figure 1.2 Proposed TDR option 2 and 3



Proposed TDR

From the docks at Galway, there are a number of junctions/ sections of road where there are areas of temporary works required on third party lands. As these are minor temporary works (i.e. removal of street furniture and laying down a temporary load bearing surface), they are not encompassed in the Redline Boundary. The works have been assessed in a swept path analysis **Appendix 16.3 & Appendix 16.3a of the EIAR**: and outlined in **Table 2.6 of Chapter 2**. The first 1~~-1~~-3 nodes/ junctions outlined in Table 2.6 apply to all 3 TDRs (Proposed TDR and TDR option 2 and 3) from Galway Docks to the M50 Exit/ junction north of Drogheda.

TDR Option 2

As outlined above, the first 14 3 nodes/ junctions outlined in Table 2.6 (from Galway Docks to the M50 Exit/ junction north of Drogheda) apply to TDR option 2. Additional to these eleven (no.11) nodes, there are four (no.4) additional pinch points on TDR Option 2 from the M50 Exit/ junction north of Drogheda to the Wind Farm Site. These require works such as hedgerow removal/trimming and laydown of temporary road surface.

A swept path analysis on these pinch points are shown in **Appendix 3.1b**. These include

- Full turnabout on M1, Exit 14, at townland of Charleville (6918-JOD-PL-HR -2000_1 of **Appendix 3.1b**)
- Exit 12 (heading south) on M1 motorway to R169 (6918-JOD-PL-HR -2001_1 and 6918-JOD-PL-HR-2002_1 of **Appendix 3.1b)**
- Junction R169 and R132 (6918-JOD-PL-HR -2101_2 and 6918-JOD-PL-HR-2102_2 of **Appendix 3.1b**)
- Junction L2254 and R132 (6918-JOD-PL-HR-2200_3, 6918-JOD-PL-HR-2201_3 and 6918-JOD-PL-HR-2202_3 of **Appendix 3.1b**)

TDR Option 3

Additional to the 143 nodes assessed in Chapter 2 and Appendix 16.2, there are three (no.3) additional pinch points on TDR Option 3 from the M50 Exit/ junction north of Drogheda to the Wind Farm Site. The preliminary Delivery Route and Site Route Analysis (Chapter 3: Alternatives Considered - **Appendix 3.2**) undertaken as an initial assessment of the potential turbine delivery access route encompassed an assessment of these three (no.3) additional pinch points/ junctions. This includes hedgerow removal/trimming and laydown of temporary road surface. These pinch points/ junctions are detailed within **Appendix 3.1a**; 4.1a node 1, 4.1b node 2 and 4.1c node 3 and are shown in Figure 4.1a, Figure 4.1b and Figure 4.1c of Appendix 3.1b, respectively:

- Exit 12 (heading north) on M1 motorway to R169 (Figure 4.1a of **Appendix 3.1b**)
- Junction R169 and R132 (Figure 4.1b of **Appendix 3.1b**)
- Junction L2254 and R132 (Figure 4.1c of **Appendix 3.1b**)

1.2.3 Relevant Legislation and Guidance

The legislation and guidance is for each element of this EIA assessment is outlined in the individual EIAR chapters:

- Chapter 5 Population and Human Health
- Chapter 5 Biodiversity
- Chapter 9 Aquatic Ecology
- Chapter 10: Soils and Geology
- Chapter 11: Hydrology and Hydrogeology:
- Chapter 12: Landscape and Visuals
- Chapter 13: Noise and Vibration:
- Chapter 14 Material Assets incl. Roads
- Chapter 15 Cultural Heritage
- Chapter 16: Traffic and Transportation:
- Chapter 18: Air and Climate:

2 ASSESSMENT STRUCTURE

2.1 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

The approach to the assessment is as follows:

(a) identify the assessment conclusion as described in the relevant EIAR chapter for the Proposed GCR and Proposed TDR

(b) identify relevant differences in the GCR and TDR Options and

(c)assess the environmental impacts of the differences and explain whether these differences change the assessment conclusion.

In line with the EIA Directive, as amended and current EPA guidelines (2022) the structure of this chapter is as follows:

- Baseline Description – a description of the receiving environment. This consists of a site walk over and/or desk study of the receiving environment. The data used for this description is outlined within each subsequent section of this report;
- Assessment of Potential Effects – including the "Do Nothing" scenario (accounts for likely changes in the baseline due to natural changes and nearby projects) and identifying the ways in which area could be affected during the construction on the TDR/GCR options. The potential impacts are classified as outlined in Table 1.6 of the Introduction Chapter

(as prescribed in the EPA Guidelines, 2022). Typically, for each impact assessed the quality of the impact, for example, positive or negative, the significance of the impact, for example, slight or moderate and the duration of the impact, for example, short-term or long-term are assigned.

- Cumulative Effects –other developments with the potential to give rise to cumulative effect developments (operational and in the planning process) within a 20km of the Development (shown in Appendix 2.4), in conjunction with the Development, are assessed to determine the potential cumulative effects
- Mitigation Measures and Residual Effects – a description of measures recommended to avoid, prevent, reduce or, if necessary, offset any potential significant adverse effects and a summary of the significance of any residual effects after mitigation measures have been implemented. The mitigation hierarchy approach, as outlined in Chapter 1 of Avoidance, Reduction/ Elimination and Remedy aims to avoid significant impact through embedded mitigation (avoidance), and where avoidance is not possible, through mitigation measures. Remedy, the lowest rung of the mitigation hierarchy is only considered where mitigation measures are not feasible or possible.
- Statement of Significance.

2.2 SENSITIVE RECEPTORS

Sensitivity is defined as the potential for a receptor to be significantly affected by a proposed development (EPA, 2022). Within this section the sensitive receptors for each element of the GCR & TDR options are outlined.

- **Population and Human Health:** Habitable dwellings, businesses and community amenities within 100m of the GCR option 2 and within 100m of the TDR areas requiring road/ widening works.

- **Biodiversity:** The Zone of Influence (ZoI), or distance over which potentially significant effects may occur, will differ across the Key Ecological Receptors (KERs), depending on the potential impact pathway(s):
  - The ZoI in relation to direct impacts on habitats and flora and fauna species is confined to the Redline Boundary of the GCR and to the areas of works on the TDR.
  - The ZoI of general construction activities (i.e., risk of spreading/introducing non-native invasive species, dust deposition and disturbance due to increased noise, vibration, human presence and lighting) is not likely to extend more than several hundred metres from the GCR and TDR area of works.

- The ZoI of potential impacts on surface water quality in the receiving environment, and associated aquatic flora and fauna, could extend downstream for up to 15km (following UK guidance, Scott Wilson *et al.* 2006) but possibly more. For the Turbine Delivery Routes, the ZoI is confined to the portions of the route where road upgrade works are required.

- **Aquatic Ecology:** Aquatic ecological receptors associated with rivers crossed or adjacent to the GCR & TDR options or water courses potentially affected by these routes.

- **Soils and Geology**: Designated sites within the Study Area (including the GCR & TDR options) are considered sensitive environmental receptors, which can be affected by excavation and earthworks.

- **Hydrology and Hydrogeology**: River sub-basins located within the GCR options; Termonfeckin_010, Termonfeckin_020 (IE_NB_06T010400), and Tullyeskar_010 (IE_EA_07T270880) and river sub-basins within the TDR options; Tullyeskar_010, Mattok_020, White (Louth)_010, and White (Louth)_020 (IE_NB_06W010400). Refer to section 8.1.8 for a breakdown of the Hydro-geological Hydrological receptor for the GCR and TDR options and the assigned sensitivities.

- **Landscape and Visual:** refer to Appendix 12.1a for description of sensitive receptors

- **Material Assets incl. Roads**: any dwelling/ business/ community buildings that have the potential to experience
  - interference to broadcast services from telecommunication operator sites/ infrastructure
  - electrical outage
  - interference to the gas, water or wastewater services.

- **Noise and Vibration:** Noise Sensitive Receptors (NSRs), which are residential properties located within c. 2 km of the Proposed Development.

- **Cultural Heritage:** Cultural Heritage constraints within a 100m wide corridor centred on the GCR and TDR Options, and within locations along the TDRs that require temporary works to facilitate turning of wide-bearing loads

- **Traffic and Transportation**: the public road network and associated junctions affected by all aspects of construction the GCR and TDR options including the Enabling works

at junctions and pinch points on the public road network to facilitate the swept path of abnormal load vehicles delivering turbine components

- **Air and Climate:** dwelling/ business/ community buildings within 100m of the GCR and TDR options that may be affected by nuisance dust.

3 PROJECT DESCRIPTION

The entire Proposed Development for the Kellystown Wind Farm Site is described in detail in **Chapter 2**: Project Description. Within this EIA document, the project description details GCR option 2 and TDR option 2 and 3.

3.1 SITE LOCATIONS AND ENVIRONS

Grid Connection Route

The townlands through which the proposed GCR option and GCR option 2 passes are shown in Table **3.1**. The townlands through which the GCR passes are the same for both the proposed GCR and GCR option 2.

Turbine Delivery Route

The townlands through which the TDRs pass, from the M1 junction in Mell, North Drogheda to the Wind Farm Site, are shown in **Table 3.1**. The TDR from Galway docks to the M1 junction in Mell, is common to all TDR options.

Table 3.1 Townland within GCR and TDR options

GCR name	Proposed GCR	GCR option 2	
Townlands	Tullyallen Killineer Mell Tullyeskar Carntown Ballymakenny Tullyard Brownstown Piperstown	Tullyallen Killineer Mell Tullyeskar Carntown Ballymakenny Tullyard Brownstown Piperstown Alternative section of route is contained within the townland of Mell	
TDR name	**Proposed TDR**	**TDR option 2**	**TDR option 3**
Townlands	Stonehouse Castletown	Charleville Richardsotwn	Woodland Castleotwn

From M1 junction in Mell, North Drogheda	Priest town Roxborough Bawntaaffe Silloge Newtown Monasterboice Killineer Mell	Dromin Moooremount Ravel Shamrockhill Woodland Athclare Stirue Rathgory Priest town Paddock Bawntaaffe Newtown Monasterboice Coolfore Balgatheran Hill of Rath Mell	Stonehouse Athclare Stirue Rathgory Priest town Paddock Bawntaaffe Newtown Monasterboice Coolfore Balgatheran Hill of Rath Mell

3.2 DESCRIPTION OF GCR OPTION 2 AND TDR OPTION 2 AND 3

3.2.1 Description of GCR option 2

The GCR will exit the Drybridge 110kV Substation Compound west onto the Slane Road, L20000 for 100m before turning north along the L2322 for 200m. The GCR diverges north-east onto the N51 toward the roundabout at Drogheda North, which is junction 10 on the M1 motorway. The cable then is routed north-west on the R168 for 750m. At Tullyallen, the cable route turns southeast onto a disused section of road for 250m. It is proposed to utilise Horizontal Directional Drilling (HDD) method to cross beneath the M1 motorway. On the east side of the motorway the cable continues along the L63324. The Grid Connection route then turns northwest along the L6322 for 280m before turning right onto the L6323. The route continues northeast for approximately 950m, and turns north onto the R132.[1] Continuing for 2.6 km along the R132, The UGC turns east at the roundabout at Mell and carries on along the L166. At Moneymore, the route turns north-west onto R132 and continues for 2.6km along the R132. The cable then crosses into the L23083. A sharp south-east turn is taken at Tulleskar onto the L2308 for approximately 3km. On the L2308, there is a bridge, with a stone arch underneath the road without bridge parapets, at Carntown, A HDD method will be employed to cross beneath this bridge. The Grid Connection route turns north onto the L2310 for 0.9km and thereafter transitions into the L2275. On the L2275, there are two culverts to be crossed. A HDD will be employed to cross beneath these culverts. Before the Grid Connection route approaches Piperstown, a further HDD will be required to cross this bridge.

[1] This section is the only new section of GCR option 2 that differs from the Proposed GCR.

At Piperstown the Grid Connection turns west and enters wind farm lands via private access route for 500m. Accessing the wind farm from the southeast corner, the grid connection route will continue to head north for circa. 400m before reaching The Wind Farm Site substation.

The proposed GCR and GCR option 2 follow the same route except a 280m along the L6322 and 950m along the road L6323 which is 950m in length contained within the townland of Mell.

The Grid Connection will be constructed to the requirements and specifications of ESB Networks Limited. The three conductors will be laid in separate ducts which will be laid in accordance with the ESBN functional specifications for 38kV Networks Ducting/Cabling (Minimum Standards). The width of a 38kV cable trench with a trefoil formation will be 600mm. The depth of the trench for 38kV cables is 1.22m. A separate duct will be provided within the trench for fibre optic communications. Refer to ESBN Cable ducting Specifications in Appendix 2.2.

The construction methodology outlined in the Project Description (Chapter 2) for the proposed GCR, will also apply to GCR option 2. The communication chambers and link boxes, joint bays and trenching design will not differ from those outlined for the proposed grid.

Watercourse and Horizontal Directional Drilling (HDD): In comparison to the Proposed GCR, the differences are as follows:

- there is one less watercourse crossing on the Proposed GCR option, the GCR will not cross Hill of Rath order 1 watercourse (ITM co-ordinates 706,209.16E 776,890.30N m)
- The GCR crossing over the Mell order 2 watercourse, will be at 706,249.70E 777,279.36N m. This is approximately 550 m upstream from where the proposed GCR crosses the Mell order 2 river.
- The GCR crossing on Mell order 2 watercourse will require HDD in both Grid Connection routes.

3.2.2 Description of TDR options; temporary works

Areas where TDR temporary works are required e.g, area to facilitate turning of wide-bearing loads, along the TDR from the M1 junction in Mell, North Drogheda to the Wind Farm Site, are shown in **Table 3.2** and **Table 3.3**. These areas of temporary works are within the existing public road corridor, and as shown in Table 3.2 and Table 3.3 and are located in the townlands of Charleville, Woodland and Castletown for TDR option 2 and Athclare Woodland and Castletown for TDR option 2.

Table 3.2 Location and description of temporary works for TDR option 2

TDR option 2 widening works	Townland	Description	Drawing/ document reference
Full turnabout on M1, exit 14	Charleville 703,322.92E 791,112.67N m	Loadbearing Surface required for abnormal load vehicles Obstacle Free Area required for abnormal load vehicles (street furniture and vegetation)	6918-JOD-PL-HR-2000_1
Exit 12 (heading south) on M1 motorway to R169	Woodland 705,169.47E 786,921.37N m	Loadbearing Surface required for abnormal load vehicles Obstacle Free Area required for abnormal load vehicles (street furniture and vegetation)	6918-JOD-PL-HR-2001_1 6918-JOD-PL-HR-2002_1 (Appendix 3.1b)
Junction R169 and R132	Woodland 705,712.44E 787,214.11N m	Loadbearing Surface required for abnormal load vehicles Obstacle Free Area required for abnormal load vehicles (street furniture and vegetation)	6918-JOD-PL-HR-2101_2 6918-JOD-PL-HR-2102_2 (Appendix 3.1b)
Junction L2254 and R132	Castletown 705,728.96E 784,768.86N m	Loadbearing Surface required for abnormal load vehicles Obstacle Free Area required for abnormal load vehicles (street furniture and vegetation)	6918-JOD-PL-HR-2200_3 6918-JOD-PL-HR-2201_3 6918-JOD-PL-HR-2202_3 (Appendix 3.1b)

*Widening works at this location are common to TDR option 2 and 3

Table 3.3 Location and description of temporary works for TDR option 3

TDR option 3 widening works	Townland and ITM co-ordinates (m)	Description	Drawing/ document reference
Exit 12 (heading north) on M1 motorway to R169	Athclare 705,069.20E 786,840.60N	Road signs to be removed on near side of junction due to over sail. Land area required for widening – 110m^2 Clearance area for transport required 651m^2	Figure 4.1a (Appendix 3.1a)
Junction R169 and R132*	Woodland 705,712.44E 787,214.11N	Over sail on out turn radius. Removal of street furniture on inner and outer turn radius Land area required for widening – 606m^2 Clearance area for transport required 771m^2	Figure 4.1b (Appendix 3.1a) Also refer to: 6918-JOD-PL-HR-2101_2 6918-JOD-PL-HR-2102_2 (Appendix 3.1b)
Junction L2254 and R132*	Castletown 705,728.96E 784,768.86N m	Over sail on outer radius vegetation pruning/ cutting Land area required for widening – 119m^2 Clearance area for transport required 262m^2	Figure 4.1c (Appendix 3.1a) Also refer to: 6918-JOD-PL-HR-2200_3 6918-JOD-PL-HR-2201_3 6918-JOD-PL-HR-2202_3 (Appendix 3.1b)

*Widening works at this location are common to TDR option 2 and 3

3.2.3 Turbine Component Delivery Route

It is envisaged that the turbine nacelles, tower hubs and rotor blades will be delivered to the Proposed Development site from Galway Port, County Galway. From there, they will be transported to the Site via the R339, R865, N6, M6, M4, N4, M50 and M1 as shown on **Figure 1.2**. The Proposed TDR and the follow the same route until the M1 where they spilt off. The breakdown of distances the turbines are required to travel on each road for TDR option 2 and option 3 is detailed in **Table 3.4** and **Table 3.5.**

Table 3.4: Turbine Delivery Route Distances TDR option 2

Turbine Delivery Route	Distance in Kilometres travelled on (km)
Port of Galway	
New Docks Road	0.11km
Local Road	0.16km

Turbine Delivery Route	Distance in Kilometres travelled on (km)
Lough Atalia Road	1.4km
R339	1.9km
R865	0.1km
N6	6.1km
M6	71.5km
N6	8.1km
M6	57.2km
M50	13.0km
M4	45.0km
N4	6.0km
M1	55.7km
N33	0.56km
M1	7.0km
R169	0.62km
R132	2.4km
L-6274-0	1.2km
Kellystown Wind Farm	Total Distance = c.278km

Table 3.5: Turbine Delivery Route Distances TDR option 3

Turbine Delivery Route	Distance in Kilometres travelled on (km)
Port of Galway	
New Docks Road	0.11km
Local Road	0.16km
Lough Atalia Road	1.4km
R339	1.9km
R865	0.1km

Turbine Delivery Route	Distance in Kilometres travelled on (km)
N6	6.1km
M6	71.5km
N6	8.1km
M6	57.2km
M50	13.0km
M4	45.0km
N4	6.0km
M1	52.1km
R169	0.7km
R132	2.5km
L-6274-0	2.2km
Kellystown Wind Farm	Total Distance = c.268km

The delivery of the turbines to the Site will require co-ordination with a number of statutory bodies including Transport Infrastructure Ireland (TII), Galway County Council, Dublin County Council, Louth County Council, Celtic Roads Group and An Garda Síochána. The Traffic Management Plan (TMP), **Appendix 16.~~1~~2**, is specific to the Proposed TDR.. Final details such as time of delivery and agreed diversion routes will be agreed with all stakeholders prior to construction of the wind farm.

3.2.4 Likely EVOLUTION OF BASELINE

For GCR option 2 and TDR option 2 and 3, the do-nothing effect would be that the receiving environment stays in the same or similar condition as it currently is. The GCR and TDR options are primarily in the public road corridor (as described throughout section 3). The evolution of the baseline environment is likely to be road upgrades, widening and maintenance. It is also likely that future developments will be proposed in this region. These roads may therefore require works for laying of new services and connection to existing services and utilities i.e., gas and water services infrastructure.

4 POPULATION & HUMAN HEALTH

For Legislation and Guidance, Definition of the study areas and summary of the consultation process for this element of the EIAR, refer to section 5.1.3, section 5.2.2 and section 5.2.4 of **Chapter 5.**

The effect of a development on population and human health includes the following broad areas of investigation:

- Population and Settlement Patterns
- Economic Activity and Tourism
- Employment
- Topography and Land Use
- Health Impacts of Wind Farms
- Property Value / Residential Amenity and
- Natural Disaster and Major Accidents.

This assessment considers the following criteria:

- Sensitive receptors in the area
- Existing land use in the area
- General amenities in the area
- Potential effects from water, noise, air quality and traffic

4.1 BASELINE DESCRIPTION

As outlined in Table 3.1 and section 3.1 of this document, the Proposed GCR and GCR option 2 lie within the same townlands. The widening works on the TDR junctions/ nodes of TDR option 2 and 3 outlined in Table 3.2 and Table 3.3 are all within 2.5 km of the Redline Boundary of the Wind Farm Site and are therefore within and/or in close proximity to the local study area used for the Proposed TDR; Electoral Division (EDs) of Mullary.

On this basis, the baseline description of the receiving environmental as outlined in Chapter 5, section 5.3 is entirely applicable and does not need to be changed or updated for the purpose of this assessment. Accordingly, it is not repeated here for the purpose of this assessment.

4.2 ASSESSMENT OF POTENTIAL EFFECTS

The potential impacts of the GCR option 2 and TDR option 2 and 3 on the Population and Human Health factors, is measured from the perspective of the receptors. The receptors for this study are habitable dwellings, businesses and community amenities within 100m of the

GCR option 2 and within 100m of the TDR areas requiring road/ widening works. There are eleven (no. 11) dwellings within 100m of the TDR option 2 and 3 temporary widening zones these differ from the Proposed TDR. There are one hundred and twenty four (no. 124) dwellings and businesses along GCR option 2, 9 (no. 9) of which are along the section of GCR option that differ to the proposed GCR.

Grid Connection Route: The Grid Connection works for GCR option 2 will potentially impact on the Human Health and Population factors considered within this section, by means of the construction phase and the operation phase, where general maintenance of the grid connection infrastructure such as Junction Boxes will be carried out when required over the life span of the Wind Farm. For these works, traffic management plan will be agreed with the Local Authority and access priorities given to local residents where possible. The effect of the proposed Grid Connection works has been included in the assessment of the construction and operational phase of the Project within the following subsection. Viewed independently however, the overall effect of GCR Option 2 are considered **negative, long-term and not significant/ imperceptible** on all population and human health factors.

Turbine Delivery Route: The active construction areas for the road works along the Turbine Delivery Route for TDR option 2 and 3 will involve surface-level earthworks (removal of soil and unconsolidated rock) and will be temporary in nature. The proposed Turbine Delivery Route works associated with the Project are **negligible** and will not have any long-term negative effects on the factors considered in this section.

4.2.1 Land use and Topography

There will be no long-term impact of the TDR on Land use or topography. Similarly, there will not be any long term impact on the GCR, as outside the Wind Farm Site the GCR will remain in the public road corridor. Prior to the grid connection installation works within public roads, all access points (domestic, business, farm) will be considered when finalising the temporary road closures and diversions to maintain local access as much as possible and avoid impacts on various land uses.

The status of the overall impact of the Project as outlined in Chapter 5, with the GCR and TDR options considered in this document, remains **negative, long-term and slight** on land use and topography, throughout construction, operational and decommissioning phase of the Project.

4.2.2 Population and Settlement Patterns

Given that construction workers who are not based locally may temporarily relocate to the region for the duration of the works on GCR option 2 and for work of the TDR widening locations, the impact on population and settlement patterns are considered:

- **positive, short-term** and **imperceptible** for the construction and the decommissioning phase,
- **neutral and imperceptible** for the operational phase

The status of the overall impact of the Project as outlined in Chapter 5, with the GCR and TDR options considered in this document, remains **neutral and imperceptible** in terms of population and settlement patterns.

4.2.3 Economic Activity

Increases in economic activity resulting from the expenditure on items such as Site preparation, purchase and delivery of materials, plant, equipment etc and components are expected. Additionally, employees/ contractors involved in the construction of the Development will most likely use local shops, restaurants and hotels/accommodation.

Therefore, impact on economic activity is deemed to be

- **positive, slight and short-term** during the construction phase and the decommissioning phase,
- **positive, imperceptible and long-term** during the operational phase.

The status of the overall impact of the Project as outlined in Chapter 5, with the GCR and TDR options considered in this document, remains **positive** and **not-significant** in terms of economic activity.

4.2.4 Employment

In addition to the economic benefits outlined in the previous section, there are expected to be employment effects that are attributable to the TDR and GCR works. The impact is predicted to be:

- **slight, positive, short-term** impact during the construction and decommissioning phase
- **not significant, positive long-term** during the operational phase.

The status of the overall impact of the Project as outlined in Chapter 5, with the GCR and TDR options considered in this document, remains **slight, positive and long-term** in terms of impact on employment in the area.

4.2.5 Tourism

Due to the localised short-term duration of the works on GCR option 2 and TDR option 2 and 3 there is expected to be a:

- **short-term, not-significant, negative impact** on tourism during the construction and decommissioning phases
- **neutral, long-term and imperceptible** during the operational phase

The status of the overall impact of the Project as outlined in Chapter 5, with the GCR and TDR options considered in this document, remains as **slight, negative** during both construction and decommissioning phases and **long-term**, **slight positive** impact during operational phase.

4.2.6 Human Health

Given the short-term duration of the works on GCR option 2 which are confined to the public road corridors and the short-term temporary work of the TDR widening locations, the following impact on population and settlement patterns are considered:

Electromagnetic fields

As outlined in section 5.3.7.2, Chapter 5, EMF levels of 0.13 μT arise from a 110 kV underground cable when directly above it, is insignificant compared to the International Commission on Non-Ionising Radiation Protection (ICNIRP) Guidelines, which give a limit of 100 μT for sources of AC magnetic fields. On this basis, EMFs are very localised and are considered to have an:

- **imperceptible, negative and short-term** effect during the construction and decommissioning phases of the project utilising GCR Option 2 and and TDR options.
- **imperceptible, negative and long-term** during the operational phase of the Project utilising GCR Option 2 and TDR options.

Noise: With setback distance aligning with the draft WEDG (2006) and WEDG (2019), no significant impact on Population and Human Health is anticipated as a result of noise impacts. Section 9 of this document provides an impact assessment of the potential for Noise from the GCR and TDR options.

Air Quality: The effect of the GCR/ TDR options on air quality during the construction, operational and decommissioning phases will be:

- **slight, negative** and **temporary/short-term** during the construction phase

- **slight, positive and long-term** during the operation phase reducing localised emissions from alternative carbon fossil fuels.
- **slight, negative** and **temporary/short-term** during the decommissioning phase

The status of the overall impact of the Project as outlined in Chapter 5, with the GCR and TDR options considered in this document, remains as **slight positive** and **long term** in terms of air quality.

Water contamination: **Section 8: Hydrology and Hydrogeology** of this document provides an assessment of the hydrological impacts in relation to the GCR and TDR options including the potential for water contamination. The significance of the potential effects of the GCR and TDR options on water contamination is specified in **Table 8.2 and Table 8.3** of this document. The range of possible effects are all graded below major or moderate significance, and are therefore not considered to be 'significant' in accordance with the EPA Guidance 2022. Furthermore, there is no likelihood of significant cumulative effects over and above any pre-existing effect caused by existing, proposed or consented projects.

Traffic and Transport: Section 14 of this document assesses the impact that GCR option 2 and TDR option 2 and 3 will have local road users and traffic in the construction, operational and decommissioning phase. This assessment has identified that the overall potential effects of the Project on traffic and transport (irrespective of which GCR or TDR is used) will remain as **Slight to Moderate**, given the mitigation measures embedded in the design and proposed for the implementation of the Project.

4.2.7 Property Value

Given that there will be no long-term impact of the GCR option 2 and TDR options 2 and 3 on land use or topography, the GCR/ TDR options are not expected to have any impact on property values.

The effects of the Project on Property values have been reviewed and assessed within **Chapter 5**, Section 5.3.8. Based on the evidence from a number of these published studies, the operation of a wind farm at the Site is considered to not significantly affect property values in the area. The Project is expected to have a **medium-long-term imperceptible** impact on property values, irrespective of the TDR or GCR option used.

4.3 CUMULATIVE EFFECTS

On review of the Cumulative Effects outlined EIAR **Chapter 5: Population & Human Health**, **Section 5.5.10,** cumulative effects from works on GCR option 2 could include air pollution (dust), potential health impacts on nearby residents, noise No likely significant residual population and human health effects are predicted to arise as a result of GCR option 2 or TDR options 2 and 3. The cumulative impact assessment of the Project on population and human health has been set out in full in EIAR Chapter 5. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2 and 3. This is due to the temporary nature of the works for the TDR and minor divergence of the GCR. No cumulative effects on population and human healthcare predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3.

4.4 MITIGATION MEASURES AND RESIDUAL EFFECTS

On review of the Mitigation Measures and residual effects outlined **Chapter 5: Population & Human Health**, **Section 5.5,** it can be concluded that irrespective of which TDR option or GCR option is considered, the same Mitigation Measures must be applied.

4.5 STATEMENT OF SIGNIFICANCE

The significant effects of the construction, operation and decommissioning of the Project (Wind Farm Site, GCR option 2 and TDR option 2 and 3) on the receiving environment in terms of Population and Human Health, namely, economic activity, employment, land use, tourism and human health has been assessed individually and cumulatively, with respect to the sensitive receptors.

There are no likely significant effects for the Project, alone or cumulatively whether the Project involves the Proposed GCR or GCR Option 2, or the Proposed TDR or TDR Option 2 or TDR Option 3. Through the implementation of mitigation measures, the cumulative effects associated with the Project are predicted to be not significant.

5 BIODIVERSITY

For Legislation and Guidance, Definition of the study areas and summary of the consultation process for this element of the EIAR, refer to section 6.2.2, section 6.2.3 and section 6.2.6 of **Chapter 6 respectively.** A summary of the consultation responses are also presented in **Table 1.8, Chapter 1**.

5.1 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

5.1.1 Purpose of the Report

The purpose of this report is to:

- Establish and evaluate the baseline ecological environment as relevant to the GCR option 2 and TDR option 2 and 3. identify the assessment conclusion as described in the relevant EIAR chapter for the Proposed GCR and Proposed TDR, identify relevant differences in the GCR and TDR Options and assess the environmental impacts of the differences and explain whether these differences change the assessment conclusion.
- Set out the prevention and mitigation measures required to address any potentially significant ecological effects and ensure compliance with relevant nature conservation legislation.
- Provide an assessment of the significance of any residual ecological effects.
- Identify any appropriate enhancement and / or post-construction monitoring requirements.

5.1.2 Desk Study

A comprehensive desktop review was carried out to identify features of ecological importance within the study area and surrounding region which was wide enough to cover the area being considered for GCR Option 2 and TDR Option 2 &

This comprised a review of available ecological data, including the following:

- Online web-mapper of National Parks and Wildlife Service (NPWS) for data on sites designated for nature conservation (European & National) and on protected flora species and protected bryophytes (see www.npws.ie/protected-sites),
- Online web-mapper of National Biodiversity Data Centre for protected species datasets (see http://maps.biodiversityireland.ie)

5.1.3 Field Surveys

5.1.3.1 Habitats, vegetation and flora

The site of the Proposed Wind Farm Development was visited on the following dates: 21st and 22nd June 2023, 15th December 2023 and 17th September 2024. All Grid Connection Routes and the relevant sections of the Turbine Delivery Route Options were surveyed by driving the routes with stops for a walkover inspection at potential areas of ecological interest or where works are proposed.

Habitats within the study area were classified in accordance with 'A Guide to Habitats in Ireland' (Fossitt 2000). The dominant plant species present in each habitat type were recorded during the field surveys. This is considered sufficient to allow accurate classification of the habitats present. The extents and details of classified habitats were recorded and mapped using GIS. Where relevant, linkages with the EU Habitats Directive classification system are given.

During the various site surveys particular attention was paid to the possible occurrence of plant species listed in either the Flora (Protection) Order 2022 or the Irish Red Data Books (Curtis and McGough 1988, Lockhart et al. 2012). Vascular plant species nomenclature in this report follows Stace (2010) while that of mosses follows Smith (2004).
During the surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 – 2021 was conducted[2]. Invasive alien species which are widespread in Ireland, including Co. Louth, include Japanese knotweed, giant hogweed and Himalayan balsam.

The mapping of habitats was assisted by the use of aerial photography (OSI Geohive & BING online websites).

5.2 BASELINE DESCRIPTION

The potential for the Project to impact on sites that are designated for nature conservation is considered in this section.

Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are designated under the EU Habitats Directive as amended and EU Birds Directive as amended respectively and are collectively known as 'European Sites' or 'Natura 2000' sites. The potential for significant effects on the integrity of European Sites is fully assessed in the AA Screening

[2] http://Invasives.biodiversityireland.ie/

Report and Natura Impact Statement that accompanies this application. As per EPA Guidance 2022, *"a biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment in the context of likely significant effects on the environment, as required by the EIA Directive".* Section 6.4.2 of this EIAR **Chapter 6** provides a summary of the key assessment findings with regard to European Designated Sites.

Natural Heritage Areas (NHAs) are designated under Section 18 the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this Environmental Impact Assessment Report (EIAR).

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these sites is fully considered in this EIAR.

All designated sites that could potentially be affected were identified using a source-pathway - receptor model. To provide context for the assessment, European and national sites within a distance of 15km surrounding the Development Site inclusive of all GRC and TDR options have been considered. The distance of 15km follows guidance from the Department of Environment, Heritage and Local Government (2010) and would be a conservative distance in many cases. However, sites that were further away from the Project were also considered and no potential for impact was identified due to the absence of direct and indirect connections.

No part of the GCR option 2 or TDR option 2 and 3 options widening areas are within a site with a nature conservation designation.

5.2.1.1 European designated sites

A total of ten European designated sites occurs within a 15 km distance of the Wind Farm Site (see **Figures 6.1 & 6.2)** of **Chapter 6.** These European designated sites are also and with 15 km of the GCR Option 2 and TDR Option 2 and 3 proposed works and are listed in EIAR Chapter 6 Biodiversity - **Table 6.2**; there are four (no. 4) Specials Areas of Conservation (SACs) and six (no. 6) Specials Protection Areas (SPAs), none of which are within or adjacent to the Proposed Development.

Furthermore, no part of the GCR option 2 or TDR option 2 and 3 options widening areas are within a site with a nature conservation designation.

5.2.2 Habitats and Vegetation

The principal habitats for the TDR option 2 and 3 sections which require temporary widening are mapped in **Figure 5.1 to 5.3.** The habitats are predominantly Arable land and Improved (agricultural) grasslands, with smaller areas of Broadleaf woodland and hedgerows

Figure 5.1 Habitat Map for TDR option 2 and 3 (Exit 12 on M1)

Figure 5.2 Habitat Map for TDR option 2 and 3 (L2254/ R132)

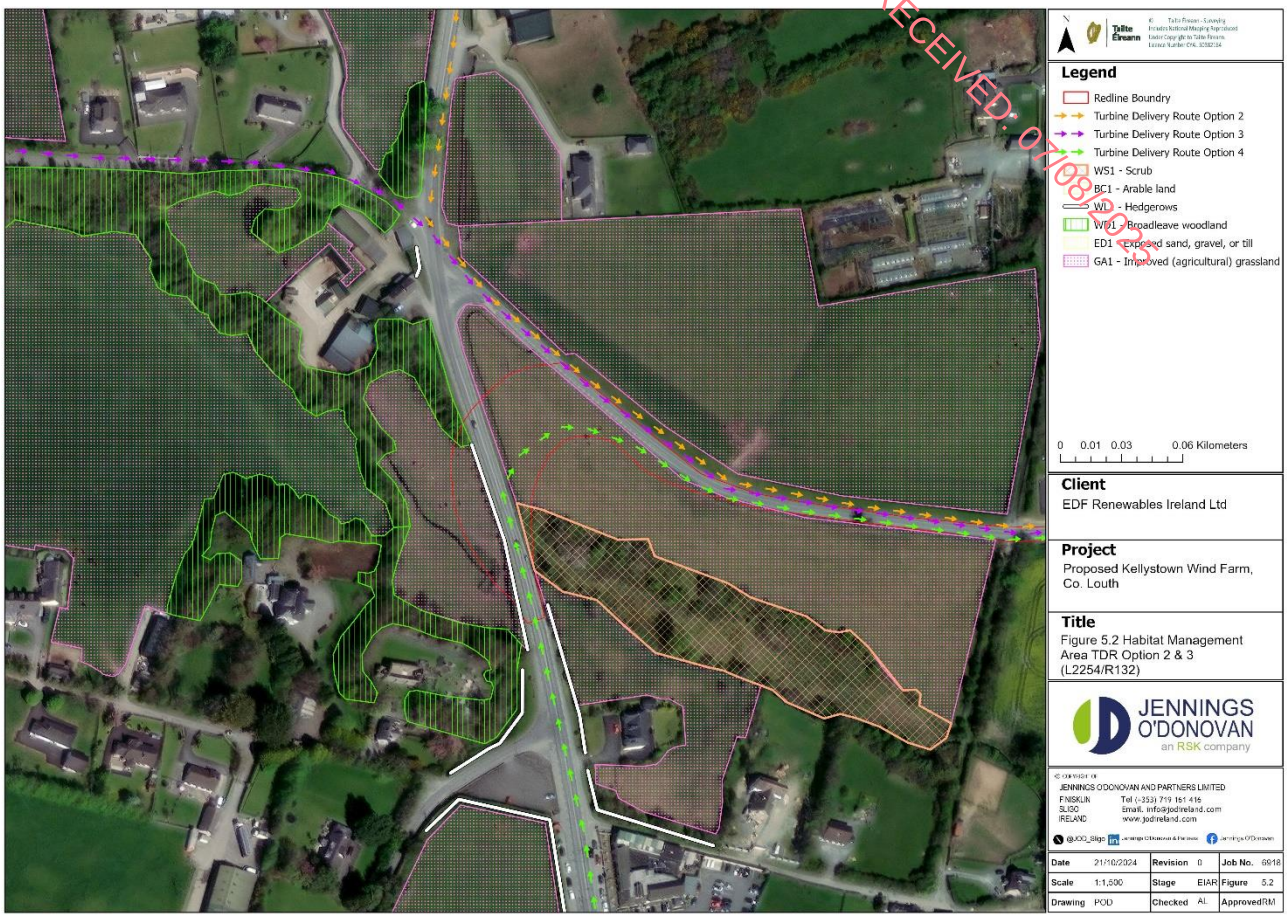


Figure 5.3 Habitat Map for TDR option 2 and 3 (R169/ R132)

For GCR option 2, all sections of the route outside of the Wind Farm Site are within the public road corridor. This has a Fossit classification code BL3 - Buildings and artificial surfaces. BL3 Buildings and artificial surfaces, hold no ecological value as they are highly artificial. GCR option 2 will cross the M1 and 5 no. watercourses using HDD method.

The GCR route follows the regional R132 road and other local roads, as described in section 3.2.1. All of the roads are characterised by ribbon residences, farm complexes and some commercial premises. The regional road generally has wide grassy verges to both sides and is lined with hedgerows and treelines. Ash and sycamore, with beech to a lesser extent, are the principal tall tree species. The main hedge forming species are hawthorn, blackthorn, and elder.

As with the regional road, the local roads have grassy verges though these are often narrow (<1 m). The verges are generally dominated by grassy vegetation with cock's-foot *Dactylis glomerata* and Yorkshire fog *Holcus lanatus* dominating. Other frequent species in the grassy

vegetation include common nettle *Urtica dioica*, meadowsweet *Filipendula ulmaria*, wild angelica *Angelica sylvestris* and creeping buttercup *Ranunculus repens*.

The hedging along the local roads is mostly maintained at a low level 3-4m but with taller trees locally and especially at residences and farm entrances. Hawthorn, blackthorn, and ash are the main species, with a scattering of sycamore, willows, holly, hazel and elder. Brambles *Rubus fruticosus* are frequent within the hedge bases, along with ivy *Hedera helix*.

5.3 ASSESSMENT OF POTENTIAL EFFECTS

5.3.1 The 'Do-Nothing' Impact

Without the development proceeding, GCR option 2 will remain as public road corridors. In the likely evolution scenario, these roads will be upgraded, used to encompass gird connection for other energy project or for enhancing the current grid network. The TDR widening sections are likely to remain as shown in **Figure 5.1** to **5.3** for the near future. Though it is possible that these junctions/ nodes will be widened in the further for road upgrading and haulage purposes.

5.3.2 Potential Impacts on European Conservation Sites

In Section 2.3 of the Natura Impact Statement (NIS), that accompanies this planning application, the ten identified European sites are considered for the potential of the proposed Project to impact on their qualifying interests and/or Special Conservation Interests. These sites are:

- Clogher Head SAC (code 001459)
- Boyne Coast and Estuary SAC (code 001957)
- River Boyne and River Blackwater SAC (code 002299)
- Dundalk Bay SAC (code 000455)
- Stabannan-Braganstown SPA (code 004091)
- Dundalk Bay SPA (code 004026)
- North-West Irish Sea SPA (code 004236)
- Boyne Estuary SPA (code 004080)
- River Nanny Estuary and Shore SPA (code 004026)
- River Boyne and River Blackwater SPA (code 004232)

A review of surrounding European sites further than 15 km from the GCR/ TDR options were also considered. No realistic Source-Pathway-Receptor chain for significant effect was identified for any European Site that was further than 15 km from the GCR/ TDR options.

In **Table 5.1** of this document, the ten European sites are re-assessed to consider any additional hydrological connectivity (due to the GCR option 2 and TDR option 2 and 3), that may impact on their qualifying interests (QIs) and/or Special Conservation Interests (SCIs). In this table, the distance from GCR/TDR options and the European sites are given along with a summary of their hydrological connectivity with SPA/SAC. The conclusion drawn on the connectivity between the designated site and the Project from the NIS section 2.3 is also included in this table.

Findings show that for the SPA/SAC sites where there was no hydrological connection between the proposed TDR and/or proposed GCR and the European sites, consideration of GCR options and/or TDR options did not change this outcome. On this basis, it can be concluded that the impact consideration on the European sites outlined in chapter 6 are unaffected by the GCR option 2 and/or TDR option 2 and 3.

Table 5.1 Distance from GCR/TDR options and summary of hydrological connectivity with SPA/SAC

European Site SAC/SPA	Distance from GCR/TDR options and summary of hydrological connectivity with SPA/SAC
Special Areas of Conservation	
Clogher Head SAC (site code 001459)	This SAC lies: 11.4km west of the new section of GCR option 2 (section that differs from the Proposed GCR) and 7.2 km west of nearest point of GCR option 2/ Proposed GCR, 11.7km west of the TDR option 2 (nearest widening works) and 10.7km west of the from TDR option 3 (nearest widening works). No parts of the GCR and TDR options cross watercourses that flow to the Clogher Head SAC. As such, it is concluded that there is no connectivity between the GCR option 2 and TDR options 2 and 3 and the SAC. On assessment of the QIs/ SCIs within the NIS and/or Chapter 6, it was concluded that there is no connectivity between the Project area and the SAC.
Boyne Coast and Estuary SAC (site code: 001957)	This SAC lies: 5.1km southeast of the new section of GCR option 2 (section that differs from the Proposed GCR) and 4.6km southeast of nearest point of GCR option 2/ / Proposed GCR, 12.7 km southeast of TDR option 2 (nearest widening works) and 12.8 km southeast of TDR option 3 (nearest widening works). The GCR and TDR options cross watercourses that flow to the Termonfeckin Stream and the SAC. As such, it is concluded that there is hydrological connectivity between the GCR option 2 and TDR options 2 and 3 and the SAC.

European Site SAC/SPA	Distance from GCR/TDR options and summary of hydrological connectivity with SPA/SAC
	Within the NIS and/or Chapter 6, it is also concluded that there is hydrological connectivity between the Project area and the SAC.
River Boyne and River Blackwater SAC (site code: 002299)	This SAC lies: 1.4km south of GCR option 2 (new section) 164m south of nearest point of GCR option 2 (same for Proposed GCR), 9.6 km south of the TDR option 2 (nearest widening works) and 9.5 km south of the from TDR option 3 (nearest widening works). However, parts of the GCR and TDR options cross watercourses that flow to the River Boyne and the SAC. As such, it is concluded that there is hydrological connectivity between the GCR option 2 and TDR options 2 and 3 and the SAC. Within the NIS and/or Chapter 6, it is also concluded that there is hydrological connectivity between the Project area and the SAC via the proposed GCR and the proposed TDR.
Dundalk Bay SAC (site code: 000455)	This SAC lies: 15.9 km northeast of GCR option 2 (new section) 10.6km northeast of nearest point of GCR option 2 (same for Proposed GCR), 7.7 km northeast of the TDR option 2 (nearest widening works) and 7.8 km northeast of the TDR option 3 (nearest widening works). Part of the TDR options 2 and 3 cross watercourses that are within the River Dee catchment. As such, it is concluded that there is hydrological connectivity between TDR options 2 and 3 and the SAC. Within the NIS and/or Chapter 6, it is also concluded that there is hydrological connectivity between the Project area and the SAC.
Special Protection Areas	
Stabannan-Braganstown SPA(site code: 004091)	This SAC lies: 16.1 km north of GCR option 2 (new section) 12.3 northeast of nearest point of GCR option 2 (same for Proposed GCR), 6.5 km northeast of the TDR option 2 (nearest widening works) and 6.6 km northeast of the TDR option 3 (nearest widening works). No parts of the GCR and TDR options cross watercourses that flow to the Stabannan-Braganstown SPA. As such, it is concluded that there is no hydrological connectivity between the GCR option 2/ TDR options 2 and 3 and the SPA. On assessment of the QIs/ SCIs within the NIS and/or Chapter 6, it is concluded that there is no connectivity between the Project area and the SPA.
Dundalk Bay SPA (site code: 004026)	This SAC lies: 15.9 km north of GCR option 2 (new section) 10.6km north of nearest point of GCR option 2 (same for Proposed GCR), 7.7 km north of the TDR option 2 (nearest widening works) and 7.8 km north of the TDR option 3 (nearest widening works). Parts of the TDR options 2 and 3 cross watercourses that flow to the Dundalk Bay SPA. As such, it is concluded that there is hydrological connectivity between the GCR option 2/ TDR options 2 and 3 and the SAC.

European Site SAC/SPA	Distance from GCR/TDR options and summary of hydrological connectivity with SPA/SAC
	On assessment of the QIs/ SCIs within the NIS and/or Chapter 6, it is concluded that there is likely connectivity between the SPA and the site for the Proposed Development.
North-West Irish Sea SPA (site code: 004236)	This SPA lies: 8.7km east of GCR option 2 (new section) 6.3km east of nearest point of GCR option 2 (same for Proposed GCR), 8.9km east of TDR option 2 (nearest widening works) and 8.9km east of TDR option 3 (nearest widening works). No parts of the GCR and TDR options cross watercourses that flow to the North-West Irish Sea SPA. As such, it is concluded that there is no direct hydrological connectivity between the GCR option 2/ TDR options 2 and 3 and the SPA. On assessment of the QIs/ SCIs within the NIS and/or Chapter 6, it is concluded that there is likely ornithological connectivity namely, namely black-head gull, common gull and herring gull between the SPA and the site for the Proposed Development.
Boyne Estuary SPA (site code: 004080)	This SPA lies: 4.2km southeast of GCR option 2 (new section) 3.6km southeast of nearest point of GCR option 2 (same for Proposed GCR), 12.6 km southeast of TDR option 2 (nearest widening works) and 12.5 km southeast of TDR option 3 (nearest widening works). No parts of the GCR and TDR options cross watercourses that flow to the Boyne Estuary SPA. As such, it is concluded that there is no direct hydrological connectivity between the GCR option 2/ TDR options 2 and 3 and the SAC. On assessment of the QIs/ SCIs within the NIS and/or Chapter 6, it is concluded that there is no connectivity or potential for the proposed Project to have effects on any of the SCIs of the SPA.
River Nanny Estuary and Shore SPA (site code: 004158)	This SPA lies: 10.1km southeast of GCR option 2 (new section) 9.5km southeast of nearest point of GCR option 2 (same for Proposed GCR), 18.4 km southeast of TDR option 2 (nearest widening works) and 18.4 km southeast of TDR option 3 (nearest widening works). Part of the TDR options 2 and 3 cross watercourses that flow to the River Nanny Estuary and Shore SPA. As such, it is concluded that there is hydrological connectivity between the GCR option 2/ TDR options 2 and 3 and the SPA. On assessment of the QIs/ SCIs within the NIS and/or Chapter 6, it is concluded that there is connectivity between the SPA and the site for the Proposed Development.
River Boyne and River Blackwater SPA (site code: 004232)	This SPA lies: 1.6km southeast of GCR option 2 (new section) 700km southeast of nearest point of GCR option 2 (same for Proposed GCR), 10.6 km southeast of TDR option 2 (nearest widening works) and

European Site SAC/SPA	Distance from GCR/TDR options and summary of hydrological connectivity with SPA/SAC
	10.6 km southeast of TDR option 3 (nearest widening works). While the route for the GCR option 2 is close to the River Boyne, all stream crossings are downstream of the SPA, i.e. east of M1 bridge. The TDR will pass the boundary of the SPA along the M1. As such, it can be concluded that there is no direct hydrological connectivity, as no parts of the GCR option 2 or TDR options 2 and 3 cross watercourses that flow to the River Boyne and River Blackwater SPA. On assessment of the QIs/ SCIs within the NIS and/or Chapter 6, it is concluded that there is no connectivity or potential for effects on the kingfisher population within the SPA as a result of the Project.

5.3.3 Potential Impacts on National Conservation Sites

5.3.3.1 Natural Heritage Areas

There are no Natural Heritage Areas (NHAs) within the zone of influence of GCR option 2 and /or TDR option 2 and 3.

5.3.4 Impacts on Habitats, Vegetation and Flora

The construction of the GCR/ TDR options will result in the following impacts on terrestrial habitats and flora:

- temporary loss of habitat (TDR options only)
- temporary disturbance to habitats

5.3.4.1 Temporary loss of habitat

To facilitate the delivery of the turbine components, temporary widening works are required along 4 junctions/nodes of the TDR option 2 and 3 junctions/nodes of the TDR option 3 (as outlined in **Table 4** and **5** of this document). Most of these works require street furniture removal or vegetation clearance. Vegetation clearance will be limited to land that is predominantly classed as Arable land and Improved (agricultural) grasslands. One widening section (Junction L2254 and R132 - Mullary Cross junction), common to both TDR option 2 and option 3, some hedgerow clearance is required. This junction is also the junction that will require non-temporary works for the proposed TDR.

To compensate for any hedgerow loss, the re-planting of 0.18 hectares of hedgerow north of T05 in the south west section of the site, will more than compensate for any temporary habitat loss for the proposed TDR and for the TDR options 2 and 3. Refer to the Biodiversity and Enhancement Plan, Appendix 6.1 for details. Furthermore, any removed hedging due to

temporary widening TDR option 2 and option 3 will later be replaced along the junction/nodes requiring temporary widening.

While the hedgerows removed temporarily will be replaced, it is considered that the new plantings will take up to ten years or more to develop structure and diversity comparable to the hedging being removed. The significance of the loss of hedgerows along the Turbine Delivery Routes are rated same impact as a Slight Adverse Effect of Medium-term Duration at a Local level of importance. In the long-term (>15 years), this effect is likely to become Neutral.

5.3.4.2 Disturbance to habitats along the GCR

The laying of the Grid Connection cable will cause localised disturbance to marginal vegetation alongside the roads due to trenching works and use of plant machinery. The amount of disturbance would vary depending on the exact line of the trench but may affect grassy verges and roadside banks or ditches. However, hedging or trees are not expected to be removed to facilitate the cable laying works, there are no habitats of significant ecological interest alongside the roads whether it is the Proposed GCR or GCR option 2. After the trenching works are complete and the roadside strips re-instated, full recovery of the marginal vegetation is likely to take place within 1-2 years. The effect of disturbance to roadside habitats is rated as **Not Significant**.

5.3.4.3 Disturbance to habitats along Turbine Delivery Routes

As noted, hedging will be required to be temporarily removed, as outlined in section 5.3.4.1, to facilitate the passing of the transport vehicles. The impact of this work is rated as **Not Significant**. In addition, the pruning back of branches of overhanging trees will be required along sections of the route. The effect of pruning back of branches is generally **Not Significant**, though seasonal mitigation will apply for breeding birds.

5.4 CUMULATIVE EFFECTS

All large projects within 20 km of the Proposed Development in the planning stage or operational stage (**Appendix 2.4:** List of Projects for Cumulative Assessment) have been rigorously assessed for environmental and ecological effects and where such effects are identified, mitigation has been incorporated into the design and planning process. Refer to cumulative impacts section 6.6, **Chapter 6**. Specifically in relation to GCR option 2, permitted planning application: 2360388, granted with conditions on 17/06/2024 by Louth County Council) is discussed in this section.

Planning permission has been granted with conditions (Planning Application: 2360388) to develop a new Advanced Building Solution consisting of office and light industrial/production spaces, at the IDA Drogheda North Business Park, Mell, Drogheda, Co. Louth (c. 4,650m²) with associated car parking, site services, landscaping, underground water storage tank, independent ESB substation. The carpark and service yard entrance to this IDA development will be accessed from the L6323. A section of the GCR option 2 (approximately 950m) lies within L6323 and will therefore will in close proximity to the permitted IDA development. The substation for the IDA development is located to the back of the development, setback approximately 140m from the L6323. Conditional approval of this development from Louth County Council, stipulates archaeological input, noise and dust monitoring, site landscape plan, environmental management to ensure adherence of the proposed mitigations outlined in the NIS, and adherence to surface water and storm water disposal guidelines.

The cumulative effects from works on GCR option 2 could include environmental degradation. Strict monitoring and control measures are necessary to ensure compliance with regulations and mitigate negative impacts on the surrounding area's amenity and well-being. However, given the brevity of the works on the GCR, management of the timing of the construction works will avoid any cumulative effects.

L6323 is a short road of approximately 950m. Cable laying and trenching will typically move along the grid route at a rate of 100 to 200 m per day. There is one potential Horizontal Directional Drilling (HDD) crossing on L6323 for GCR option 2. The activity works associated HDD is typically 3-5 days. As such, the GCR works on the L6323 is expected to be completed within 3 weeks.

Furthermore, the L6323 has road access from each side; accessed from the east end via the R132 and accessed from the west end via the L6322. The permitted IDA development site is located on the northside of the east end of the L6323 and is approximately 200m in length. Works on the GCR route (GCR option 2) is expected to move along the L6323 at a rate of approximately 100 to 200 m per day, therefore, clearing the permitted IDA site in less than 3 days (at the lower rate of movement). The potential HDD location is a further 400m west of the permitted IDA development.

Potential cumulative effects from noise, dust and traffic disruption will be mitigated against by management of the timing of construction works. Furthermore, co-ordination between the two sites (Permitted IDA development and the Proposed Wind Farm Site) may result in

streamlining of L6323 road opening, reducing the effects from noise, dust and traffic and reducing the use of materials associated with of a second road opening.

The Project utilizing the GCR option 2, with mitigation measures in place, will not be likely to result in any significant effect on terrestrial ecological interests in the project area or in the wider area. It will not contribute to any possible cumulative impact when considered with the various other projects within a 20 km radius.

The Project utilizing the TDR options, with mitigation measures in place, will not be likely to result in any significant effect on terrestrial ecological interests in the project area or in the wider area. It will not contribute to any possible cumulative impact when considered with the various other projects within a 20 km radius.

5.5 MITIGATION MEASURES AND RESIDUAL EFFECTS

The same mitigation measures that are identified in **Chapter 6: Biodiversity**, **Section 6.5** Mitigation Measures will be implemented. No additional mitigation measures are required as a result of the use of GCR Option 2 or TDR Option 2 or TDR Option 3.

5.6 STATEMENT OF SIGNIFIANCE

With the implementation of mitigation through avoidance principles, pollution control measures, surface water drainage measures and other preventative measures which have been incorporated into the project design and into the construction, operational and decommissioning phases, in order to minimise potential significant adverse impacts on water quality within the zone of influence of the Project, it can be concluded that the Project will no significant Impact to any European or National designated site.

With the implementation of the Biodiversity and Enhancement Plan, it is considered that the terrestrial ecological interests of the Site will increase during the operational phase of the Proposed Development, i.e. likely **long-term, positive effect**.

6 AQUATIC ECOLOGY

6.1 INTRODUCTION

This section contains the additional survey work carried out by Woodrow Sustainable Developments Ltd for the assessment of the GCR option 2 and the TDR option 2 and 3 to the proposed Kellystown Wind Farm Development Site.

6.2 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

6.2.1 Assessment Methodology Aquatic Biodiversity

The ecological assessment was carried out in accordance with the guidance for EIA, as described in Chapter 1 of the EIAR and in the guidelines for ecological impact assessment produced by the Chartered Institute of Ecology and Environmental Management: Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018).

The importance of an ecological feature should be considered within a defined geographical context (CIEEM 2018). The following frame of reference has been used in this case, relying on known / published accounts of distribution and rarity where available, and professional judgement:

- International (European)
- National (Ireland)
- Regional (Leinster)
- County (Louth)
- Local Upper Importance - Townland (Ardee)
- Local Lower Importance - Intermediate between the Site and Townland
- Site ("the Site")

The above frame of reference is applied to the ecological features identified during the desk study and surveys to inform this report.

In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Examples of relevant lists and criteria include:

- Species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive or Annex 1 of the Birds Directive)
- Species protected under the Wildlife Acts 1976 - 2021
- Red List of Mammals

The approach to impact assessment, as set out in CIEEM (2018) guidelines, only requires that ecological features (habitats, species, ecosystems and their functions/processes) that are considered to be important and potentially affected by the Development are carried forward to detailed assessment. It is not necessary to carry out detailed assessment of receptors that are sufficiently widespread, unthreatened and resilient to impacts from the

Project and will remain viable and sustainable. Therefore, for the purposes of this report, only ecological features of Local importance or greater and/or subject to legal protection have been subject to detailed assessment.

The Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines define a significant effect as, "an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features'...or for biodiversity in general". The criteria used for **Assessing Impact Significance (EPA, 2022)** range from 'no change to 'Profound Impact' as outlined in Table 9-1 of **chapter 9**.

6.2.2 Study area – turbine delivery and grid connection routes

The study area for the GCR option 2 and the TDR option 2 and 3 is based on river crossings and other water bodies along the proposed routes. The route options all follow existing roads.

There is a single turbine delivery haul route from Galway port to the M1 junction 10 (route 1), following established motorways, and this is assumed to be unaffected by the vehicle movements and not assessed. Once close to the site there are three feasible TDR route options. The TDR route options in the vicinity of the site are described in section 1.2.2. For the proposed TDR and TDR option 2 and 3, the waterbody crossings and the ecological status of these waterbodies are shown in **Table 6.5**, **Table 6.6** and **Table 6.7** below.

The difference in the GCR options (Proposed GCR and GCR option 2) are described and shown in section 1.2.1. For the proposed GCR and GCR option 2, the waterbody crossings and the ecological status of these waterbodies are shown in **Table 6.3** and **Table 6.4.** below.

6.2.3 Desk Study Methods

A desk study was carried out to collate the available existing ecological information on the selected study area. The study area, the Site and the surrounding landscape were viewed using available aerial imagery[3]. The desk study aimed to identify records of protected or notable habitats and species that may potentially be affected by the proposed works. Cumulative impacts and impacts of the GCR option 2 and the TDR option 2 and 3 were considered via a desk study.

Inland Fisheries Ireland (IFI)[4] data centre website was accessed for information on fisheries data. Other online sources available from Agency (EPA)[5], geological survey of Ireland[6] and Office of Public Works (OPW)[7] were accessed for other environmental information, such as surface water features, flood data and catchment details relevant to the preparation of this report.

Only records for the past 10 years are included within this report as older records are unlikely to still be relevant given their age and possibility of changes in land management that may have occurred in the intervening period.

The absence of rare or protected species from the NPWS and NBDC databases does not necessarily imply that it does not occur within the area, rather it has not formally been recorded as present. Similarly, the presence of a recent record within the study area does not imply it is present within the Site, rather it is known to be present within the study area chosen for desk study.

The previous aquatic ecology report carried out for the project was also reviewed during the desktop survey (APEM 2023).

Within this document only surveys and findings applicable specifically to the GCR and TDR options are discussed and presented. Refer to **Chapter 9** section 9.2.1.1 for the impact assessment methodology and **Chapter 9** section 9.2.5 for Field Survey Methods.

[3] https://earth.google.com/web (Accessed 23/10/2024)
[5] https://opendata-ifigis.hub.arcgis.com/ (Accessed 23/10/2024)
[6] https://gis.epa.ie/EPAMaps/ and www.catchments.ie/data/ (Accessed 23/10/2024)
[7] www.gsi.ie (Accessed 23/10/2024)
[8] www.floodinfo.ie - www.waterlevel.ie - www.opw.ie/hydro-data (Accessed 23/10/2024)

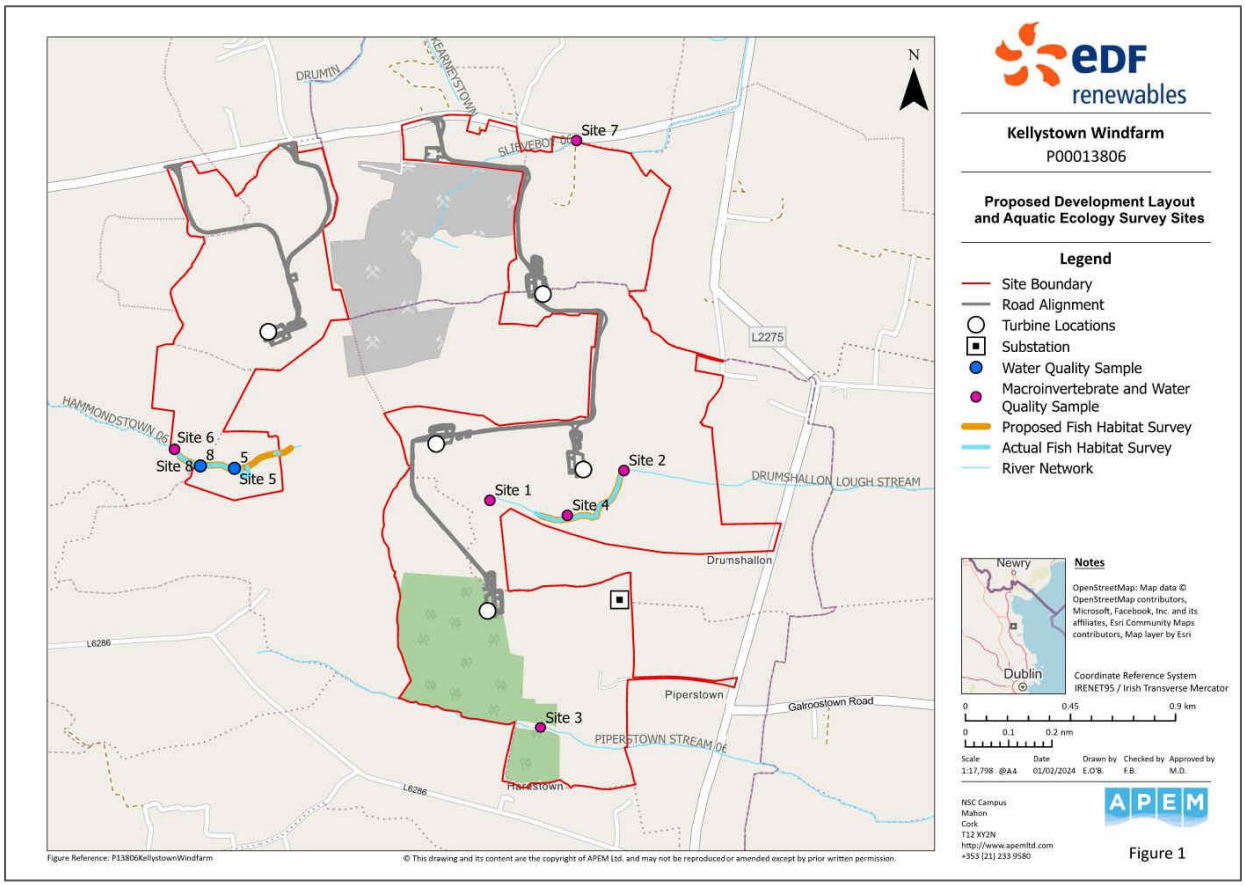
6.2.4 Field Survey

The methodology for aquatic survey assessment of the Kellystown Wind farm Site is described below. Full details are provided in the Technical Appendix (APEM, 2023).

Surveys at the seven aquatic sampling points were carried out during June 2023 as follows:

- Water quality physio-chemical measurements including water samples;
- A macroinvertebrate survey and associated Q-value rating of streams within the Site;
- A macroinvertebrate survey of the small lake within the Site at sample Site 1; and,
- Fish habitat walkover surveys in order to identify suitable habitat for the key fish species and life stages of importance.

Figure 6.1 Kellystown Site Layout and Aquatic Ecology Survey Sites



Water quality Sampling site 5 and 8 and Macroinvertebrate & Water quality Sampling site 6 (**Figure 6.1**) are located c. 2km upstream of crossing point 12 (HAMMONDSTOWN 06) on the proposed TDR route and c. 5.8km upstream of crossing point 13 (WHITE_LOUTH) on TDR option 2 and 3.

6.2.4.1 Fish Habitat Survey Methods

Fish habitat walkover surveys were conducted to identify suitable habitat for the key fish species and life stages of importance. These took place along reaches of Drumshallon Lough Stream and Hammondstown Stream. Walkover habitat surveys were conducted on 20 June 2023. Weather conditions were dry and sunny with c. 40% cloud cover, light wind, air temperature 21 °C. The river flow at this time was considered low and therefore allowed for good visibility during habitat surveys. The methodology applied to the habitat survey follows Hendry & Cragg-Hine (1997). Invasive species were noted where present.

6.3 BASELINE DESCRIPTION

6.3.1 Desk Study

Inland Fisheries Ireland (IFI) electrofishing data is available for the White (Louth) catchment, of which the Hammondstown Stream is part. The closest IFI electrofishing point is c.5km downstream of the fish habitat survey site on the Hammondstown Stream. There are further data available c.8.5km downstream of this point. The available data is summarised in **Table 6.1 and Table 6.2.** The White (Louth) River was assigned a fish ecological status of moderate in 2017 (Matson et al. 2018).

Records of species that undertake migratory movements through and / or take residency in freshwater habitats were returned from the desk study. This includes lamprey species (*Lampetra* sp.), Atlantic salmon (*Salmo salar*) and European eel (*Anguilla anguilla*).

European eel are classified as 'critically endangered' while lamprey are classified as 'near threatened' in 'Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish' (King et al., 2011). All three of Ireland's lamprey species are protected under Annex II of the EU habitats directive, with River Lamprey classified under Annex II and Annex V. Salmon (in freshwater) is listed on Annexes II and V of the EU Habitats Directive, and is listed as "Vulnerable," on the King et al. (2011) Red list.

Table 6.1: IFI Electrofishing Data for White (Louth) River, c.5km Downstream of Hammondstown Stream Fish Habitat Surveys

Year	Brown trout	European eel	Lamprey Sp.	Minnow	Salmon	Stone loach	Three-spined stickleback
2013	✓	✓		✓		✓	✓
2014	✓			✓		✓	✓
2015	✓			✓		✓	✓
2016	✓			✓		✓	✓

Table 6.2: IFI Electrofishing Data for White (Louth) River, ca 8.5 km Downstream of Hammondstown Stream Fish Habitat Surveys

Year	Brown trout	European eel	Lamprey Sp.	Minnow	Salmon	Stone loach	Three-spined stickleback
2013	✓	✓	✓	✓	✓	✓	✓
2014	✓	✓	✓	✓	✓	✓	
2015	✓	✓		✓	✓	✓	✓
2016	✓			✓	✓	✓	✓

No fish species were returned for the NBDC desk search of grid squares O08 and O18. Likewise, no records of white clawed crayfish (*Austropotamobius pallipes*) were returned from NBDC squares O08 and O18.

The EPA Appropriate Assessment tool and the NPWS Margaritifera Sensitive Area map[8] Version 8, 2017 last updated 10/09/2021) were consulted during the desk study. The site is not located in a freshwater pearl mussel sensitive catchment and there is no surface water connectivity between the Project site and any Margaritifera catchment.

Rivers crossed or adjacent to the GCR and TDR options are listed in **Table 6.3 to Table 6.2.** There is little or no ecological quality data available for each of these rivers individually, so a summary of the Water Framework Directive (WFD) status of each of the water bodies in which they are situated is also provided in Table 6.3 to Table 6.6. Fisheries data are only available for the White (Louth) catchment on the IFI portal, and these have been reported

[8] NPWS.maps.arcgis.MargaritiferaSensitiveAreas (last accessed 23/10/2024)

above. All of the rivers other than the Mattock are classified as Moderate or Poor WFD status. No sensitive receptor species were identified from these catchments, other than the fish described above.

Figure 6.2 TDR and GCR options, showing water body crossings

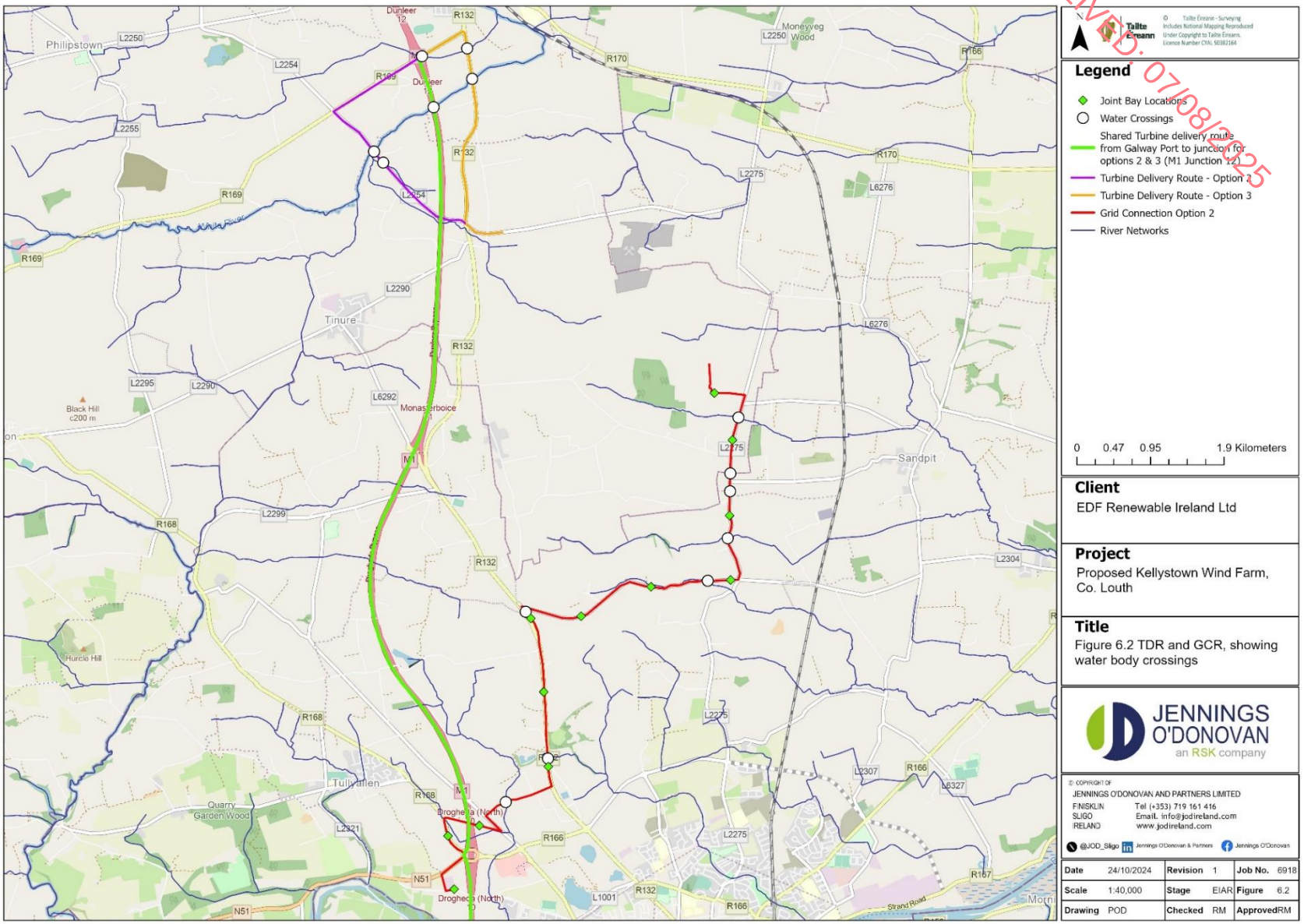


Table 6.3: Waterbodies affected and their ecological status for the Proposed GCR

River Name	River waterbody code	EPA code	Nature of interaction	WFD Water body name	WFD status	Q-value (and survey year)	Assessment Technique
Hill of Rath	IE_EA_07T270880	07H19	River crossing via existing culvert	Tullyeskar_010	Moderate	N/A	Modelling
Hill of Rath	IE_EA_07T270880	07H19		Tullyeskar_010	Moderate	N/A	Modelling
Mell	IE_EA_07T270880	07M53	River crossing via existing culvert	Tullyeskar_010	Moderate	N/A	Modelling
Twenties 07	IE_EA_07T270880	07T29	River crossing in headwaters via existing culvert	Tullyeskar_010	Moderate	N/A	Modelling
Undesignated stream	IE_EA_07T270880		Runs alongside for 2 km. River crossing via existing culvert	Tullyeskar_010	Moderate	N/A	Modelling
Ballymakenny Branch	IE_NB_06T010400	06B04	River crossing via existing culvert	Termonfeckin_020	Moderate	3 (Poor) - 1997	Monitoring
Piperstown Stream 06	IE_NB_06T010250	06P02	River crossing via existing culvert	Termonfeckin_010	Poor	3 (Poor) - 1978	Monitoring

Table 6.4: Waterbodies affected and their ecological status for Grid Option 2

River Name	River waterbody code	EPA code	Nature of interaction	WFD Water body name	WFD status	Q value (and survey year)	Assessment Technique
Hill of Rath	IE_EA_07T270880	07H19	River crossing via existing culvert	Tullyeskar_010	Moderate	N/A	Modelling
Mell	IE_EA_07T270880	07M53	River crossing via existing culvert	Tullyeskar_010	Moderate	N/A	Modelling
Twenties 07	IE_EA_07T270880	07T29	River crossing in headwaters via existing culvert	Tullyeskar_010	Moderate	N/A	Modelling
Undesignated stream	IE_EA_07T270880		Runs alongside for 2 km. River crossing via existing culvert	Tullyeskar_010	Moderate	N/A	Modelling
Ballymakenny Branch	IE_NB_06T010400	06B04	River crossing via existing culvert	Termonfeckin_020	Moderate	3 (Poor) - 1997	Monitoring
Piperstown Stream 06	IE_NB_06T010250	06P02	River crossing via existing culvert	Termonfeckin_010	Poor	3 (Poor) - 1978	Monitoring

Table 6.5: Waterbodies affected and their ecological status for TDR Option 2

River Name	River waterbody code	EPA code	Nature of interaction	WFD Water body name	WFD status	Q-value (and survey year)	Assessment Technique
White (Louth)	IE_NB_06W010400	06W01	River crossing via existing culvert (R132)	White (Louth)	Moderate	Good (2020 – New Br) Moderate (2018 – Athclare Br)	Monitoring
Athclare	IE_NB_06W010400	06A16	Runs alongside for <0.1 km in ditch. River crossing via existing culvert (R132)	White (Louth)	Moderate	Good (2020 – New Br) Moderate (2018 – Athclare Br)	Monitoring
Athclare	IE_NB_06W010400	06A16	Description required (R169)	White (Louth)	Moderate	Good (2020 – New Br) Moderate (2018 – Athclare Br)	Monitoring

Table 6.6: Waterbodies affected and their ecological status for TDR Option 3

River Name	Crossing Point	River waterbody code	EPA code	Nature of interaction	WFD Water body name	WFD status	Q-value (and survey year)	Assessment Technique
White (Louth)	16	IE_NB_06W010100	06W05	River crossing via existing culvert	White (Louth)	Moderate	Good (2020 – New Br) Moderate (2018 – Athclare Br)	Monitoring
Listulk	17	IE_NB_06W010100	06L17	Runs alongside for 0.5 km in ditch. River crossing via existing culvert	White (Louth)	Moderate	Good (2020 – New Br) Moderate (2018 – Athclare Br)	Monitoring

Table 6.7: Waterbodies affected and their ecological status for the Turbine Delivery Route - Proposed TDR

River Name	River waterbody code	EPA code	Nature of interaction	WFD Water body name	WFD status	Q-value (and survey year)	Assessment Technique
Twenties 07	IE_EA_07T270880	07T29	River crossing in headwaters via existing culvert (R132)	Tullyeskar_010	Moderate	N/A	Modelling
Timullen	IE_EA_07M010220	07T26	River crossing in headwaters via existing culvert (R132)	Mattock_020	Good	N/A	Monitoring
Hammondstown 06	IE_NB_06W010100	06H05	Runs alongside for 0.5 km. River crossing via existing culvert (R132)	White (Louth)	Moderate	Good (2020 – New Br) Moderate (2018 – Athclare Br)	Monitoring

6.3.2 Field Survey

For the field survey results of the water quality, macroinvertebrates, fish habitats and invasive species see **Chapter 9:** Aquatic Ecoogy, section 9.3.2.

6.4 TURBINE DELIVERY AND GRID CONNECTION ROUTES

While there are some temporary works required on the TDR route (as outlined in section 1.2.2), including vegetation removal at corners, all river crossings are on straight sections of road where no alterations are anticipated. The assessment has identified the following measures to adhere to.

a) No other alterations to the road, road furniture or adjacent vegetation is required in the vicinity of river crossings.

b) Vehicles are in good condition and no fuel spills occur of the roads in the vicinity of river crossings.

c) There is no extra run off into rivers as a consequence of the vehicle passage.

If the above is adhered to then no impacts are anticipated.

Non-temporary road widening works are required on the Proposed TDR route to enable passage round the corner where road L6274 joins the R132 where travelling in a north direction along the R132. This construction will be close to the Hammondstown 06 river crossing, requiring appropriate mitigation to avoid runoff into the river.

TDR option 2 and 3 also require widening works on this junction, where road L6274 joins the R132 (travelling in a south direction along the R132). Travelling south along the R132, the turn onto the L6274 is less severe, works are of a temporary nature and are limited to vegetation clearance, and then the works will be further away from Hammondstown 06 river (approximately 100m distance) then the Proposed TDR.

The GCR options would each require excavation into the roads along which they pass. Therefore, the river crossings have been assessed to determine whether there are any sensitive receptors that could be negatively affected in the absence of appropriate mitigation. As shown in Table 6.3 and 6.4, there is seven (no. 7) watercourse crossing for the Proposed GCR and six (no.6) crossing for the GCR option 2. The cable trench is to be 1.22 m deep. It is assumed that the current road depths at bridge and culvert crossing points are adequate to accommodate this and that no tunnelling is required under any rivers. Joint bays and Communication chambers require construction of a larger chamber (see Section 2.6.13.1 in Chapter 2 of the EIAR); these should not be situated on or immediately adjacent to rivers or river crossings, to minimise runoff risks during construction.

HDD will be employed under the M1 motorway (see Section 2.6.13.4 in Chapter 2 of the EIAR). This is at least 200 m from the nearest watercourse (Hill of Rath), and appropriate management of runoff (including the proposed silt fencing and placement of spoil at a suitable distance) will avoid any impacts on the river. Another HDD crossing is likely to be required for crossing underneath the order 2 Mell river on the L6323.

6.5 ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS

The project may result in emission to water and/ or disturbance to aquatic habitats downstream of the Site, which is important given the presence of lamprey and salmon in historical records downstream of the Site. Although the surveys did not record suitable salmonid or lamprey habitats within the site boundary, there is the potential for species to be present within the site and given the presence of lamprey and salmon in historical records downstream of the Site, indirect effects on these species are possible but unlikely. Protected species may also be present on Site, and direct impacts to these species such are possible. For Assessment of Potential Environmental Effects of the Project, See **Chapter 9**: Aquatic Ecology, section 9.5

6.5.1.1 TDR Routes

For the TDR Option 2 and TDR Option 3 all river crossings are on straight sections of road where no alterations are anticipated. Therefore, no impacts are anticipated. Appropriate mitigations measures are outlined in section 9.6 of Chapter 9.

6.5.1.2 GCR Routes

No impacts along the GCR Option 2 are anticipated. Appropriate mitigations measures are outlined in section 9.6 of Chapter 9 and GCR Construction Requirements and Potential Effects are outlined in **Table 6.8**.

Table 6.8 GCR Construction Requirements and Potential Effects.

Route option number	Construction requirement	Linked construction activity	Type of impact	Mitigation required
GCR option 2	Road excavation	• Ground disturbance • Suspended solids • Dust release • Construction of watercourse crossings (via existing bridges and culverts)	Direct	Yes
	Horizontal directional drilling works		Indirect	Yes
	Construction of Joint bays and Communication chambers		Indirect	Yes

Overall, direct effects upon fish and fish habitat during the construction phase are considered to have the potential to be **Significant Negative** and **Temporary** (less than 1 year)[9] at **County** scale in the **absence of mitigation measures**. The frequency of potential effects are limited to the construction phase and effects are predicted to be reversible.

Overall, indirect effects upon juvenile and spawning lamprey species during the construction phase are considered to have the potential to be **Slight Negative** and **Temporary** (less than 1 years) at a **Townland / Local Lower** scale in the **absence of mitigation measures**. Potential Indirect effects upon salmonid species and habitats is considered to be **Not Significant** and **Temporary** (less than 1 years) at a **Townland / Local Lower** scale in the **absence of mitigation measures**.

The frequency of potential effects are limited to the construction phase and effects are assessed as reversible.

6.6 CUMULATIVE EFFECTS

All large projects within 20 km of the Proposed Development in the planning stage or operational stage (**Appendix 2.4:** List of Projects for Cumulative Assessment) have been rigorously assessed for environmental and ecological effects and where such effects are identified, mitigation has been incorporated into the design and planning process. Addition to the **Chapter 9:** Aquatic Ecology, section 9.7 Cumulative Effects, Planning permission has been granted with conditions (Planning Application: 2360388) to develop a new Advanced Building Solution consisting of office and light industrial/production spaces, at the IDA Drogheda North Business Park, Mell, Drogheda, Co. Louth. The carpark and service yard entrance to this IDA development will be accessed from the L6323. A section of the GCR option 2 (approximately 950m) lies within L6323 and will therefore will in close proximity to the permitted IDA development. However this development is not expected to add to the Cumulative effects on aquatic ecology for the following reasons:

Work on the Grid route is expected to progress at a rate of a minimum of 100m per day, and the HDD location on the L6323 to cross the order 2 Mell river is 400 m west of the boundary of the proposed IDA development. It is expected that gird works on the L6323 will be completed within 3 weeks and that there will be no is no cumulative effect on the river drainage or water quality.

[9] https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf

No likely significant residual aquatic ecological effects are predicted to arise as a result of GCR option 2 or TDR options 2 and 3. The cumulative impact assessment of the Project on Aquatic ecology is set out in full in Chapter 9. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2 and 3. This is due to the temporary nature of the works for the TDR and minor divergence of the GCR. No cumulative effects on Aquatic ecology predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3.

6.7 MITIGATION MEASURES

On review of the Mitigation Measures and residual effects outlined **Chapter 9:** Aquatic Ecology, section 9.6, it can be concluded that irrespective of which TDR option or GCR option is considered, the same Mitigation Measures are sufficient and must be applied.

6.8 STATEMENT OF SIGNIFICANCE

With the proposed mitigation successfully implemented, **No Significant Residual Effects** are predicted upon aquatic ecological features within the zone of influence, from the proposed wind farm development at Kellystown in conjunction with GCR option 2 or TDR option 2 and 3.

7 SOILS AND GEOLOGY

7.1 PROJECT DESCRIPTION

Grid Connection Route:

For GCR option 2, the substation at Kellystown will connect via 12km of underground 38kV cable to the existing Drybridge 110kV Substation located in the townland of Tullyallen, from where it will connect by existing connection to the National Grid.

Turbine Delivery Route:

For TDR option 2 and 3, the turbine nacelles, tower hubs and rotor blades will be delivered to the Proposed Development site from Galway Port, County Galway. From there, they will be transported to the Site via the R339, R865, N6, M6, M4, N4, M50, M1, R169, R132 and L6274.

Watercourse Crossings

There are multiple watercourse crossings along GCR option 2, these are described in **Table 8.1**. The potential effects of works on GCR option 2 are outlined in **Table 8.5.**

There are no watercourse crossing on the TDR widening location for TDR option 2 and 3. The TDR widening at Exit 12 M1 and R169 is close to the Athclare order 2 river but does not

cross it; works will be 15m distance from this watercourse and are limited to vegetation clearance.

7.2 BASELINE DESCRIPTION

7.2.1 Land use

Consultation with Corine (2018) Land Use maps (EPA) indicate the landcover along the GCR Option 2 and parts of the TDR options are primarily classified as 'Pastures' a small section also passes through 'Forest and semi natural areas'.

7.2.2 Bedrock Geology

- The mapped geological formations underlying the alternative GCR and TDR Options 2 and 3
  are Platin Formation, Glaspistol Formation, and Clogherhead Formation (GSI, Bedrock 100k).

7.2.3 Soils and subsoils

- Consultation with available soil maps (OSI Online Database) indicate the soil type along the alternative GCR and TDR Options 2 and 3 vare Clonroche which is described as Fine loamy drift with sillceous stones.

7.3 ASSESSMENT OF POTENTIAL EFFECTS

TDR option 2 and 3 will generally use the existing public roads. However, some widening will be required at acute turns, within third party lands. Additionally, some minor temporary land is proposed through the centre of roundabouts, as described in section 3.2.2 of this report. The effects are considered to be **not significant, temporary and negative** on a very minor scale and reversible.

Grid connection trenches will also be excavated along the grid connection route to Drybridge 110kV Substation in the townland of Tullyallen. The trenches will be predominantly within roads and verges, to a proposed depth of 1.22m, depending on confirmatory investigations. Excavation of road aggregates, topsoil, topsoil, glacial till and bedrock will be required. The trenches will be backfilled using imported granular material. The excavated material will be disposed of offsite as inert landfill or recycled for use elsewhere. The effects associated with excavations for cable trenches are considered to be **not significant, permanent and negative**.

7.4 CUMULATIVE EFFECTS

Cumulative effects of the Development with other developments in the region, relate to the indirect effects that may arise due to the use of public roads as haul routes to bring construction materials to Site and the cumulative effect on the use of natural resources. **Chapter 16:** Traffic and Transport, details the scenarios whereby the materials will be imported onto Site and assess the cumulative effects. There are no anticipated changes to the cumulative effects of the Project on soils and geology due to GCR option 2 and TDR option 2 and 3.

7.5 MITIGATION AND RESIDUAL EFFECTS

On review of the Mitigation Measures and residual effects outlined **Chapter 10:** Soils and Geology, section 10.5, it can be concluded that irrespective of which TDR option or GCR option is considered, the same Mitigation Measures are sufficient and must be applied.

7.6 STATEMENT OF SIGNIFICANCE

Providing the mitigation measures outlined in **Chapter 10**, Section 10.5 are fully implemented and best practice as described in the IWEA and Scottish Best Practice Guidelines is followed on Site, it is expected that effects associated with the development of the wind farm will not be significant Whether the Proposed GCR or GCR Option 2, or the Proposed TDR or TDR Option 2 or TDR Option 3 is used. The CEMP (**Appendix 2.1**) also includes a suitable monitoring programme which will ensure that there is rigid adherence both to the CEMP and to the mitigation measures outlined here during construction, operation and decommissioning of the wind farm.

8 HYDROLOGY & HYDROGEOLOGY

This section contains the additional survey work and hydrological and hydrogeological assessments on GCR option 2 and TDR option 2 and 3. The hydrological and hydrogeological assessments of the Project is reported in Chapter 11.

8.1 INTRODUCTION

This section of the document contains the hydrological and hydrogeological assessment of GCR option 2 and the TDR option 2 and 3. Refer to sections 1.2.1 and 1.2.2 of this document for the description of GCR option 2 and the TDR option 2 and 3.

8.1.1.1 EPA Watercourses

Watercourses encountered along the GCR option 2 and the TDR option 2 and 3, identified by EPA mapping are outlined in **Table 8.1.** The river sub-basin, river sub-catchment, river segment and stream order is also presented in this table.

Table 8.1: EPA Watercourses

Internal Ref & EPA Name / Code	River Sub-Catchment	River Sub-Basin	EPA Code	EPA Segment Code	Stream Order	Applicable elsewhere in Development
GCR option 2						
Piperstown Stream 06 (IE_NB_06T010250)	Burren_SC_010	Termonfeckin_010	06P02	06_172	1	Wind Farm Site, Proposed GCR
Ballymakenny Branch (IE_NB_06T010400)	Burren_SC_010	Termonfeckin_020	06B04	06_379	1	Proposed GCR
N/A/ undesignated (IE_EA_07T270880)	Boyne_SC_130	Tullyeskar_010	-	07_591	1	Proposed GCR
Twenties 07 (IE_EA_07T270880)	Boyne_SC_130	Tullyeskar_010	07T29	07_6	1	Proposed GCR and proposed TDR
Mell (IE_EA_07T270880)	Boyne_SC_130	Tullyeskar_010	07M53	07_1119	2	-
Hall of Rath (IE_EA_07T270880)	Boyne_SC_130	Tullyeskar_010	07H19	07_1124	1	Proposed GCR
TDR option 2 and 3						
White [Louth] (IE_NB_06W010400)	Dee_SC_040	White (Louth)_010	06W01	06_1616	3	-
Athclare (IE_NB_06W010400)	Dee_SC_040	White (Louth)_020	06A16	06_920	2	-
Hammondstown 06 (IE_NB_06W010100)	Dee_SC_040	White (Louth)_010	06H05	06_174	2	-*
Listulk (IE_NB_06W010100)	Dee_SC_040	White (Louth)_010	06L17	06_680	1	-*

Internal Ref & EPA Name / Code	River Sub-Catchment	River Sub-Basin	EPA Code	EPA Segment Code	Stream Order	Applicable elsewhere in Development
Timullen (IE_EA_07M010220)	Boyne_SC_120	Mattock_020	07T26	07_1302	1	-*
Hall of Rath (IE_EA_07T270880)	Boyne_SC_130	Tullyeskar_010	07H19	07_1124	1	-*
Mountaintown (IE_NB_06W010500)	Dee_SC_040	White(Louth)_30	06M20	06_810	3	TDR option 2 only *
Lawlesstown (IE_NB_06D011000)	Dee_SC_040	Dee_080	06L19	06_289	2	TDR option 2 only *
Toberdoney 06 IE_NB_06D011000	Dee_SC_040	Dee_080	06T19	06_269	1	TDR option 2 Only *
Dee IE_NB_06D011000	Dee_SC_040	Dee_080	06D01	06_65	5	TDR option 2 only *

* watercourses included for information purposes only: no works occurring in the vicinity of the water crossing

8.1.2 Regional and Local Hydrology

The GCR option 2 passes through the Boyne_SC_130 and the Burren_SC_010 WFD river sub-catchment. The sub-catchments relevant to the TDR options 2 and 3 are the Boyne_SC_130, Boyne_SC_120, and the Dee_SC_040.

A review of flood areas in the vicinity of the L6323 road and L6322 was carried out (sections of the GCR option 2 that is not part of the proposed GCR). This area was reviewed using National Indicative Fluvial Mapping (NIFM) River Flood Extents (low probability)[10] and NIFM River Flood Extents for High End Future Scenario (HEFS)[11]. NIFM Low Probability flood events have approximately a 1-in-a-1000 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 0.1% and models the extent of land that might be flooded by rivers in a severe flood event. HEFS has an embedded overage of 30% for both extreme depth rainfall and peak flood flows and a mean sea level rise of +1000 mm. Uncertainties in the predicted HEFS flood levels can arise due to uncertainties in topographic, bathymetric and other survey data and in meteorological, rainfall and flow data, assumptions made in the hydraulic / hydrodynamic models.

No areas within road L6323/ L6322 or within a 3.5 km radius are within a NIFM low probability or HEFS zone. For TDR option 2 and 3, two sections of the R132 are within a NIFM low probability and HEFS flood zone; the Athclare order 2 and the White (Louth) order 3. No

[10] OPW national flood information portal https://www.floodinfo.ie/map/floodmaps/ [Accessed 21/10/2024]

[11] Office of Public Works (OPW), National Indicative Fluvial Mapping (NIFM) River Flood Extents - High-End Future Scenario https://data.gov.ie/dataset/nifm-river-flood-extents-high-end-future-scenario [Accessed 26/09/2024]

temporary works occur within these flood zones. There nearest temporary works are located 120m north of the Athclare order 2 HEFS zone, at the R169 and R132 junction.

8.1.3 Surface Water Hydrochemistry

The EPA and local authorities employ the use of National Water Monitoring Stations for the purposes of monitoring and water quality management for compliance with the EU Water Framework Directive. **Table 8.2** below provides the latest data available from the stations nearest downstream from the Site.

Table 8.2: EPA Monitoring Points and Latest Available Q-Values

Station ID	RS06T010350	RS06W010100	RS06T010400
River Waterbody Name	TERMONFECKIN_010	WHITE (LOUTH)_010	TERMONFECKIN_020
Station Name	Sandpit Br.	New Br.	TERMONFECKIN - Br in Termonfeckin
WFD Waterbody Code	IE_NB_06T010250	IE_NB_06W010100	IE_NB_06T010400
Type	RIVER_STATION	RIVER_STATION	RIVER_STATION
Latest Monitoring Year	2020	2020	2020
Latest Status	Poor	Good	Moderate
Latest Q-Value	3	4	3-4
Distance from the Proposed Development Boundary	2.4 km (downstream from the Site)	2.6 km (downstream from the Site)	4.8 km (downstream from the GCR)
Easting	311850.75	304622.92	314005.79
Northing	282079.99	285657.91	280318.85
Local Authority	Louth County Council	Louth County Council	Louth County Council

The project specific water quality assessment is described in full detail in **Chapter 9:** Hydrology and Hydrogeology, section 9.4.8.1.

8.1.4 Wells and Springs

A review of GSI online data and information provided by EPA did not identify groundwater wells and springs that may be affected via a hydrological connection to the Site. Landowners party to the Project provided information regarding 2 no. springs utilised for non-potable usage located within the Site. The nearest well to temporary works on TDR option 2 and 3, is located 250m east of the works required on the Junction L2254 and R132 (outlined in section 1.2.2). This borehole (IE_GSI_GW_Well_21503) is located between two dwellings, is for domestic use and has a 'poor' GSI yield class.

There are no springs or wells within the section of GCR option 2 route that differs from the proposed GCR. This section of GCR option 2 avoid the road in the vicinity of borehole IE_GSI_GW_Well_21721. GSI-mapped springs and wells identified along the GCR coincide

with the Public Supply Source Protection Areas and Zone of Contribution discussed in **Chapter 9:** Hydrology and Hydrogeology, section 8.1.7.

8.1.5 Hydrogeology – Bedrock Aquifer

A review of the available online GSI data indicates the bedrock aquifer underlying the Site is classified as a 'Poor Aquifer (bedrock which is generally unproductive)'. GSI mapping indicates there are no sand and gravel aquifers in the vicinity of the Project. While GSI data infers there is no productive groundwater source, other abstraction data (described in section 11.4.20, **Chapter 11:** Hydrology and Hydrogeology tend to indicate that a shallow groundwater resource is supplying commercial non-potable and at least one residential potable supply. The aquifer is likely to be highly localised and characterised as water perched in weathered upper layers of impermeable bedrock.

GCR option 2 and TDR option 2 and 3 pass through lands underlain by the same aquifer as that noted for the Site, as well as an aquifer classified as 'Poor Aquifer (bedrock which is generally unproductive except for local zones)', and through an area denoted as 'Regionally Important Aquifer - Karstified (diffuse)' for approximately 3.2 km.

8.1.5.1 Groundwater Body

The Site is underlain by the Louth groundwater body (IE_GBNI_NB_G_019). Sections of Grid option 2 and TDR option 2 and 3 is located within the boundaries of the Louth groundwater body, Wilkinstown groundwater body (IE_EA_G_010), and Drogheda groundwater body (IE_EA_G_025). The characteristics of the groundwater bodies are summarised in the following section. Refer to **Chapter 10: Soils and Geology** for further information on geology of the area.

8.1.5.2 Groundwater Quality / Water Framework Directive Status

The European Water Framework Directive (2000/60/EC) (WFD) requires the status of groundwater management units (groundwater bodies) within each river basin to be determined as 'Good' or 'Poor'.

For the period 2016-2021, the Louth groundwater body has overall WFD status of 'Good', the Wilkinstown groundwater body has a status of 'Poor', and the Drogheda groundwater body has a status of 'Good'. The overall status relates to both the quantitative and chemical (water quality) characteristics of a groundwater body. Both groundwater bodies are also delineated as a 'drinking water – groundwater' bodies in accordance with European Communities (Drinking Water) (No. 2) Regulations 2007 (SI no. 278/2007).

Table 8.3: Summary of Groundwater Body Status

Groundwater Body	2010 – 2015 Status	2013 – 2018 Status	2016 – 2021 Status	Objective	At Risk
Louth (IEGBNI_NB_G_019)	Good	Good	Good	Good	Not at Risk
Wilkinstown (IE_EA_G_010)	Good	Good	Poor	Good	At Risk
Drogheda (IE_EA_G_025)	Good	Good	Good	Good	At Risk

8.1.6 Protected Areas and Designated Sites

Designated sites such as Special Areas of Conservation (SAC), Special Protected Areas (SPA), Ramsar sites, and similarly designated environmental receptors hydrologically connected to the Project, have been identified as part of this assessment.

Sites were identified utilising the datasets available on the NPWS Designations Viewer, and were screened to identify hydrological sites with sensitivities to the water environment that are connected to the Project, i.e. sites which lie in the upstream catchment of, or are on downstream streamlines of, the watercourses draining the project site. Only sites meeting these criteria are discussed further in this assessment.

Along the GCR option 2, the Termonfeckin_010, Termonfeckin_020, and Tullyeskar_010 river sub-basins drain to the Boyne Coast and Estuary SAC and River Boyne and River Blackwater SAC. The TDR option 2 and option 3 is located within the White (Louth)_010 river sub-basin in the upper reaches of the Dee catchment. The River Dee ultimately discharges into the Dundalk Bay SAC approximately 12 km downstream from the TDR.

8.1.7 Groundwater Abstractions (Drinking Water)

Louth County Council was unable to supply information regarding private water supplies / abstractions located in the vicinity of the Site.

GSI online mapping outlines 'Public Supply Source Protection Areas' (PSSPA) around groundwater abstraction points that are managed by Uisce Éireann / Irish Water to supply Public Water Supply Schemes across Ireland. None are shown to be in the vicinity of the Site. The proposed GCR and GCR option 2 are noted to pass through the 'inner protection area' of 3 no. PSSPAs:

- Killineer PWS;
- Ballymakenny GWS; and
- Drybridge PWS.

GSI mapping also identifies 'Group Scheme Source Protection Areas' (GSSPA). These delineate 'Zones of Contribution' to groundwater abstraction points that supply Group Water Schemes across Ireland affiliated to the National Federation of Group Water Schemes which supply > 15 people. None are shown to be in the vicinity of the Site. The GCR passes proximal to the 'Drybridge' Zone of Contribution.

8.1.8 Receptor Sensitivity

The baseline assessment identified the receptors which have the potential to demonstrate sensitivity to the Development; the receptors and their sensitivity / value are summarised in **Table 8.4**. Sensitivity is based on the baseline assessment and determined in accordance with the rationale previously described.

Table 8.4: Baseline Receptor Sensitivity and Rationale

Type	Receptor	Sensitivity	Rationale
The Site			
Hydrological	On-site watercourses draining the **Termonfeckin_010** river sub-basin	Low	Termonfeckin_010 (and its tributaries within the Site) have a WFD 'Poor' classification and low fisheries potential.
	On-site watercourses draining the **White (Louth)_010** river sub-basin	Medium	White (Louth)_010 (and its tributaries within the Site) have a WFD 'Moderate' classification and low fisheries potential.
	On-site watercourses draining the **Slieveboy_010** river sub-basin	Medium	Slieveboy_010 (and its tributaries within the Site) have a WFD 'Moderate' classification and low fisheries potential.
	Off-site designated site (Boyne Coast and Estuary SAC)	Extremely High	Designated site with international importance hydrologically connected to the Site.
	Off-site protected area (Sea point Bathing Water Area)	High	Protected area as locally important amenity site hydrologically connected to the Site.
Hydro-geological	Bedrock Groundwater / Aquifers	Low	The bedrock aquifer underlying the site is classified as a 'Poor' Aquifer (bedrock which is generally unproductive).
	Abstractions / Non-Potable Supplies within the Site	Low	2 no. springs used for non-potable uses are located within the Site.
	Abstractions / Non-Potable Supplies within the adjacent Kilgarvan Quarry	Low	4 no. production wells used for non-potable uses located within the adjacent Kilsaran Quarry site.
	Abstractions / Potable Supply	Low	Single dwelling was served by a borehole within the dwelling site curtilage.
Terrestrial	The Development	Low	Proposed infrastructure prone to damage including potential for water damage of electrical infrastructure in a flood event;

Type	Receptor	Sensitivity	Rationale
			potential for structural damage of access infrastructure in the event of hydraulic incapacity.
Grid Connection Route – Option 2			
Hydrological	Watercourses draining the Termonfeckin_020 river sub-basin	Medium	Termonfeckin_020 (and its tributaries) have a WFD 'Moderate' classification.
	Watercourses draining the Tullyeskar_010	Medium	Tullyeskar_010 (and its tributaries) have a WFD 'Moderate' classification.
	Designated sites (Boyne Coast and Estuary SAC, and River Boyne and River Blackwater SAC)	Extremely High	Designated site with international importance hydrologically connected to the GCR.
	Floodplains	Medium	Route in proximity to discrete areas of fluvial floodplain.
Hydro-geological	Bedrock Groundwater / Aquifers	Low	The bedrock aquifer underlying the northern and central sections of the GCR are classified as a 'Poor' Aquifer (bedrock which is generally unproductive / generally unproductive except for local zones)
		High	The bedrock aquifer underlying the southern section of the GCR is classified as 'Regionally Important Aquifer - Karstified (diffuse)'.
	Abstractions / PWS	High	The GCR passes through the 'inner protection area' of 3 no. Public Supply Source Protection Areas (Killineer PWS, Ballymakenny GWS; and Drybridge PWS).
	Karst Features	High	4 no. karst features in the vicinity of the GCR. Karst features with potential to act as direct conduit to groundwater akin to well drained soils.
Turbine Delivery Route			
Hydrological	Watercourses draining the Tullyeskar_010 river sub-basin	Medium	Tullyeskar_010 (and tributaries) have a WFD 'Moderate' classification.
	Watercourses draining the Mattock_020 river sub-basin	High	Mattock_020 (and tributaries) have a WFD 'Good' classification.
	Watercourses draining the White (Louth)_010 river sub-basin	Medium	White (Louth)_010 (and tributaries) have a WFD 'Moderate' classification.
	Watercourses draining the White (Louth)_020 river sub-basin	Medium	White (Louth)_020 and (and tributaries) have a WFD 'Moderate' classification.
	Designated sites (Dundalk Bay SAC)	Very High	Designated site with international importance hydrologically connected to the TDR.

Type	Receptor	Sensitivity	Rationale
	Floodplains	Medium	Route in proximity to discrete areas of fluvial floodplain.
Hydro-geological	Bedrock Groundwater / Aquifers	Low	The bedrock aquifers underlying the TDR are classified as a 'Poor' Aquifer (bedrock which is generally unproductive / generally unproductive except for local zones) and 'Poor' Aquifer (bedrock which is generally unproductive).
		High	The bedrock aquifer underlying the southern section of the TDR is classified as 'Regionally Important Aquifer - Karstified (diffuse)'.

8.2 ASSESSMENT OF POTENTIAL EFFECTS

8.2.1.1 Components Contributing to Predicted Environmental Effects

The components contributing to the predicted environmental effects from the Project including the proposed GCR and proposed TDR are assessed within Chapter 11. During construction, GCR option 2 and the TDR option 2 and 3 comprises works that have the potential to cause change to local hydrology and water quality. The works associated with construction and cable trenches and minor TDR widening works, comprises earthworks, plant movements with associated use of lubricants and fuel oils, spoil handling and placement of aggregates associated with construction and cable trenches and minor TDR widening works.

The operational phase of GCR option 2 and the TDR option 2 and 3 has very limited potential to cause adverse effects on the environment. Any potential adverse effects will be to maintenance periods along the GCR.

Activities associated with the decommissioning phase at the end of the operating design life will be limited to removal of the underground cables.

The associated impact significance of the effects on the receptors affected (following the implementation of avoidance and design measures proposed) has been determined in accordance with the rationale described previously (Table 8.4) and the results are presented in **Table 8.5** for GCR option 2 and in **Table 8.6** for TDR option 2 and 3.

Table 8.5 Potential effect of GCR option 2

Receptor and Sensitivity	Potential Effect	Phase of Development	Magnitude	Potential Effect Significance	Likelihood	Overall Effect Significance and Rationale
Grid Connection Route						
Surface Watercourses within Termonfeckin_010; Termonfeckin_020; and Tullyeskar_010; river sub-basins (Low to Medium)	Reduced water quality	Construction	Small Adverse	Imperceptible to Slight Adverse	Likely	**Minor Adverse** All watercourse crossings coincide with existing road crossings and culverts; the cable will be laid within the road deck over the existing culvert, or via horizontal directional drilling (HDD) under the watercourse. Methods will not cause requirement for any in-stream work or work that would directly cause potential for pollution of the watercourse. Other effects associated with typical GCR construction activities would be similar to those described in **Chapter 11,** section 11.5.4.2 (e.g., sediment / suspended pollution or chemical pollution of surface water runoff and groundwater) and would be solely associated with the construction phase.
		Operational & Decommissioning	Negligible	Imperceptible	Unlikely	**Not Significant** During the operational phase of the Proposed Development, the cable route would by its nature (buried) and have no effect on water quality. During decommissioning, underground cables will be removed while the ducting will be left in-situ avoiding the need for earthworks.
	Changes to watercourse morphology	Construction, Operational & Decommissioning	Negligible	Imperceptible	Rare	**Not Significant** All watercourse crossings coincide with existing road crossings and culverts; the cable will be laid within the road deck over the existing culvert, or via horizontal directional drilling (HDD) under the watercourse. Methods will not cause requirement for any in-stream work or work that would directly affect watercourse morphology. Underground cables will be removed while the ducting will be left in-situ.
Floodplains (Medium)	Flood risk to the Proposed Development	Construction, Operational & Decommissioning	Negligible	Imperceptible	Unlikely	**Not Significant** The cable route affects no significant fluvial floodplains other than those contiguous with existing road bridges and culverts. The cable route will not further encroach into existing floodplains compared to existing conditions. Appropriate techniques to manage surface water around working areas during construction would be implemented.

Receptor and Sensitivity	Potential Effect	Phase of Development	Magnitude	Potential Effect Significance	Likelihood	Overall Effect Significance and Rationale
Grid Connection Route						
						During decommissioning, underground cables will be removed while the ducting will be left in-situ.
	Increased flood risk elsewhere	Construction, Operational & Decommissioning	Negligible	Imperceptible	Rare	**Not Significant** Appropriate techniques to manage surface water around working areas during construction would be implemented. The cable route would by its nature (buried) have no effect on flooding by causing restrictions or disruption to flood flows.
Designated Sites (Boyne Coast and Estuary SAC, and River Boyne and River Blackwater SAC) (Extremely High)	Reduced water quality	Construction	Small Adverse	Significant	Unlikely	**Moderate Adverse** All watercourse crossings coincide with existing road crossings and culverts; the cable will be laid within the road deck over the existing culvert, or via horizontal directional drilling (HDD) under the watercourse. Methods will not cause requirement for any in-stream work or work that would directly cause potential for pollution of the watercourse. Other effects associated with typical GCR construction activities would be similar to those described in **Chapter 11,** section 11.5.4.2 (e.g., sediment / suspended pollution or chemical pollution of surface water runoff and groundwater) and would be solely associated with the construction phase.
		Operational & Decommissioning	Negligible	Imperceptible	Unlikely	**Not Significant** During the operational phase of the Proposed Development, the cable route would by its nature (buried) and have no effect on water quality. During decommissioning, underground cables will be removed while the ducting will be left in-situ avoiding the need for earthworks.
Bedrock Groundwater / Aquifers (Low to High)	Reduced Groundwater Quality	Construction	Small Adverse	Imperceptible to Slight Adverse	Unlikely	**Minor Adverse** Limited potential for short term slight deteriorations in water quality due to excavations that would release sediments; use of mechanical plant with associated fuels and lubricants.
		Operational & Decommissioning	Negligible	Imperceptible	Rare	**Not Significant** During the operational phase of the Proposed Development, the cable route would by its nature (buried) have no effect on water quality. During decommissioning, underground cables will be removed while the ducting will be left in-situ.

Receptor and Sensitivity	Potential Effect	Phase of Development	Magnitude	Potential Effect Significance	Likelihood	Overall Effect Significance and Rationale
Grid Connection Route						
	Reduced Groundwater Quantity	Construction, Operational & Decommissioning	Negligible	Imperceptible	Rare	**Not Significant** Shallow excavations associated with cable laying would not be anticipated to cause any change in groundwater flow routes.
Public Supply Source Protection Areas (High)	Reduced Groundwater Quality	Construction	Small Adverse	Slight Adverse	Unlikely	**Minor Adverse** Limited potential for short term slight deteriorations in water quality due to excavations that would release sediments; use of mechanical plant with associated fuels and lubricants.
		Operational & Decommissioning	Negligible	Imperceptible	Rare	**Not Significant** During the operational phase of the Proposed Development, the cable route would by its nature (buried) have no effect on water quality. During decommissioning, underground cables will be removed while the ducting will be left in-situ.
	Reduced Groundwater Quantity	Construction, Operational & Decommissioning	Negligible	Imperceptible	Rare	**Not Significant** Shallow excavations associated with cable laying would not be anticipated to cause any change in groundwater flow routes.
Karst Features (High)	Reduced Groundwater Quality	Construction	Small Adverse	Slight Adverse	Unlikely	**Minor Adverse** Karst features are primarily a geotechnical risk, but they may act as a direct conduit (pathway) for potential pollutants to groundwater receptor.

Table 8.6 Potential effect of TDR option 2 and 3

Receptor and Sensitivity	Potential Effect	Phase of Development	Magnitude	Potential Effect Significance	Likelihood	Overall Effect Significance and Rationale
Turbine Delivery Route						
Watercourses draining the Tullyeskar_010 river sub-basin (Medium)	Reduced Water Quality	Construction, Operational & Decommissioning	Negligible	Imperceptible	Rare	**Not Significant** Works associated with the TDR in this river sub-basin are limited to temporary street sign / street furniture removal and construction of temporary load bearing surfaces, remote from watercourses.
Watercourses draining the Mattock_020 river sub-basin (High)	Reduced Water Quality	All Phases	Negligible	Imperceptible	Rare	**Not Significant** No physical works are required within this river sub-basin (traffic management only).
Watercourses draining the White (Louth)_010 river sub-basin (Medium)	Reduced Water Quality	Construction	Moderate Adverse	Moderate Adverse	Likely	**Moderate Adverse** A new offline track and embankment reprofiling is required adjacent to the Hammondstown watercourse. Temporary short-term construction activities adjacent to watercourse would be likely to cause a temporary but fundamental change in water quality in the absence of additional mitigation. Spillage of oils, chemicals, or cementitious material associated with temporary construction and arising due to improper site management would be likely to cause a temporary but fundamental change in water quality.
		Operational & Decommissioning	Negligible	Imperceptible	Rare	**Not Significant** Works required to facilitate the turbine delivery shall be temporary for the construction phase only.
Watercourses draining the White (Louth)_020 river sub-basin (Medium)	Reduced Water Quality	Construction, Operational & Decommissioning	Negligible	Imperceptible	Rare	**Not Significant** No physical works are required within this river sub-basin.
Designated sites (Dundalk Bay SAC) (Very High)	Reduced Water Quality	Construction, Operational & Decommissioning	Negligible	Imperceptible	Unlikely	**Not Significant** Designated site hydrologically connected to the TDR via the White (Louth)_010 watercourse. However, given the distance between the location of the temporary TDR works and the SAC (c. 8 km), it is unlikely the designated site could feasibly be affected by works associated with the Proposed Development.

Receptor and Sensitivity	Potential Effect	Phase of Development	Magnitude	Potential Effect Significance	Likelihood	Overall Effect Significance and Rationale
Turbine Delivery Route						
Floodplains (Medium)	Flood risk to the Proposed Development	Construction, Operational & Decommissioning	Negligible	Imperceptible	Unlikely	**Not Significant** The TDR affects no significant fluvial floodplains other than those contiguous with existing roads. The cable route will not further encroach into existing floodplains compared to existing conditions. Appropriate techniques to manage surface water around working areas during construction would be implemented.
	Increased flood risk elsewhere	Construction, Operational & Decommissioning	Negligible	Imperceptible	Rare	**Not Significant** Appropriate techniques to manage surface water around working areas during construction would be implemented.

8.3 MITIGATION MEASURES AND RESIDUAL EFFECTS

8.3.1 Construction Phase

A description of all the mitigation measures associated with the construction phase are described in **Chapter 11:** Hydrology and Hydrogeology, section 11.8**.** On this basis of the assessment of the potential effects of the GCR and TDR options, no further mitigation measures are required above those documented in section 11.8.

8.3.1.1 Watercourse Crossings Proposed Mitigation Measures

Compared to the proposed GCR which requires five (no. 5) watercourses crossing (3 no. bridges and 2 no. culverts), GCR option 2 will requires four (no. 4) watercourses crossing (2 no. bridges and 2 no. culverts). Where there is insufficient cover to install the cable to ESB specification (450 mm cover to the top of ducts), Horizontal Direction Drilling (HDD) shall be employed.

GCR option 2 will not encounter Waterunder Bridge on the L6332 and will therefore not require a HDD crossing at this location, as is the case for the proposed GCR. GCR option 2 instead crosses the same river (Mell order 2) on L6323, a further 550 m upstream of Waterunder Bridge. Where there is insufficient cover to install the cable to ESB specification (450 mm cover to the top of ducts), Horizontal Direction Drilling (HDD) shall be employed at this location. All other culverts will be traversed using standard 38kV Service / Culvert Crossing details provided in **Appendix 2.3:** 38kV Grid Connection - Outline Construction Methodology. Mitigation measures as outlined in section 7 of Appendix 2.3 will be employed during the construction phase.

Consultation and approval will be sought from all relevant stakeholders and regulators in accordance with OPW Section 50 guidelines (OPW, 2022), at the pre-construction detailed design stage for all works in and affecting watercourses and drains.

8.3.2 Operational Phase

A description of all the mitigation measures associated with the operational phase are described in **Chapter 11**: Hydrology and Hydrogeology, section 11.9**.** On this basis of the assessment of the potential effects of the GCR and TDR options, no further mitigation measures are required above those documented in section 11.9.

8.3.3 Decommissioning Phase

A description of all the mitigation measures associated with the operational phase are described in **Chapter 11:** Hydrology and Hydrogeology, section 11.10. On this basis of the assessment of the potential effects of the GCR and TDR options, no further mitigation measures are required above those documented in section 11.10.

Table 8.7 Mitigated Effect of GCR option 2

Receptor and Sensitivity	Potential Effect	Phase of Development	Magnitude	Potential Effect Significance	Likelihood	Overall Effect Significance and Rationale
Grid Connection Route						
Surface Watercourses within Termonfeckin_010; Termonfeckin_020; and Tullyeskar_010; river sub-basins (Low to Medium)	Reduced water quality	Construction	Negligible	Imperceptible	Unlikely	**Not Significant** Surface water management and pollution control and in particular to work in and adjacent to watercourses, is likely to result in no permanent change and no significant temporary change in conditions exceeding natural or pre-existing conditions. Pollution prevention measures proposed to control chemical pollution at all phases is likely to result in no permanent or temporary change in conditions exceeding natural or pre-existing conditions. Robust water quality monitoring will permit a rapid response to any residual risk.
Designated Sites (Boyne Coast and Estuary SAC, and River Boyne and River Blackwater SAC) (Extremely High)	Reduced water quality	Construction	Negligible	Imperceptible	Unlikely	**Not Significant** Surface water management and pollution control and in particular to work in and adjacent to watercourses, is likely to result in no permanent change and no significant temporary change in conditions exceeding natural or pre-existing conditions. Pollution prevention measures proposed to control chemical pollution at all phases is likely to result in no permanent or temporary change in conditions exceeding natural or pre-existing conditions. Robust water quality monitoring will permit a rapid response to any residual risk.
Bedrock Groundwater / Aquifers (Low to High)	Reduced Groundwater Quality	Construction	Negligible	Imperceptible	Unlikely	**Not Significant** Pollution prevention measures proposed to control chemical pollution at all phases is likely to result in no permanent or temporary change in conditions exceeding natural or pre-existing conditions.
Public Supply Source Protection Areas (High)	Reduced Groundwater Quality	Construction	Negligible	Imperceptible	Unlikely	**Not Significant** Pollution prevention measures proposed to control chemical pollution at all phases is likely to result in no permanent or temporary change in conditions exceeding natural or pre-existing conditions.
Karst Features (High)	Reduced Groundwater Quality	Construction	Negligible	Imperceptible	Unlikely	**Not Significant** Pollution prevention measures proposed to control chemical pollution at all phases is likely to result in no permanent or temporary change in conditions exceeding natural or pre-existing conditions.

Table 8.8 Mitigated Effect of TDR option 2 and 3

Receptor and Sensitivity	Potential Effect	Phase of Development	Magnitude	Potential Effect Significance	Likelihood	Overall Effect Significance and Rationale
Turbine Delivery Route						
Watercourses draining the White (Louth)_010 river sub-basin (Medium)	Reduced Water Quality	Construction	Negligible	Imperceptible	Unlikely	**Not Significant** Surface water management and pollution control and in particular to work in and adjacent to watercourses, is likely to result in no permanent change and no significant temporary change in conditions exceeding natural or pre-existing conditions. Pollution prevention measures proposed to control chemical pollution at all phases is likely to result in no permanent or temporary change in conditions exceeding natural or pre-existing conditions. Robust water quality monitoring will permit a rapid response to any residual risk.

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8.4 CUMULATIVE EFFECTS

No likely significant residual water environment effects are predicted to arise as a result of GCR option 2 or TDR options 2 and 3. The cumulative impact assessment of the Project has been set out in full in Chapter 11. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2 and 3. No cumulative effects on hydrology are predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3.

All large projects within 20 km of the Proposed Development in the planning stage or operational stage (**Appendix 2.4:** List of Projects for Cumulative Assessment) have been rigorously assessed for environmental and ecological effects and where such effects are identified, mitigation has been incorporated into the design and planning process. Addition to the **EIAR Chapter 11:** Hydrology and Hydrogeology, section 11.12 Cumulative Effects, Planning permission has been granted with conditions (Planning Application: 2360388) to develop a new Advanced Building Solution consisting of office and light industrial/production spaces, at the IDA Drogheda North Business Park, Mell, Drogheda, Co. Louth. The carpark and service yard entrance to this IDA development will be accessed from the L6323. A section of the GCR option 2 (approximately 950m) lies within L6323 and will therefore be in close proximity to the permitted IDA development. However, this development is not expected to add to the cumulative effect for the following reasons:

Work on the Grid route is expected to progress at a rate of a minimum of 100m per day, and the HDD location on the L6323 to cross the order 2 Mell river is 400 m west of the boundary of the proposed IDA development. It is expected that grid works on the L6323 will be completed within 3 weeks and that there will be no is no cumulative effect on the river drainage or water quality. Adherence of mitigation measures as outlined in section 11.8 of **Chapter 11**, and in section 7 of **Appendix 2.3**, no additional cumulative effects are expected.

8.5 STATEMENT OF SIGNIFICANCE

GCR option 2 and TDR options 2 and 3 were comprehensively assessed. The significant potential effects that could specifically arise from these options during the construction of infrastructure elements include the excavation activities associated with cable trenches, and all works in close proximity to surface water or drainage network including watercourse crossings and culverts.

Elements of the construction and operation of the GCR and TDR options that may potentially impact on the hydrogeological and water environment receptors have been identified and their pathways for impacts have been assessed.

Implementation of the control measures outlined in this document, Chapter 11 and **Appendix 2.3** (38kV Grid Connection - Outline Construction Methodology), will result in a robust environmental management plan which will target and mitigate likely sources and pathways of contaminant arising along the GCR and TDR options. The GCR and TDRs are not likely to significantly impact groundwater quantities, quality or availability.

9 NOISE

Construction activities outside of the main wind turbine area i.e. along the proposed GCR and the proposed TDR have been assessed qualitatively (Chapter 13). These activities will be of short duration and best practice during construction would minimise any potential impact. The exception to this is for Horizontal Directional Drilling (HDD) which is required at a number of locations along the proposed GCR. At one of these HDD locations, where the cable route is required to pass under the M1 motorway, where the HDD will be of a larger scale. On this basis, for this particular HDD activity, full noise propagation modelling and assessment has been undertaken and has been documented in Chapter 13.

Within this section, the potential effect of noise due to GCR option 2 has been assessed. The difference between the proposed GCR (assessed in Chapter 13 and Appendix 13.1) and GCR option 2, has been assessed in terms of proximity to sensitive receptors and proximity to potential HDD locations.

9.1 ASSESSMENT OF POTENTIAL EFFECTS

The potential effect of noise due to GCR option 2 that requires assessment are limited to:

- works on the section of road that differs to the proposed GCR route (280m along L6322 and the road L6323 which is 950m in length) during the construction phase,
- the maintenance works along this section of road, during the operations phase,
- the removal of the grid cables from the duct during the decommissioning phase,

9.1.1 Potential effect during Construction Phase

9.1.1.1 GCR option 2 assessment

The difference between the proposed GCR and GCR option 2, is limited to a section of 280m along the L6322 and the road L6323 which is 950m in length. Along the L6322 section of road there are 5 dwellings which are accessed directly from the L6322. There are no

watercourse crossing or HDD required along this section of road. As such, the potential noise effects will be no greater than those outlined in **Chapter 13.**

Along the L6323 road (950m) there are 2 residential dwellings. These dwelling are a minimum of 200m away from a possible HDD crossings (Bridge on order 2 River Mell) order located at 706,252.79E 777,278.04N). Furthermore, the extent of any possible HDD works at this location will be of a considerably smaller scale to those modelled for the HDD under the M1 (discussed in next section). As such, it can be concluded that any of the potential noise effects will be no greater than those outlined in **Chapter 13**. The impact is deemed **not significant for construction activities associated with cable trenching, HDD and distant road junction upgrades.**

9.1.1.2 HDD assessment

As outlined in section 5.3 of **EIAR Appendix 13.1: Construction Noise Report Kellystown Wind Farm** there is a requirement to undertake Horizontal Directional Drilling (HDD) at six locations on the proposed GCR. The obstacles along the route at five of the HDD locations are small in nature and include the requirement to cross near three stone-built bridges and two drains culverts. For these crossing the noise assessment has assumed the use of a small, portable HDD rig. The sixth location involves HDD under the M1 motorway. A much larger scale HDD rig will be required for this work therefore a separate noise model and assessment was undertaken to consider the potential noise emission levels at the closest noise receptors.

For the HDD noise level assessment for HDD under the M1 Motorway, detailed noise modelling was undertaken at three receptors (CNALs 16-18). These CNALs represent the closest NSRs to the HDD activities. Predictions have been made assuming that all items of plant are operating continually throughout the assessment periods to provide a worst-case scenario. In addition, the noise model assumes that noise sources would be located within the most likely activity areas closest to the receptors, whereas in reality plant would move around the site and only a proportion of the plant may be operating at any one time. As such, the predictions are inherently likely to over-predict the actual sound levels that are likely to be experienced. The Construction Noise Assessment Locations (CNALs) and the modelled noise levels are presented in Table 9.1 and Table 9.2 respectively.

As per Table 9.2, at the three CNAL locations, the predicted noise levels are below the weekday and Saturday daytime threshold value of 65 dB $L_{Aeq(t)}$. There will be no HDD

construction activities at night, therefore it can be concluded that the 45 dB $L_{Aeq(t)}$ night-time thresholds are also met at all sensitive receptors for HDD.

Table 9.1 Construction Noise Assessment Locations for HDD noise assessment modelling

Construction Noise Assessment location (CNAL)	X (ITM)	Y (ITM)
CNAL16 *	705950	776917
CNAL17 *	705953	776917
CNAL18 *	705846	777037

Table 9.2 Predicted Noise immission levels from HDD activity

CNAL	Category A Threshold dB $L_{Aeq, t}$ Daytime (07:00 – 19:00) and Saturdays (07:00 - 13:00)	Immission Level, dB $L_{Aeq, t}$
CNAL16	65	59
CNAL17	65	59
CNAL18	65	56

9.1.2 Potential effect during Operational and Decommissioning Phase

During the operational period there may be times where maintenance works are required along GCR option 2 route. Noise levels during maintenance will not exceed those anticipated during construction and will only occur for a shorter period of time. Accordingly, the impact of maintenance during the operational phase is deemed **negative, not significant and temporary/ Brief.**

The impact of cable removal during the decommissioning phase is **deemed negative, imperceptible and temporary/ Brief**. There will be no noise associated with trenching or backfilling during decommissioning.

9.2 CUMULATIVE EFFECTS

All large projects within 20km of the Proposed Development in the planning stage or operational stage (**Appendix 2.4:** List of Projects for Cumulative Assessment) have been

rigorously assessed for environmental and ecological effects and where such effects are identified, mitigation has been incorporated into the planning. Addition to the **Chapter 13,** section 13.4.5, Planning permission has been granted with conditions (Planning Application: 2360388) to develop a new Advanced Building Solution consisting of office and light industrial/production spaces, at the IDA Drogheda North Business Park, Mell, Drogheda, Co. Louth. The carpark and service yard entrance to this IDA development will be accessed from the L6323. A section of the GCR option 2 (approximately 950m) lies within L6323 and will therefore be in close proximity to the permitted IDA development. However, this development is not expected to add to the cumulative effect for the following reasons:

Work on the Grid route is expected to progress at a rate of a minimum of 100m per day, and the potential HDD location on the L6323 to cross the order 2 Mell river, lies 400 m west of the boundary of the proposed IDA development. It is expected that grid works on the L6323 will be completed within 3 weeks and that there will be no is no cumulative effect on noise With adherence to mitigation measures as outlined in section 13.5 of **Chapter 13**, no additional cumulative effects are expected.

No likely significant residual noise effects are predicted to arise as a result of GCR option 2 or TDR options 2 and 3. The cumulative impact assessment of the Project has been set out in full in Chapter 13. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2 and 3. No cumulative effects on noise are predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3.

9.3 MITIGATION MEASURES AND RESIDUAL EFFECTS

On review of the Mitigation Measures and residual effects outlined **Chapter 13:** Noise, section 13.5, it can be concluded that irrespective of which TDR option or GCR option is considered, the same Mitigation Measures are sufficient and must be applied.

9.4 STATEMENT OF SIGNIFICANCE

The noise levels predicted at the nearest receptors are below the level at which risk of hearing damage, or indeed negative health effects are possible.

Noise during construction and Decommissioning of the Development will be managed to comply with current best practice, legislation and guidelines so that effects are not significant.

10 LANDSCAPE & VISUAL AMENITY

This section of document assesses the effects of GCR option 2 and TDR option 2 and 3 on the landscape and visual amenity of the receiving environment. Where significant effects are predicted, the chapter identifies appropriate mitigation strategies therein. The assessment will consider the potential effects during the construction, operational, and decommissioning phases.

10.1 ASSESSMENT OF POTENTIAL EFFECTS

10.1.1 Landscape Impacts

As outlined in Chapter 12, impacts pertaining to aspects of the Project such as the grid connection route, and turbine delivery route, are localised to the immediate environment, and as such the consideration of impacts focuses on the immediate landscape context within approximately 500m. This area is considered within the Central Study Area (approx. <5km) and also fall within the 20km Study Area.

GCR Option 2: The grid connection cabling will run from the onsite 38kV Substation to Drybridge 110kV Substation, Co. Louth across the site and public road corridor. No overhead lines are required for the connection. Connection works will involve the installation of ducting, joint bays, drainage and ancillary infrastructure. This will require delivery of plant and construction materials, followed by ground excavation, stockpiling of materials, laying of cables, and subsequent reinstatement of trenches, resulting in minor and very localised construction stage landscape effects.

Landscape impacts are assessed on the basis landscape sensitivity weighed against the magnitude of physical landscape effects within the Site and effects on the surrounding landscape character.

The construction methodology has considered the minimisation of landscape disturbance, with measures such as Horizontal Directional Drilling (HDD) being proposed as part of the grid connection works to minimise any damage.

TDR option 2 and 3: Temporary works required in relation to the turbine delivery route will require the installation of load bearing surfaces and the localised disturbance of grass and vegetation. A description of TDR temporary works are outlined in section 3.2.2 (Table 3.2 and Table 3.3) of this document.

The TDR temporary works for TDR options 2 and 3 are as follows:

- Exit 12 (heading south on M1 motorway to R169 (TDR option 2 only)
- Exit 12 (heading north on M1 motorway to R169 (TDR option 3 only)
- Junction R169/ R132
- Junction L2254/ R132

The widening points will result in a small amount of very localised hedgerow removal or pruning and widening into areas of predominantly Improved agricultural grasslands and arable land. Any localised areas damaged during construction will be reinstated to their original condition. Replacement of trees and hedgerows will be undertaken in accordance with approved landscaping plans, with landscape works undertaken in accordance with best practice. The following standards are widely adopted as representing best practice in landscape operations:

- BS 4428:1989 Code of practice for general landscape operations (excluding hard surfaces). BS 5837:2012 – Trees in Relation to design, demolition and construction.
- BS 8545 Trees: from nursery to independence in the landscape - Recommendations.
- BS 3936 - Part 1: Nursery stock specification for trees and shrubs.

10.1.1.1 Landscape Character, Value and Sensitivity

Landscape value and sensitivity are considered in relation to a number of factors that accord with the Landscape Institute and the Institute of Environmental Management and Assessment publication entitled Guidelines for Landscape and Visual Impact Assessment – Third Edition (2013) (GLVIA3), which are set out below and discussed relative to the Central Study Area. The landscape sensitivity of the Central Study Area (approx. <5km) is deemed to be **Medium**, as outlined in section 12.6.1.1 of **Chapter 12.**

10.1.1.2 Magnitude of Landscape Effect

The physical landscape as well as the character of the Proposed Development and its Central Study Area (<5km) is affected by the ancillary development such as the grid connection.

Project Effects on Landscape Character

An assessment of the construction ,operation and decommissioning Effects on Landscape Character is outlined in **Chapter 12:** Landscape and Visual, section 12.6.1.2 and included in this document section. The Central Study Area contains gentle undulations, with local high points of around 130m AOD, beyond which the landform rises to the south (within

approximately 4km), and west where the landform is defined by a series of rolling hills. The site's location on the edge of this more elevated area marks a transition to the wider coastal plain to the east and north.

The site and much of the Central Study Area are contained within the 'Uplands of Collon and Monasterboice' LCA (County Louth), the description of which recognises the site's relatively elevated plateau location and the opportunities this brings for views over the wider landscape from parts of it. It states that the landscape quality is 'quite high', and that the elevation affords a 'high scenic quality value'. In this regard, it is noted that much of the land within the southwest of the Central Study Area is designated an AHSQ in recognition of its scenic qualities.

Within the Central Study Area there are also three designated views and prospects, View 23 (Callystown to Clogherhead), View 25 (Brownstown southwards over AHSQ towards Drogheda), and View 26 (Newtown Monasterboice towards Monasterboice Tower). Whilst these reflect the scenic opportunities presented in the Central Study Area, it is noted that none of these views directly orientate towards the Proposed Development, and in the case of View 23, and 25 orientate in the opposite direction from the site.

In some locations, broad views and vistas across the distant rolling landscape and uplands are often afforded, and from some of the more elevated locations, longer-range views are available towards the Cooley Mountains to the north. Where views are more open and long distance in nature, this generally affords a higher scenic value. However, it is also recognised that in many locations, the relative elevation of the Central Study Area, and the presence of belts of vegetation in the landscape, act to restrict these longer range views and retain a focus on the immediate working landscape, where the scenic value is considered comparatively reduced.

The description of character outlines the variety of landcover present, and this is considered particularly pertinent to the Central Study Area where the prevailing pastoral agricultural context is influenced by blocks of conifer plantation, an operational quarry, major road and rail corridors, and modern residential developments.

The description of character highlights the archaeological significance of the landscape and the prevalence of archaeological monuments, with particular reference to features at Monasterboice. Whilst it is recognised that there are features present in the Central Study Area (such as Monasterboice) that have notable heritage and archaeological value, in terms of the contemporary experience and perception of the landscape, the Central Study Area is not considered to have a notable time-depth quality, relative to other parts of the wider landscape such as in the Boyne Valley, where a mix of modern residential properties and working characteristics that relate to subsistence informing landscape character.

To the west of the Central Study Area, the underlying agrarian landscape is influenced by the M1 road corridor and other notable roads such as the R132. The scale of this infrastructure, and its audible and visual influence, degrades the landscape and scenic qualities of the Central Study Area.

To the north and east the landscape forms part of the wider Muirhevna Plain LCA, which is an extensive plain that plays host to extensive agricultural land uses as a result of its rich soils. Whilst it is dissected by a variety of small meandering rivers, and in places has a lightly undulating character, it is generally a flat and large scale landscape.

To the east, the landscape falls towards the coastal edge, and retains a working, agricultural character, albeit this is dissected by the Belfast to Dublin railway corridor. To the south, the land slopes southward towards Drogheda, with the agricultural context becoming increasingly influenced by its proximity to the urban edge.

Whilst the landscape of the Central Study Area is recognised for its scenic and archaeological values, these values reflect the longstanding human interaction with this landscape over time, rather than being explicitly informed by naturalistic qualities and values. It is a working landscape, that is extensively influenced by typical productive rural landscape activities and land uses, and so whilst some parts are inherently more susceptible to change, such as in the locality of Monasterboice, it is considered to be a robust landscape.

On balance of the reasons outlined above, the landscape sensitivity of the Central Study Area is deemed to be Medium.

10.2 CUMULATIVE EFFECTS

In addition to the assessment of these cumulative effects, Planning Application: 2360388 is also considered within this section for cumulative effects. Planning permission has been granted with conditions for Planning Application: 2360388, to develop a new Advanced Building Solution consisting of office and light industrial/production spaces, at the IDA Drogheda North Business Park, Mell, Drogheda, Co. Louth. The carpark and service yard entrance to this IDA development will be accessed from the L6323. A section of the GCR option 2 (approximately 950m) lies within L6323 and will therefore be in close proximity to the permitted IDA development. However, in conjunction with the GCR option 2, when completed (estimated time of approximately 3 weeks for L6323) which will have no above ground visual or landscape impact, this development is not expected to add to the cumulative effects outlined in Chapter 12: Landscape and Visual, section 12.6.6. It is considered that the receiving landscape and visual baseline would remain in the same or similar condition as it is currently.

The cumulative impact assessment of the Project has been set out in full in Chapter 12. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2 and 3. No cumulative effects on landscape and visual are predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3.

10.3 MITIGATION MEASURES & RESIDUAL EFFECT

On review of the Mitigation Measures and residual effects outlined **Chapter 12,** section 12.4, it can be concluded that irrespective of which TDR option or GCR option is considered, the same Mitigation Measures are sufficient and must be applied.

10.4 STATEMENT OF SIGNIFICANCE

Based on the landscape, visual and cumulative assessment contained herein, it is considered that there will not be any significant effects arising from the Project with GCR option 2 or TDR option 2 and 3.

11 AIR AND CLIMATE

11.1 BASELINE DESCRIPTION

11.1.1 Existing Air Quality Conditions

Generally, Ireland is recognised as having some of the best air quality in Europe. However, from time to time, and under certain weather conditions, it is possible to experience some air

pollution in the larger towns and cities. The most recent published report on air quality in Ireland is the 'Air Quality in Ireland 2022' report published by the EPA in 2023. This report provides an overview of the ambient air quality in Ireland in 2022. The measured concentrations are compared with both EU legislative standards and WHO air quality guidelines for a range of air pollutants.

The Site of the proposed Kellystown Wind Farm is located in County Louth. The Site is located cc. 39km north of Dublin City and Suburbs, cc. 4.93km north of Drogheda Town and 16.60km south of Dundalk Town. The closest settlement to the Site is the Village of Tinure located 1.9km to the west of the Site and the town of Dunleer located 2.36km north of the Site. The townlands in which GCR option 2 and TDR option 2 and 3 are located, are listed in Table 3.1 of this document.

The closest local/national monitoring site for the Proposed Development within the same air quality zone is Kilkitt, Co. Monaghan. Kilkitt indicative monitoring site is located approximately 46.6km northwest of the Development. The Kilkitt site is located in a rural setting with little traffic or other influences on air quality. Monitoring is done using continuous monitors for nitrogen oxides, sulphur dioxide and ozone.

Given the distance from the Proposed Development and the nearest national/local monitoring site, a second monitoring station was considered. The Drogheda monitoring site, Co. Louth is located approximately 6.2km southeast of the Site. It should be noted the Drogheda monitoring site is located within Air Quality Zone C (16 urban areas with population greater than 15,000) versus the Zone D (remainder of the country) in which the Development is sited. The Drogheda monitoring station automatically monitors and reports particular matter (PM10 and PM2.5) in the surrounding environment. Results from the monitoring campaign during 2022 show:

- No levels above the EU limit value (EIAR Table 18.1) were recorded at any of the ambient air quality network monitoring sites in Ireland in 2022.
- WHO guideline values were exceeded at a number of monitoring sites for fine particular matter (PM2.5) and (PM10), ozone (O3), Nitrogen Dioxide (NO2). WHO guideline values for Sulphur dioxide (SO2) were exceeded at one monitoring station. PAHs exceeded the European Environment Agency reference at 3 monitoring sites.
- Kilkitt Monitoring station did not exceed WHO 1-hour limit value 350 µg/m3, the 24-hour limit value of 125 µg/m3 or the Calendar year limit value of 20 µg/m3 for SO2 (EIAR Table 18.1) in 2022.

- Kilkitt Monitoring station did not exceed WHO 1-hour limit value of 200 µg/m3 or the Calendar year limit value of 40 µg/m3 for NO2 (EIAR Table 18.1) in 2022.
- Kilkitt Monitoring station did not exceed the maximum 8-hour daily mean target value for Ozone as defined in Directive 2008/50/EC for the protection of human health of 120 µg/m3, the maximum 1-hour average information threshold of 180 µg/m3 or the maximum 1-hour average Information threshold of 240 µg/m3 in the year of 2022.
- Drogheda Monitoring station exceeded WHO 24-hour PM10 limit value of 50 µg/m3 on one occasion in the year 2022. This is below the WHO's basis of application of limit action, to not exceed the PM10 limit value more than 25 times in a calendar year (EIAR Table 18.1).
- Drogheda Monitoring station was below the WHO annual mean PM10 limit value of 40 µg/m3 in 2022. An annual mean for PM10 value of 11.93 µg/m3 was obtained at the station in 2022.
- Drogheda Monitoring station was below the WHO annual mean Stage 1 and Stage 2 PM2.5 limit value of 25 µg/m3 and 20 µg/m3 respectively in 2022. An annual mean for PM2.5 value of 6.91 µg/m3 was obtained at the station for the year of 2022.

11.2 ASSESSMENT OF POTENTIAL EFFECTS

Dust Emissions

The main potential source of impacts on air quality during construction is dust. There is potential for the generation of dust from excavations and from construction of access tracks and hardstands and the trench for the cable ducting for GCR option 2. The potential nuisance issues arising from this are dependent on the terrain, weather conditions (i.e, dry and windy conditions) and the proximity of receptors. Dust from cement can cause ecological damage if allowed to migrate to water courses, though it is proposed that ready-mix concrete will be used with no on-site batching taking place, and therefore this will not be a potential source of emissions. Potentially dust generating activities are as follows:

- Earth moving and excavation plant and equipment for handling and storage of soils and subsoils;
- Transport and unloading of stone materials for access track construction;
- Rock will be extracted from turbine foundation construction and this will be used for subsequent use in construction of tracks and hardstands as needed; and
- Vehicle movements over dry surfaces such as access tracks.

Due to the similar nature, timing and extent of the proposed work, the GCR and TDR options are not expected to affect the potential impact of dust emissions discussed in **Chapter 18**. The potential impact from dust becoming friable and being a nuisance to workers, residents

and local road users is considered, a **slight, negative, short-term, direct** impact during the construction phase.

Exhaust Emissions

Emissions from plant and machinery, including trucks, during the construction of the Project are a potential impact. The engines of these machines produce emissions such as carbon dioxide (CO_2), carbon monoxide (CO), Nitrogen Oxides (NO_x), and Particulate Matter (PM_{10} and $PM_{2.5}$).

Particulate Matter ("PM") less than ten micrometres in size (PM_{10}) can penetrate deep into the respiratory system increasing the risk of respiratory and cardiovascular disorders. PM_{10} arises from direct emissions of primary particulate such as black smoke and formation of secondary PM in the atmosphere by reactions of gases such as sulphur dioxide and ammonia. The main sources of primary PM_{10} are incomplete burning of fossil fuels such as coal, oil and peat and emissions from road traffic, in particular diesel engines. Other sources of particulates include re-suspended dust from roads. Natural PM includes sea-salt and organic materials such as pollens. The diverse sources and impacts of PM make it one of the most challenging issues to address.

Nitrogen oxides (NO_x), includes the two pollutants, nitric oxide (NO) and nitrogen dioxide (NO_2). Power-generation plants and motor vehicles are the principal sources of NOx, through high temperature combustion. NO_x contributes to the formation of acid rain and is also a recognised ozone precursor. Short-term exposure to NO_2 is associated with reduced lung function and airway responsiveness, and increased reactivity to natural allergens. Long-term exposure is associated with increased risk of respiratory infection in children. The construction phase is likely to lead to small localised increases in these emission levels which is likely to lead to a temporary imperceptible effect.

Due to the similar nature, timing and extent of the proposed work, the GCR and TDR options are not expected to affect the potential impact of the exhaust emissions discussed in **Chapter 18**. The construction phase is likely to result in an increase in exhaust emissions from construction vehicles and transport associated with the site works. The impact on air quality from an increase in exhaust emissions will be **short-term, slight negative** impact.

11.3 CUMULATIVE EFFECTS

The cumulative impact assessment of the Project has been set out in full in Chapter 18. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2

and 3. No cumulative effects on air and climate are predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3

11.4 MITIGATION MEASURES & RESIDUAL EFFECT

On review of the Mitigation Measures and residual effects outlined **Chapter 18,** section 18.3.7, it can be concluded that irrespective of which TDR option or GCR option is considered, the same Mitigation Measures are sufficient and will be implemented.

11.5 STATEMENT OF SIGNIFICANCE

This section has assessed the significance of potential effects of GCR option 2 or TDR option 2 and 3 on air quality. The GCR and TDR options have been assessed as having the potential to result in slight, negative, temporary/short-term effects during construction and decommissioning. There will be a slight, positive, long-term effect in terms of helping Ireland meet its international obligations to reduce greenhouse gas emissions for the overall project.

Given that only effects of significant impact or greater are considered "significant" in terms of the EIA Regulations, the potential effects of the Project with GCR option 2 or TDR option 2 and 3 on air quality and climate are considered not significant.

12 CULTURAL HERITAGE

For Assessment Methodology, Legislation and Guidance and summary of the consultation process for this element of the EIAR, refer to section 15.2.2, section 15.2.3 and section 15.2.6 of **Chapter 15.**

12.1 BASELINE DESCRIPTION

A baseline archaeological description and historical context is detailed in section 15.3 of **Chapter 15** this description covers the additional areas of GCR Option 2, TDR Option 2 and TDR Option 3.

12.1.1 Study Areas for GCR and TDR options

A 100m wide corridor area centred on the Grid Connection Route (GCR) (see **EIAR Volume III; Figure 15.13**) and any work areas required to facilitate the Turbine Delivery Route (TDR) was also assessed. This study area included GCR option 2 and TDR option 2 and 3.

The extent of the 100m Study Area centred on the Grid Connection Route and the Turbine Delivery Route has suitably facilitated the compilation of a robust baseline context for the known and potential Cultural Heritage resource within the vicinity of their localised footprints. This has informed an appraisal of the potential presence of any sub-surface elements which may be susceptible to direct or indirect effects.

12.1.2 Grid Connection Route: Cultural Heritage Receptors

A review of Cultural Heritage constraints within a 100m wide corridor centred on the Grid Connection Routes (GCR option 2) was carried out and these comprised recorded archaeological sites and designated architectural heritage structures. Reviews of historic OS maps and aerial/satellite images were also undertaken in order to assess the potential presence of unrecorded Cultural Heritage constraints within the roadways that comprise the route of GCR option 2. Undesignated Cultural Heritage receptors along the section of the GCR option 2 that differs to the proposed GCR (as assessed in chapter 14) is outlined in **Table 12.1**. There is one undesignated site (road-bridge CH15), construction at which will involve HDD and will not require any interventions to the bridge structures or within the associated watercourses (potential underwater cultural heritage receptors). As outlined in section 15.4.2 of chapter 15, road-bridge CH15 is considered low value receptors of negligible magnitude of impact, resulting in Not Significant significance of effects.

Table 12.1 Undesignated Cultural Heritage receptors along the L6323/ L6322 section of GCR option 2.

Grid Option	CH Ref	Name/Class	Townland	ITM	Approx. distance from Route
GCR option 2	CH15	Un-named road bridge	Mell	706256, 777279	0 m

There are eight recorded archaeological sites located within the GCR option 2 assessment corridor (**Table 12.2, Volume III Figure 15.13**). A historic church and graveyard (LH021-038001- and LH021-038002-/RPS Lhs021-008/NIAH13902114) together with a school-house (RPS Lhs021-016/NIAH13902113) is located in Ballymakenny, fronting the local roadway/GCR, while another historic church, graveyard and font (LH024-004001- to LH024-004003-) are located in Killineer townland 41 m distant to the roadway/GCR.

A ring-barrow (LH024-046---), enclosure (LH024-045---) and ditches with struck flint (excavation miscellaneous) (LH024-051---) at Tullyallen townland along the GCR route corridors were all excavated as part of construction works relating to the M1 motorway in 2000 and are now 'records-only' of these previously located sites.

Table 12.2 Recorded Archaeological Sites within GCR 100m Study Area

Grid Option	Monument No.	Classification	Townland	Approx. distance from Route
Option 2	LH021-038001-	Church	Ballymakenny	16 m
Option 2	LH021-038002-	Graveyard	Ballymakenny	1.4 m
Option 2	LH024-045----	Enclosure	Tullyallen	0 m
Option 2	LH024-046----	Barrow - ring-barrow	Tullyallen	34 m
Option 2	LH024-051----	Excavation - miscellaneous	Tullyallen	0 m
Option 2	LH024-004001-	Church	Killineer	41 m
Option 2	LH024-004002-	Graveyard	Killineer	41 m
Option 2	LH024-004003-	Font	Killineer	41 m

There are five designated architectural heritage structures located within the GCR option 2 assessment corridors (Table 12.3**, Volume III Figure 15.13**). These structures are also located within the proposed GCR and have been assessed in **Chapter 15**. Although it is noted that St Nicholas' Church of Ireland is also within the archaeological complex LH021-038001-. Piperstown House gate-lodge fronts the roadway, forming part of the house curtilage (RPS Lhs021-015/NIAH 13902112), as does Killineer House gate-lodge (RPS

Lhs024-003B/NIAH 13902428). A house NIAH 13902427 is also located along the GCR corridor at Killineer.

Table 12.3 Designated Architectural Heritage Structures within GCR 100m Study Area

Grid Option	RPS	NIAH	Name/Class	Townland	Approx. distance from Route
Proposed GCR & Option 2	Lhs021-015	13902112	Piperstown Gate Lodge	Piperstown	14 m
Proposed GCR & Option 2	Lhs021-008	13902114	St Nicholas' Church of Ireland	Ballymakenny	16 m
Proposed GCR & Option 2	Lhs021-016	13902113	St Nicholas School House	Ballymakenny	15 m
Proposed GCR & Option 2	-	13902427	House	Killineer	11 m
Proposed GCR & Option 2	Lhs024-003B	13902428	Killineer Gate-lodge	Killineer	9 m

12.1.3 Turbine Delivery Route: Cultural Heritage Receptors

There are two TDR options (other than the proposed TDR), these are TDR option 2 and TDR option 3. There are 3 no. locations along the TDRs that require temporary works to facilitate turning of wide-bearing loads. These 3 no. proposed temporary works areas will include road widening/ground reduction and as such have been reviewed in order to ascertain if there are any known or potential Cultural Heritage constraints located at these areas. In addition, a review of a 100m wide area radius at the 3 no. temporary works areas was also undertaken. The results of this review are presented in **Table 12.4.** There are no predicted likely effects on the Cultural Heritage resource at any of the three proposed temporary works areas.

Table 12.4 Review of Cultural Heritage constraints at TDR work areas (TDR option 2 and 3)

TDR Works Area	ITM Co-Ords	Assessment of work area on historic OS mapping	Recorded Cultural Heritage Constraint within 100m of location
1	705776, 784670	Existing roadway was built at time of 1st ed OS mapping (mid-19th C); enclosed field with no built cultural heritage structures to western verge (proposed works area).	None
2	707289, 776930	Modern roundabout junction within enclosed field adjacent existing 1st ed OS roadway to NE and quarries to south. No built cultural heritage structures at proposed works area.	None
3	706443, 776673	Modern roundabout junction; crosses an existing road on 1st ed OS. All proposed works within road surface. No built Cultural Heritage structures.	None

12.1.4 Field Work

The Project area was inspected in January 2022, December 2022, February 2024, and March 2024. Each of the development elements associated with the Project are described with respect to Cultural Heritage field walkover survey.

12.2 ASSESSMENT OF POTENTIAL EFFECTS

12.2.1 GCR Option 2: Cultural Heritage Receptors

There is one undesignated site (road-bridge CH15), construction at which will involve HDD and will not require any interventions to the bridge structures or within the associated watercourses (potential underwater cultural heritage receptors). As outlined in section 15.4.2 of **chapter 15**, road-bridge CH15 is considered low value receptors of negligible magnitude of impact, resulting in Not Significant significance of effects.

There are eight recorded archaeological sites located within the 100m Grid Connection Study Area for although three of these are excavated record-only sites. Upstanding sites comprise two historic churches and graveyards at Ballymackenny (roadside) and Killineer which are located 1.5m-41m distant from the grid connection route.

In addition, there are five designated architectural heritage structures which comprise two gate-lodges, a church (also an SMR), a school-house and a vernacular house. All of these structures front the local road network and will not be directly impacted by the GCR route which will be retained in-road and/or along the existing road verge only.

12.2.2 TDR options 2 & 3: Cultural Heritage Receptors

The TDR requires three discreet working areas to facilitate wide and abnormal loads (turning) along existing local road networks. There are no works locations that retain known Cultural Heritage receptors on or near these locations and as such there are no predicted direct impacts on the resource.

12.3 CUMULATIVE IMPACTS

All large projects within 20 km of the Proposed Development in the planning stage or operational stage (Appendix 2.4: List of Projects for Cumulative Assessment) have been rigorously assessed for environmental and ecological effects and where such effects are identified, mitigation has been incorporated into the planning. Refer to section 15.6 of Chapter 15 for an assessment of the Cumulative Impacts.

No likely significant residual cultural heritage effects are predicted to arise as a result of GCR option 2 or TDR options 2 and 3. The cumulative impact assessment of the Project on cultural heritage is set out in full in Chapter 15. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2 and 3. This is due to the temporary nature of the works for the TDR and minor divergence of the GCR. No cumulative effects on cultural heritage predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3.

The cumulative impact assessment of the Project has been set out in full in Chapter 15. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2 and 3. No cumulative effects on cultural heritage are predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3.

12.4 MITIGATION MEASURES AND RESIDUAL EFFECTS

The mitigation measures and residual effects described in **Section 15.5 of EIAR Chapter 15 Cultural Heritage** will be implemented for the GCR option 2 and TDR option 2 and option 3.

12.5 STATEMENT OF SIGNIFICANCE

An assessment has been made of the potential for significant effects of the GCR and TDR options on the Cultural Heritage resource. Following the application of effective mitigation measures based on best practice guidelines, including archaeological inputs during the Project design process combined with onsite archaeological works prior to and during the construction phase, the Project is not predicted to result in likely direct Significant effects on

the Cultural Heritage resource at construction stage whether the Proposed GCR or Proposed TDR is used, or GCR Option 2, TDR Option 2 or TDR Option 3.

13 MATERIAL ASSETS INCL. ROADS

This chapter assesses the impacts of GCR option 2 and TDR option 2 and 3 on material assets. The material assets assessed in this chapter are:

- Land Use - Agriculture
- Land Use - Forestry
- Telecommunications
- Electricity
- Air Navigation
- Quarries
- Utilities (gas, water, waste)

As for the proposed GCR, of GCR option 2 will connect the Site to Drybridge 110 kV substation west of Drogheda. A small section of the GCR option 2 is located within the redline boundary, with the remaining route located in the public roads i.e., lies within the existing road structure. Therefore, the section outside the redline boundary, has no potential to impact upon land use and this is therefore not assessed further, and as it is an underground GCR it does not require Aviation assessment.

Subsequently as part of the Request for Further Information TLI Group carried out Screening on Chapel Lane which is the Alternative GCR option 2. The L-6322 was noted as a narrow road at 5 m with existing water services on the west side of the road. In addition, existing ESB medium voltage underground cables were identified within the IDA section of Chapel Lane. The intention would be to run parallel while maintaining clearance distances. The services can be avoided and no impact is anticipated.

As for the proposed TDR, for TDR option 2 and 3, it is envisaged that the turbine nacelles, tower hubs and rotor blades will be delivered to the Proposed Development site from Galway Port, County Galway. Outside of the Redline Boundary all works are temporary and will be carried out above ground, e.g, vegetation clearance, removal of street furniture, and therefore has no potential to impact upon land use and this is therefore not assessed further' for land use changes, Telecommunications, Electricity, Aviation and Utilities.

13.1 ASSESSMENT OF POTENTIAL EFFECTS

13.1.1 Telecommunications

The construction of GCR option 2 and TDR option 2 and 3 will require relatively localised excavation and enabling works within the curtilage of the public road network and there will be no above ground structures. There will be no impact to telecommunication links.

13.1.2 Electricity Networks

This section describes the transmission network and the anticipated connection option. It is not proposed to utilise any elements of the distribution network.

The nationwide electricity transmission system allows for the transport of large volumes of electricity from generation stations, including wind farms, to bulk supply points near the main population centres where it interconnects with the distribution system.

GCR option 2 will be c. 12km in length and will be predominantly along the public roads corridor, with c.900m of the GCR in site access tracks within the Redline Boundary.

Connection will be sought from the grid system operator by application to EirGrid. The substation will connect via underground 38kV cables. At the existing Drybridge 110kV substation, the cable will connect into existing infrastructure within the confines of the substation and its compound. The Grid Connection will be constructed to the requirements and specifications SPEC-171213-AXS (Functional Specification the installation of ducts and ancillary structures for 38kV underground power cables and associated communication cables for contestable projects). See Substation Layout on **Planning Drawing 05949-DR-125-P1** and Control Building Elevations Section & Plan on **Planning Drawing 05949-DR-128-P1.**

As all on-site internal cabling will be underground as will the grid connection from the Onsite Substation and Control Building to the 110kV Drybridge substation, there will be no impact on the overhead electricity network.

The Development will contribute directly and in the long-term to the electricity network by strengthening it through the addition of electrical transmission infrastructure and through renewable energy generation.

Additionally, the internal cabling will be laid as outlined in the construction methodology for the Grid connection (**Appendix 14.1)**, specifying procedures required to facilitate

watercourse and road crossings, drainage management plan and access route to work area and consideration of existing services in the GCR. At the existing Drybridge 110kV Substation, the cable will connect into existing infrastructure within the confines of the substation and its compound and thus will have a **slight brief effect** on the electrical network during the construction phase.

There will no impact on the electrical network during the operational phase or the decommissioning phase.

13.1.3 Air Navigation

The construction of the GCR option 2 and TDR option 2 and 3 will require relatively localised excavation and enabling works within the curtilage of the public road network. There will be no impact to air navigation.

13.1.4 Quarries

The crushed stone for construction of the grid route option and the turbine delivery route options will come from licenced quarries in the locality such as:

- Kilsaran Quarry, Gallstown, Co. Louth
- Roadstone Mullaghcrone, Co. Meath
- Breedon Quarries, Heronstown, Co. Meath

The locations of these quarries in relation to the Proposed Development can be seen in **Figure 16.5** in **Chapter 16: Traffic and Transport**. The construction of the Project will impact natural resources such as aggregates which will be sourced from the quarries in proximity to the Wind Farm Site (**section 14.10.1**). This will have a **short-term slight negative** impact on natural resources for the duration of the construction phase of the Project. The quantity and type of waste generated is expected to be very similar, irrespective of which GCR or TDR option is selected. The quantity of stone required is expected to be very similar, irrespective of which GCR or TDR option is selected.

13.1.5 Utilities

As outlined in section 3.2.2 of this document, all works on the TDR option 2 and 3 are temporary surface works and do not require excavations. The works are confined to the temporary removal of street furniture, signage and placement of a temporary load bearing surface and vegetation clearance. There will be no potential impact to water and gas services as a result of the temporary works associated with TDR option 2 and 3 during the construction

phase. Furthermore, there will be no impact during the operational phase and no impact during the decommissioning phase.

Within this section, the impact of utilities are assessed on the section of road that differs to the proposed GCR route (280m along L6322 and the road L6323 which is 950m in length).

Gas:

TLI Group conducted a survey of the Preferred GCR and Option 2 There is one distribution gas pipeline (medium pressure line with operating pressures from 20 mbar to 7 bar10) laid in L6322, as shown in Grid Connection drawing 05949-DR-101-P1_SLP. Pipeline will require at least one (1 no.) overcrossing/undercrossing gas pipeline crossing, the methodology for which are shown in Drawing 05949-DR-116 and 05949-DR-117. Gas Networks Ireland will be consulted prior starting works, to allow early engagement in this project. During the operational phase any works will be due to maintenance of existing grid cable structures as such as there is no expected impact of gas networks. During decommissioning, works will be confined to cable removal from existing ducts. As such there is no expected impact on gas networks during the decommissioning phase.

Water:

GCR option 2: There is one Uisce Éireann water mains laid in L6322, as shown in Grid Connection drawing 05949-DR-101-P1_SLP. Crossing of watermains where required will be carried as shown in drawing 05949-DR-114-P1 (Watermain Under Crossing) and 05949-DR-115-P1 (Watermain Over Crossing). Prior to the construction phase, Uisce Éireann will be consulted again and advised on the project proposals, to allow Uisce Éireann to be involved in the pre-construction plans for this project and to advise of any new developments in the water services in the area.

During the operational phase any works will be due to maintenance of existing grid cable structures as such as there is no expected impact of water networks. During decommissioning, works will be confined to cable removal from existing ducts. As such there is no expected impact on the water networks during the decommissioning phase.

Potential impacts arising from the Project relating to existing water services have also been assessed and are detailed in **Chapter 11:** Hydrology and Hydrogeology and referred to in **Chapter 5:** Population and Human Health with accompanying mitigation measures.

13.1.6 Waste

There are many waste types generated from the construction and operational phase of the Project. These are general office waste, bowser waste, portaloo waste, excavated soil, washings, concrete waste and wash-out water, chemicals, fuel and oils, packaging waste and hazardous waste. Waste generated on site will be managed as per the Appendix 2.1, Waste management Plan (no.5).

Excavated Materials

The top 100mm layer of GCR option 2 (12km x 600m wide grid route excavation area) is potentially hazardous (containing Bitumen), this equates to 720m^3 of potentially hazardous material. This waste will be transported by an authorised waste permit holder to a licensed facility for disposal of hazardous bituminous materials (EWC code 17 03 02).

With exception to the hazardous waste (containing Bitumen) from the GCR, all excavated materials will be re-used/ stored on site as outlined above, thus removing the need for transport of excavated material from site and disposal at a waste facility. As such, the effect of material waste disposal will be not significant. The quantity and type of waste generated is expected to be very similar, irrespective of which GCR or TDR option is selected.

13.2 CUMULATIVE EFFECTS

All large projects within 20 km of the Proposed Development in the planning stage or operational stage (**Appendix 2.4:** List of Projects for Cumulative Assessment) have been rigorously assessed for environmental and ecological effects and where such effects are identified, mitigation has been incorporated into the design and planning process.

No likely significant residual material asset effects are predicted to arise as a result of GCR option 2 or TDR options 2 and 3. The cumulative impact assessment of the Project on material assets is set out in full in Chapter 14. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2 and 3. This is due to the temporary nature of the works for the TDR and minor divergence of the GCR. No cumulative effects on material asset predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3.

13.2.1 Landuse – Agriculture

There is no permanent loss of agricultural land associated GCR option 2 and TDR option 2 and 3. The cumulative effects of the Project as outlined in section 14.5.6 of Chapter 14, are unaltered by the assessment of GCR option 2 and TDR option 2 and 3.

13.2.2 Landuse – Forestry

There is no permanent loss of forestry associated GCR option 2 and TDR option 2 and 3. The cumulative effects of the Project as outlined in section 14.6.6 of Chapter 14, are unaltered by the assessment of GCR option 2 and TDR option 2 and 3.

13.2.3 Telecommunications

The cumulative effects of the Project as outlined in section 14.7.11 of Chapter 14, are unaltered by the assessment of GCR option 2 and TDR option 2 and 3.

13.2.4 Electricity Networks

The cumulative effects of the Project as outlined in section 14.8.7 of Chapter 14, are unaltered by the assessment of GCR option 2 and TDR option 2 and 3.

13.2.5 Air Navigation

There is no cumulative impacts relating to GCR option 2 and TDR option 2 and 3 and surrounding projects in relation air navigation during the construction, operation or decommissioning phase. The cumulative effects of the Project on air navigation, as outlined in section 14.9.7 of Chapter 14, are unaltered by the assessment of GCR option 2 and TDR option 2 and 3.

13.2.6 Quarries

The cumulative effects of the Project on natural quarry resources, as outlined in section 14.9.7 of Chapter 14, are unaltered by the assessment of GCR option 2 and TDR option 2 and 3. There are no changes to the cumulative impacts assessment relating to GCR option 2 and TDR option 2 and 3 and surrounding projects in relation natural quarry resources during the construction, operation or decommissioning phase.

13.2.7 Waste

There are no changes to the cumulative impacts assessment relating to GCR option 2 and TDR option 2 and 3 and surrounding projects in relation waste requirements during the construction, operation or decommissioning phase. The cumulative effects of the Project on waste facilities, as outlined in section 14.9.7 of Chapter 14, are unaltered by the assessment of GCR option 2 and TDR option 2 and 3.

13.3 MITIGATION MEASURES & RESIDUAL EFFECT

The mitigation measures and residual effects described in **Chapter 14 Material Assets** – Sections 14.7.9, 14.8.5, 14.9.6, 14.10.4, 14.11.6, 14.11.7 will be implemented for the GCR option 2 and TDR option 2 and option 3.

13.4 STATEMENT OF SIGNIFICANCE

As outlined Chapter 14, there is no significant negative impacts on Land Use: Agriculture, Land Use: Forestry, Telecommunications, Air Navigation, Quarries and Utilities (gas, water, waste). There is expected to be a **long-term moderate positive** residual impact on the electricity transmission infrastructure in the area (due to the installation of new infrastructure).

14 TRAFFIC AND TRANSPORT

This section assesses the impact that GCR option 2 and TDR option 2 and 3 will have local road users and traffic in the construction, operational and decommissioning phase.

14.1 BASELINE DESCRIPTION

Kellystown wind farm site is located to the east of the M1 motorway, approximately 9.3km to the north of Drogheda. Access to the onsite 38kV substation and the met mast will be from two existing access points on the L2275. The turbines will be linked to the onsite 38kV substation by underground electrical and communications cabling. The wind farm will be linked to the National Grid by an underground grid connection constructed from the onsite 38kV substation to the existing Drybridge 110kV substation. The wind farm site will be drained by an integrated site drainage network consisting of clean and dirty water drainage systems. The turbine components for the proposed Kellystown Windfarm will be shipped to the Port of Galway where they will be stored for transportation. The turbine components will be transported on the public road network using abnormal load vehicles between the Port of Galway and the wind farm site.

A description and images of the receiving environmental with regards to the local roads, road junctions and traffic counts are outlined in **Chapter 16**, Section 16.2.6.

14.2 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

14.2.1 Grid connection Works

The location of the Kellystown Windfarm grid connection is shown on **Figure 16.2** in Chapter 16**.** A detailed description of the grid connection works for GCR option 2 on the public road network is outlined below. The section of roads where the description differs from the proposed GCR, is marked in bold.

- L6274 - 38kV Cable trench from Turbine T1 to Site Entrance No. 2
- L2275 - Cable Trench in Public Road, Watermain Crossing, HDD Bridge / Stream Crossing, Joint Bay, Services Crossing, HDD Culvert Crossing
- L2308 - Cable Trench in Public Road, Joint Bay, HDD Bridge / Stream Crossing
- R132 - Cable Trench in Public Road, Culvert Crossing (Offline), Services Crossing, Joint Bay (Offline), Watermain Crossing, Culvert Crossing
- L6323 - Cable Trench in Public Road, Watermain Crossing, Services Crossing, HDD Bridge / Stream Crossing (**GDR option 2 only**)
- L6322 - Cable Trench in Public Road, Watermain Crossing, Services Crossing, Gas Main Crossing, HDD Bridge / Stream Crossing (**GDR option 2 only**)

- L63324 - Cable Trench in Public Road, Gas Main Crossing, Joint Bay, HDD Motorway Crossing, Gas Main Crossing, Watermain Crossing, Service Crossing
- R168 - Cable Trench in Public Road, Watermain Crossing, Joint Bay
- N51 - Cable Trench in Public Road, Service Crossing, Watermain Crossing
- L2322 - Cable Trench in Public Road, Watermain Crossing
- L2000 - Cable Trench in Public Road, Joint Bay, Service Crossing

14.2.2 Turbine Delivery Route and Enabling Works

The turbine components for the proposed Kellystown Wind Farm will be shipped to the Port of Galway where they will be stored for transportation. The turbine components will be transported on the public road network using abnormal load vehicles between the Port of Galway and the wind farm site. The Kellystown Windfarm turbine delivery route is shown on **Figure 16.3** in Chapter 16**.** Delivery vehicles will use the following road network to access the site. The section of roads where the description differs from the proposed TDR, is marked in bold.

- Exit from Port of Galway onto Dock Street – Galway County Council
- Lough Atalia Road – Galway County Council
- R339 – Galway County Council
- R336 – Galway County Council
- N6 national primary road – Galway County Council / Transport Infrastructure Ireland
- M6 motorway – Galway County Council / Transport Infrastructure Ireland / PPP Operator
- M6 motorway – Roscommon County Council / Transport Infrastructure Ireland
- M6 motorway – Westmeath County Council / Transport Infrastructure Ireland
- M4 motorway – Westmeath County Council / Transport Infrastructure Ireland
- M4 motorway – Meath County Council / Transport Infrastructure Ireland
- M4 motorway – Kildare County Council / Transport Infrastructure Ireland / PPP Operator
- M4 motorway – South Dublin County Council / Transport Infrastructure Ireland
- M50 Motorway – Fingal /South Dublin Co. Co. / Transport Infrastructure Ireland / PPP Operator
- M1 Motorway - Fingal County Council / Transport Infrastructure Ireland
- M1 Motorway - Meath County Council / Transport Infrastructure Ireland / PPP Operator
- M1 Motorway - Louth County Council / Transport Infrastructure Ireland
- R169 – Louth County Council (**TDR option 2 and 3 only**)
- R132 – Louth County Council (**TDR option 2 and 3 only**)
- L6274 – Louth County Council

A detailed description of the turbine delivery route and enabling works on the public road network is given in Section 4 and Appendix B of the Traffic Management Plan included in **Appendix 16.2** to Chapter 16. the works will include the following:

- ~~Galway Docks – Parking Restrictions in Galway Port Car Park, Alterations to Existing Fencing, Loadbearing Surface to be provided.~~
- Lough Atalia Road / R339 College Rd Junction – Contraflow Maneuver ~~Existing Signs and traffic lights to be temporarily removed during abnormal load deliveries.~~
- R338 / R339 Junction - Contraflow Maneuver, Flexi bollards to be removed ~~Existing Signs and traffic lights to be temporarily removed during abnormal load deliveries. Hedge to be trimmed.~~
- R339 / Connolly Avenue Junction – Road widening in verge, lamp posts, traffic lights and pole to be removed. Trees to be pruned. ~~Existing hedge to be trimmed.~~
- Connolly Avenue / R336 Junction – Road widening in verge, lamp posts and pole to be removed. Trees to be pruned. ~~Verge to be Strengthened, Lighting column and signs to be temporarily removed during abnormal load deliveries.~~
- R336 / N6 Junction - Contraflow Maneuver, road signs, lamp post railings and traffic lights to be temporarily removed. Trees to be trimmed. ~~Verge to be Strengthened, Lighting column to be temporarily removed during abnormal load deliveries.~~
- ~~N6 / R865 Junction – Traffic island to be Strengthened, traffic signals to be temporarily removed during abnormal load deliveries.~~
- ~~N6 R339 Junction - Traffic island to be Strengthened, traffic signals to be temporarily removed during abnormal load deliveries.~~
- N6 / N67 Coolagh Roundabout Segregated Left Turn Lane – Road signs and lamp posts to be removed. ~~The swept path analysis carried out at the roundabout slip lane indicates that abnormal loads will overrun the carriageway edge and oversail the road verge on the nearside and offside of the slip lane. Widening to withstand wheel loading from abnormal load vehicles to be provided. Lighting column and sign on nearside to be temporarily relocated. Signs to be relocated on the offside of the slip lane to allow load oversail.~~
- ~~M4 / M50 interchange, Lucan - Existing rebound bollards on the N4 Slip road hard shoulder to be temporarily removed during abnormal load deliveries.~~
- M1 Motorway Junction 10 M1 / N51 Roundabout – Road widening and modifications to street furniture. ~~The swept path analysis carried out at the junction indicates that verge widening will be required on the slip lane verge at the approach to the roundabout and at the exit from the roundabout. Existing signage in the verges to be removed to allow~~

~~loads to oversail when circulating the junction. Existing splitter islands to be modified to withstand wheel loading from abnormal load vehicles.~~

- N51 / R168 Hill of Rath Roundabout - Road widening and modifications to street furniture. ~~The swept path analysis carried out at the roundabout indicates that a temporary access road will be required through the roundabout central island to allow abnormal load vehicles to navigate the roundabout. The access road will be constructed to withstand wheel loading from abnormal load vehicles. Existing signage on the roundabout central to be relocated. Trimming of existing vegetation at the approach to the roundabout.~~
- N51 / R132 Rosehall Roundabout - Road widening and modifications to street furniture. ~~A swept path assessment has been undertaken and indicates that loads will overrun and oversail the verge on the right hand side approaching the roundabout and the left hand side existing the roundabout. Sign on the middle island approaching and existing the roundabout will be temporary removed to allow loads to oversail roundabout central island.~~
- R132 Northbound - Contraflow Maneuver.~~Abnormal load vehicles will contraflow the R132 slip lane to travel north on the R132 regional road. The contraflow manoeuvre has been agreed in principle with Louth County Council during the pre-planning process.~~
- R132 / L6274 Junction – Road widening in third party land, temporary access road. ~~The swept path analysis carried out at the junction indicates that a temporary access road will be required at the R132 / L6274 junction for abnormal load vehicles to navigate the bend.~~

The changes outlined above in Orange are from the Collett Sweep Path Analysis for the delivery of the Nordex 162 and Vesta 162 **Appendix 16.3** & **Appendix 16.3a.**

During decommissioning, for turbine removal the routes assessed in **Chapter 16: Traffic and Transport** will be utilised irrespective of which TDR is used (i.e, roads L6274 and R132), refer to section 16.2.23 of chapter 16. As a result, turbine removal during decommissioning using TDR option 2 and 3 is not required to be assessed in this document.

14.2.3 Haul Routes for Wind Farm Grid Connection HGV Traffic

All HGV traffic associated with the construction of the wind farm grid connection between the 38kV onsite substation and the 110kV substation at Drybridge will follow the grid connection route and associated diversions to access the works. Construction vehicles will be prohibited from using local roads which are not part of the grid connection works or local diversions. The grid connection route is shown in **Figure 16.2** in Chapter 16. Workers employed on the

grid connection works will follow the grid connection route shown in **Figure 16.2** in Chapter 16 to access the works.

14.2.4 Sensitive Receptors

The following sensitive receptors will be impacted by the additional traffic generated by the proposed Kellystown Windfarm and by works carried on and adjacent to the public road network as part of the wind farm development. Detailed descriptions of the works locations and traffic management measures are included in the Traffic Management Plan in **Appendix 16.7.**

Table 14.1: Sensitive Receptors – Construction Phase

Receptor	Sensitivity	Reason for inclusion
L6323	Medium	Grid connection works
L6322	Medium	Grid connection works
Full turnabout on M1, exit 14 (Charleville)	Low	Enabling works for transportation of turbine components (TDR option 2)
Exit 12 (heading south) on M1 motorway to R169	Medium	Enabling works for transportation of turbine components (TDR option 2)
Junction R169 and R132	Medium	Enabling works for transportation of turbine components (TDR option 2 and 3)
Junction L2254 and R132	Medium	Enabling works for transportation of turbine components (TDR option 2 and 3)
Exit 12 (heading north) on M1 motorway to R169	Medium	Enabling works for transportation of turbine components (TDR option 3)

Table 14.2: Sensitive Receptors – Operational Phase

Receptor	Sensitivity	Reason for inclusion
L6323	Low	Grid connection works
L6322	Low	Grid connection works

Table 14.3: Sensitive Receptors – Decommissioning Phase

Receptor	Sensitivity	Reason for inclusion
L6322	Medium	Removal of grid connection cable.
L6323	Medium	Removal of grid connection cable.

14.3 ASSESSMENT OF POTENTIAL EFFECTS

14.3.1 Wind Farm Traffic Generation

The estimated timescale for the completion of the construction phase is 18 months, inclusive of all works to Site Access Tracks, access routes, substation building and erection and commissioning of turbines and grid connection works. The estimated HGV and abnormal load deliveries of materials and turbine components required to construct the wind farm and the grid connection are given in **Table 14.4**.

As per the EPA Guidelines 2022, The significance of effects is based on the magnitude of the impact and the receptor sensitivity (assigned in section 14.2.4), see **Figure 14.1**. The significance of effects for the receptors identified on the GCR and TDR option (that were not assessed as part of the proposed GCR and proposed TDR) are show in Table 14.4.

Figure 14.1 EPA Guidelines 2022, Significance of Effects

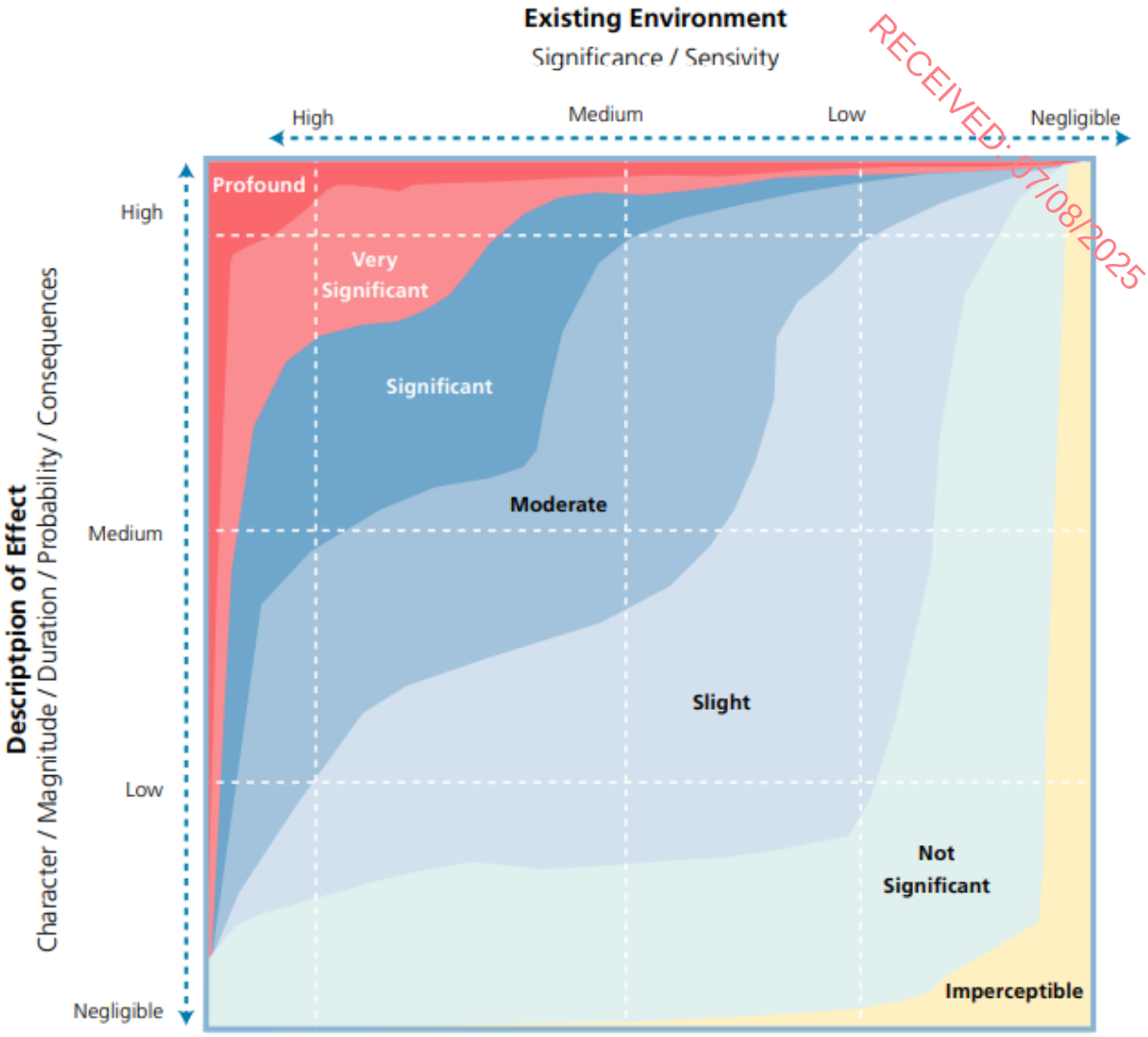

Table 14.4 Magnitude and Significance of Effects

Receptor	Sensitivity	Magnitude	Significance of Effect	Duration of Effect
Construction Phase – GCR option 2				
L6323 and L6322	Medium	Medium	Moderate	Short Term
Operational Phase- GCR option 2				
L6323 and L6322	Low	Low	Slight	Short Term
Decommissioning Phase- GCR option 2				
L6322	Medium	Low	Slight	Short Term
Construction Phase – TDR options 2 & 3				
M1, roundabout exit 14 (Charleville)	Low	Low	Slight	Short Term
Exit 12 on M1 (northbound) motorway to R169	Medium	Low	Slight	Short Term

Junction R169 and R132	Medium	Medium	Moderate	Short Term
Junction L2254 and R132	Medium	Medium	Moderate	Short Term
Exit 12 (southbound) on M1 motorway to R169	Medium	Low	Slight	Short Term

Due to the slight difference in the GCR and TDR routes this assessment has identified that the overall potential effects of the Project on traffic and transport (irrespective of which GCR or TDR is used) will remain as **Slight to Moderate**, given the mitigation measures embedded in the design and proposed (chapter 16, section 16.4) for the implementation of the Project.

14.4 CUMALATIVE EFFECTS

No likely significant residual traffic and transport effects are predicted to arise as a result of GCR option 2 or TDR options 2 and 3. The cumulative impact assessment of the Project on traffic and transport is set out in full in Chapter 16. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2 and 3. This is due to the temporary nature of the works for the TDR and minor divergence of the GCR. No cumulative effects on traffic and transport predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3.

14.5 MITIGATION MEASURES & RESIDUAL EFFECT

See **EIAR Chapter 16: Traffic and Transport – Section 16.7**

On review of the Mitigation Measures and residual effects outlined **Chapter 16,** section 16.4, it can be concluded that irrespective of which TDR option or GCR option is considered, no additional Mitigation Measures are required.

14.6 CUMALATIVE EFFECTS

14.6.1 Unrelated Proposed and Consented Developments

The proposed Kellystown Windfarm is located close to high quality public roads such as the M1 motorway, N51 national secondary road and the R132. The results of the traffic analysis in **Appendix 16.1** show that the R132/L6274/L2254 and the L6274/L2275 junctions will continue to operate with reserve capacity during wind farm construction and decommissioning periods. An additional analysis was carried out to test the capacity of the junction with the forecast growth on the public road network increased by an additional 10% to test the capacity of the junctions with additional development traffic which may arise in the future. The results of the analysis show that the junctions will continue to operate with reserve capacity with additional development traffic during construction in 2035 and decommissioning in 2070.

The Louth County Council planning portal provides details of planned developments in County Louth. A search of the portal in September 2024 showed that there is one (no. 1) planned development (Planning Application: 2360388) in the vicinity of the proposed Kellystown Windfarm which may generate an increased number of new trips on the public road network for a short period of time. Planning Application: 2360388 has been granted with conditions to develop a new Advanced Building Solution consisting of office and light industrial/production spaces, at the IDA Drogheda North Business Park, Mell, Drogheda, Co. Louth (c. 4,650m²) with associated car parking, site services, landscaping, underground water storage tank, independent ESB substation. The carpark and service yard entrance to this IDA development will be accessed from the L6323. A section of the GCR option 2 (approximately 950m) lies within L6323 and will therefore will in close proximity to the permitted IDA development. The substation for the IDA development is located to the back of the development, setback approximately 140m from the L6323. Conditional approval of this development from Louth County Council, stipulates archaeological input, noise and dust monitoring, site landscape plan, environmental management to ensure adherence of the proposed mitigations outlined in the NIS, and adherence to surface water and storm water disposal guidelines. The cumulative effects from works on GCR option 2 could include air pollution (dust), potential health impacts on nearby residents, noise and environmental degradation. Strict monitoring and control measures are necessary to ensure compliance with regulations and mitigate negative impacts on the surrounding area's amenity and well-being. However, given the brevity of the works on the GCR, management of the timing of the construction works will avoid any cumulative effects. L6323 is a short road of approximately 950m. Cable laying and trenching will typically move along the grid route at a rate of 100 to 200 m per day. There is one potential Horizontal Directional Drilling (HDD) crossing on L6323 for GCR option 2. The activity works associated HDD is typically 3-5 days. As such, the GCR works on the L6323 is expected to be completed within 3 weeks.

Furthermore, the L6323 has road access from each side; accessed from the east end via the R132 and accessed from the west end via the L6322. The permitted IDA development site is located on the northside of the east end of the L6323 and is approximately 200m in length. Works on the GCR route (GCR option 2) is expected to move along the L6323 at a rate of approximately 100 to 200 m per day, clearing the permitted IDA site in less than 3 days (at the lower rate of movement). The potential HDD location is a further 400m west of the permitted IDA development.

Potential cumulative effects from noise, dust and traffic disruption will be mitigated against by management of the timing of construction works. Furthermore, co-ordination between the two sites (Permitted IDA development and the Proposed Wind Farm Site) may result in streamlining of L6323 road opening, reducing the effects from noise, dust and traffic and reducing the use of materials associated with of a second road opening.

No likely significant residual traffic and transport effects are predicted to arise as a result of GCR option 2 or TDR options 2 and 3. The cumulative impact assessment of the Project on traffic and transport is set out in full in Chapter 16. The conclusions of this assessment do not change as a result of GCR option 2 or TDR options 2 and 3. This is due to the temporary nature of the works for the TDR and minor divergence of the GCR. No cumulative effects on traffic and transport predicted as a result of the Project, whether it utilises the Proposed GCR and Proposed TDR, or GCR option 2 or TDR options 2 and 3.

14.7 SUMMARY OF SIGNIFICANT EFFECTS

This section has assessed the significance of potential effects of the Project on traffic and transport in the event that GCR Option 2, TDR Option 2, or TDR Option 3 is used'. Grid connection works on the local road network requiring road closures have been assessed as negative due to the short-term disruption for public road users.

The significance of the effects has been assessed as slight on the public road network where traffic management / two way traffic flows can be maintained during enabling works and moderate / significant on local roads where road closures will be required to carry out the grid connection works.

The duration of effects relating to grid connection works, enabling works on the turbine delivery route and delivery of turbine components have been assessed as short Term lasting less than one year.

14.8 STATEMENT OF SIGNIFICANCE

This assessment has identified that the potential effects of the Project in the event that GCR Option 2, TDR Option 2, or TDR Option 3 is used on traffic and transport are considered to be **Slight to Moderate**, given the mitigation measures embedded in the design and proposed for the implementation of the Project.