

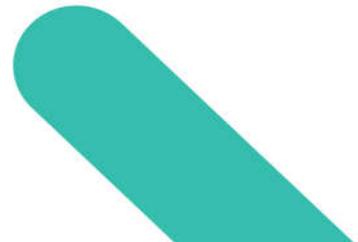
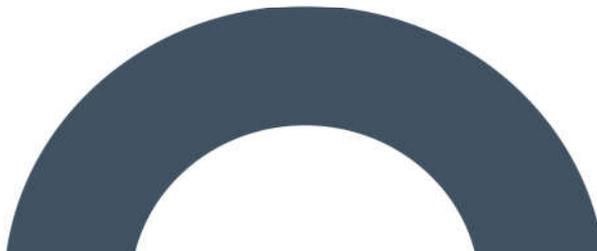
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# Environmental Impact Assessment Report

Carrig Renewables Wind  
Farm

Chapter 15 – Material Assets

Tipperary Planning Authority - Inspection Purposes Only!



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## DOCUMENT DETAILS

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# 1. INTRODUCTION

## 1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by MKO on behalf of Carrig Renewable Energy Ltd, who intend to apply to both Tipperary County Council (TCC) and Offaly County Council (OCC) for planning permission to construct a renewable energy development which will comprise 7 No. wind turbines, and associated infrastructure south of the village of Carrig, Co. Tipperary. The proposed development is being brought forward in response to regional, national, and European policy regarding Ireland's transition to a low carbon economy and associated climate change policy objectives.

The majority of the proposed development including the 7 no. turbines and associated infrastructure, on-site substation and 10.1 kilometres (km) of the underground grid connection cabling route is located in Co. Tipperary and will be the subject of an application for planning permission to TCC. The remaining 3.6km of the grid connection cabling route is located in Co. Offaly and will be the subject of an application for planning permission to OCC.

Both planning applications are accompanied by this EIAR. The planning applications are also accompanied by a Natura Impact Statement ('NIS').

Full details of the pre-application consultation undertaken with regards both planning applications can be found in Section 2.5.2 in Chapter 2 of this EIAR.

### 1.1.1 References to Proposed Development

For the purposes of this EIAR, where the 'Proposed Development' is referred to, this relates to turbines, access roads, temporary construction compounds, meteorological mast, junction accommodation works, spoil management, tree felling, site drainage, battery energy storage system, 38kV onsite substation and associated underground 38kV cabling connecting to the existing Dallow 110kV Substation. The Proposed Development is described in detail in Chapter 4 of this EIAR.

This EIAR, along with a Natura Impact Statement ('NIS'), will accompany the applications for planning permission for the Proposed Development which will be made to the local authorities. Both the EIAR and NIS contain the information necessary for the local authorities to complete the Appropriate Assessment and Environmental Impact Assessment as required for this planning permission application.

Both the EIAR and NIS take into account the combined impacts of these individual elements of the Proposed Development.

For clarity in this EIAR, all elements of the Proposed Development will be assessed cumulatively and in combination with other plans and projects to aid the local authorities in carrying out an EIA.

The EIAR Site Boundary identifies the primary EIAR site area for the Proposed Development, however, each individual topic, i.e., chapter, has its own study area for assessment purposes relevant to that topic which will be clearly identified in the relevant chapters. The actual site outline (red line boundary) for the purposes of the two planning permission applications occupies a smaller area within the primary EIAR Site Boundary. The EIAR Site Boundary encompasses an area of approximately 315 hectares (ha). The permanent footprint of the Proposed Development measures approximately 7.18 ha, which represents approximately 2.3% of the Site.

The Proposed Development is described in detail in Chapter 4 of this EIAR.

## Proposed Development Site Location

The core of the Proposed Development site is located approximately 2 kilometres west of the village Carrig, Co. Tipperary, 5.7 kilometres to the southwest of Riverstown, Co Tipperary and 7 kilometres southwest of Birr, Co. Offaly. It is proposed to access the Proposed Development via a new access track off the L5040 Local Road to the southeast of the Proposed Development. The Proposed Development is served by a number of existing public and agricultural roads and tracks. A site location context map is included as Figure 1-1. A site location map is included as Figure 1-2. The core of the EIAR Site Boundary is shown overlain on aerial imagery in Figure 1-3. For clarity, the planning application boundary is shown on Figure 1-4.

The grid connection includes for underground 38kV cabling from the proposed onsite 38kV substation, in the townland of Faddan More, to the existing Dallow 110kV substation in the townland of Clondallow, County Offaly. The underground cabling route to Dallow, measuring approximately 13.7km in length, is primarily located within the public road corridor.

Current land-use on the Proposed Development comprises coniferous forestry, peat-cutting and agriculture. Current land-use along the grid connection comprises of public road corridor, public open space, discontinuous urban fabric, and agriculture. Land-use in the wider landscape of the Site comprises a mix of agriculture, peat cutting, quarrying, low density residential and commercial forestry.

The townlands in which the Proposed Development is located are listed in Table 1-1.

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## 15. MATERIAL ASSETS

Material Assets are defined in the ‘Guidelines on the Information to be contained in Environmental Impact Assessment Reports’ (EPA, 2022) ‘as *‘built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure’*. They may be either of human or natural origin. The cultural assets of Archaeology and Cultural Heritage are addressed in Chapter 13 of this Environmental Impact Assessment Report (EIAR). Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are addressed in Chapter 8: Land, Soils and Geology, Chapter 9: Water, Chapter 11: Climate. Tourism and amenity resources, which are also considered material assets, are addressed in Chapter 5 on Population and Human Health. The Population and Human Health chapter also addresses existing land-uses (economic assets), including forestry and agriculture.

This chapter of the EIAR addresses the likely significant effects of the Proposed Development on transportation infrastructure (Section 15.1 Traffic and Transport), on Telecommunications and Aviation (Section 15.2) and Other Material Assets (Section 15.3), which are economic assets of human origin. Waste Management is also considered within the EPA 2022 Guidelines as part of Material Assets. EPA Waste Management pertaining to the construction, operation and decommissioning of the Proposed Development is summarised in Section 4.3.9.6 of Chapter 4 of the EIAR. Traffic volumes generated by the removal of waste from the Proposed Development to fully authorised waste facilities, is considered in Section 15.1 below.

This chapter of the EIAR has been prepared in accordance with the requirements of the EIA legislation and guidance outlined in Chapter 1: Introduction.

### 15.1 Traffic and Transport

#### 15.1.1 Introduction

##### 15.1.1.1 Background and Objectives

The purpose of this section is to assess the effects, on roads and traffic and transport, of the traffic movements that will be generated during the construction, operational and decommissioning phases of Carrig Renewables Wind Farm (the ‘Proposed Development’).

A full description of the Proposed Development, including construction phasing details, is provided in Chapter 4 of this EIAR. For developments of this nature, the construction phase is the critical period with respect to the traffic effects experienced on the surrounding road network in terms of the additional traffic volumes that will be generated on the road network, and the geometric requirements of the abnormally sized loads associated with the wind turbine components. The requirements of the additional traffic and abnormal loads generated during the construction stage were assessed for the surrounding public road network that will provide access to the Proposed Development site. Locations where remedial measures are required to accommodate the abnormal loads are identified.

The magnitude of the increase in traffic volumes experienced on the surrounding public road network is identified during the various construction stages of the Proposed Development. A Traffic Management Plan (TMP) has been developed and included as Appendix 15-2 of this EIAR. The TMP seeks to minimise the traffic impact on the local public road network.

All figures associated with this chapter have been included in Appendix 15-3 of this EIAR.

### 15.1.1.2 Statement of Authority

This section of the EIAR has been prepared by Alan Lipscombe of Alan Lipscombe Traffic and Transport Consultants Ltd. Alan is a competent expert in traffic and transport assessments. In 2007 Alan set up a traffic and transportation consultancy providing advice for a range of clients in the private and public sectors. Prior to this Alan was a founding member of Colin Buchanan's Galway office having moved there as the senior transportation engineer for the Galway Land Use and Transportation Study. Since the completion of that study in 1999, Alan has worked throughout the West of Ireland on a range of projects including: major development schemes, the Galway City Outer Bypass, Limerick Planning Land-Use and Transportation Study, Limerick Southern Ring Road Phase II, cost benefit analyses (COBA) and various studies for the NUI Galway. Before moving to Galway in 1997, Alan was involved in a wide variety of traffic and transport studies for CBP throughout the UK, Malta and Indonesia. He has particular expertise in the assessment of development related traffic, including many wind farm developments including the following; Ardderoo, Derryadd, Derrinlough, Knocknamork, Shehy More, Cloncreen, Derrykillev, Coole, Ballyhorgan, Cahermurphy, Lettergull, Barnadivane, Cleanrath and Knockalough.

Alan has a BEng (hons) Degree in Transportation Engineering (Napier University, Edinburgh, 1989), is a member of Engineers Ireland and of the Institute of Highways and Transportation and is a TII accredited Road Safety Audit Team Member.

Traffic counts were undertaken by Traffinomics Ltd, which is an Irish traffic survey company with a comprehensive knowledge of traffic data collection methods. The company, which is 10 years old, is headed by Simon Wheeler, who has been in the traffic survey data collection business for 35 years. Previously Simon worked with Count On Us Ltd, followed by Abacus Transportation Surveys Limited, Ireland's first lens based traffic data collection business. Clients of Traffinomics Ltd. include TII, Local Authorities and many leading retailers.

### 15.1.1.3 Guidance on Assessment of Effects

This section of the EIAR has been completed in accordance with the EIA guidance set out in Chapter 1. The assessment uses standard terminology to describe the likely significant effects associated with the Proposed Development. Further information on the classification of effects used in this assessment is presented in Section 1.7 of this EIAR.

### 15.1.1.4 Scoping and Consultation

#### Transport Infrastructure Ireland

Transport Infrastructure Ireland (TII) responded to Scoping on the 23<sup>rd</sup> of May 2023, in which it provided a list of recommendations to be followed when preparing the EIAR. All relevant TII guidelines and policies have been taken into account in the preparation of this assessment, including the following;

- PE-PDV-02045, Transport Assessment Guidelines, Transport Infrastructure Ireland, May 2014
- PE-PAG-02017, Project Appraisal Guidelines, Unit 5.3, Travel Demand Projections, Transport Infrastructure Ireland, October 2021
- DN-GEO-03060, Geometric Design of junctions, Transport Infrastructure Ireland, April 2017.

Specific traffic related issues raised by TII include the following;

- Consultations should be had with relevant Local Authority / National Roads Design Offices with regards to locations of existing and future national roads schemes. It is confirmed that extensive consultation has been undertaken with the Local Authorities as set out below.
- TII is specifically concerned as to the potential significant impacts the development would have on the national road network (and junction with national roads) in the proximity of the proposed development, including the potential haul route. The impacts of the Proposed Development in terms of link flows on the delivery routes are set out in Section 15.1.6.1 and 15.1.6.2 of the EIAR, while an assessment of the capacity of the N52 / L-5040 N junction is set out in Section 15.1.6.3. A swept path analysis undertaken for the abnormally large loads on the Turbine Delivery Route is set out in Section 15.1.9 of the EIAR. The assessment sets out the temporary local measures that will be required on the national, regional and local road networks during the construction of the Proposed Development.
- The developer should have regards to any EA/ EIS and all conditions and /or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should in particular have regard to any potential cumulative impacts. The traffic related cumulative impacts are addressed in Section 15.1.12.5.
- The developer, in preparing an EIAR, should have regard to TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works). It is confirmed that the design of access junctions is in accordance with TII guidelines.
- The developer, in preparing EIAR, should have regard to TII's Environmental Assessment and Construction Guidelines, including the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (National Roads Authority, 2006). Air quality is addressed in Chapter 10 of this EIAR.
- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. In relation to national roads, the Authority's Traffic and Transport Assessment Guidelines (2014) should be referred to in relation to proposed development with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of the NRA/TII TTA Guidelines which addresses requirements for sub-threshold TTA. Any improvements required to facilitate development should be identified. It will be the responsibility of the developer to pay for the costs of any improvements to national roads to facilitate the private development proposed as TII will not be responsible for such costs. It is confirmed that the assessment presented in Chapter 15 of the EIAR is undertaken in accordance with Traffic and Transport Assessment Guidelines, TII (2014).
- The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required, It is noted that there are no new access junctions proposed on the national road network and that only minor temporary works are proposed at existing junctions in order to accommodate the abnormally loads. Any temporary additional access points that are proposed on the national road network will be open for the duration of the deliveries which will be managed by Garda Siochana escort vehicles. These temporary access points will be closed at all other times. For this reason, a Road Safety Audit has not been undertaken at this stage, although the Applicant will do so if considered appropriate as the design progresses.
- In the interests of maintaining the safety and standard of the national road network, the EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network. All construction will be undertaken in accordance with current guidelines including the *Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works* (DoT now DoTT&S) and *Guidance for the Control and Management of Traffic at Roadworks* (DoTT&S).
- TII recommends that that applicant/developer should clearly identify haul routes proposed and fully assess the network to be traversed. It is noted that the email that accompanied the EIAR Scoping referral indicates a haul route to site utilising the M7, N52 and N62, national roads. Where abnormal 'weight' loads are proposed, separate structure approvals/permits,

and other licences may be required in connection with the proposed haul route. All national road structures on the haul route through all the relevant County Council administrative areas should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal 'weight' load proposed. The proposed haul routes are identified in this Chapter 15 of the EIAR. While it is proposed that the delivery stage of the Proposed Development will involve abnormally large loads, the axle loadings will not exceed accepted limits. A program of pre delivery condition and structural assessment of the route is however proposed, as set out in the Traffic Management Measures, included as Appendix 15-2.

- In addition, the haul route should be assessed to confirm capacity to accommodate abnormal 'length' loads and any temporary works required. It is confirmed that a geometric assessment was undertaken, as set out in Section 15.1.9.
- The applicant/developer should also consult with all PPP Companies, MMaRC Contractors and road authorities over which the haul route traverses to ascertain any operational requirements, including delivery timetabling, etc. to ensure that the strategic function of the national road network is safeguarded. The applicant agrees with this condition.
- Where temporary works within any MMaRC Contract Boundary are required to facilitate the transport of turbine components to site, the applicant/developer shall contact [thirdpartyworks@tii.ie](mailto:thirdpartyworks@tii.ie) in advance, as a works specific Deed of Indemnity will be needed by TII before the works can take place. The applicant agrees with this condition.
- Additionally, any damage caused to the pavement on the existing national road arising from any temporary works due to the turning movement of abnormal loads (eg. tearing of the surface course, etc.) shall be rectified in accordance with TII Pavement Standards and details in this regard shall be agreed with the Road Authority prior to the commencement of any development on site. The applicant agrees with this condition.

It is noted that the grid connection proposals outlined in the EIAR Scoping Report outlines the proposal to connect the Proposed Development to the 38kV Birr substation. The connection method (overhead line/underground cable) or grid connection route is not elaborated. Please note, any grid connection and cable routing proposals should be developed to safeguard proposed road schemes as TII will not be responsible for costs associated with future relocation of cable routing where proposals are catered for in an area of a proposed national road scheme. In that regard, consideration should be given to routing options, use of existing crossings, depth of cable laying, etc. Extensive detail of the route selection and construction methodology are provided in Chapter 3, while an assessment of the likely traffic related impacts is set out in Section 15.1.7 of this EIAR.

#### Department of Transport

A scoping request was issued to The Department of Transport on the 24<sup>th</sup> of May 2023 via email and an emailed response was received on the same day. The response primarily refers to issues relating to grid connection works within the public road network and recommends that alternative route options to the public road network should be considered. Alternative grid connection route options were considered in Chapter 3 of this EIAR.

#### Tipperary County Council

A pre-planning meeting was held with Tipperary Co. Council on the 29<sup>th</sup> of June 2023 at which representatives from MKO and Tipperary County Council Engineering Department were in attendance. Issues relating to the proposed grid connection, the public roads within the site boundary, the pre and post Proposed Development condition of the public road network, the turbine delivery route and the quantity of stone that will be required to be delivered to the site were discussed.

An additional meeting was held on Monday 4<sup>th</sup> September with the Planning and Roads Section of TCC where further discussions were held in relation to various matters including the Grid Connection

Route, sections of the Grid Connection that will take place within verges, footpaths and carriageways, and proposed traffic management measures for the L5040 during the delivery of cement and stone.

### 15.1.1.5 Methodology and Section Structure

The report adopts the guidance for such assessments set out by Transport Infrastructure Ireland, or TII, in the document number PE-PDV-02045 'Traffic and Transport Assessment Guidelines, May 2014'.

The geometric requirements of the transporter vehicles were assessed using AutoCAD and Autotrack.

The Traffic and Transport Section of the EIAR is set out as follows:

- A review of the existing and future transport infrastructure in the vicinity of the Proposed Development, including the proposed haul route, an assessment of 2023 traffic flows and traffic forecasts during an assumed construction year of 2028 (Section 15.1.2 Receiving Environment and 15.1.3 – Existing Traffic Volumes),
- A description of the nature of the Proposed Development and the traffic volumes that it will generate during the different construction stages and when it is operational (Section 15.1.4 – Proposed Development Traffic Generation),
- A description of the abnormally sized loads and vehicles that will require access to the site (Section 15.1.5 Construction Traffic Vehicles),
- A review of the effects of Proposed Development generated traffic on links and junctions during construction and when the facility is operational (Section 15.1.6 – Traffic Effects During Construction and Operation),
- A review of the effects of the Proposed Development on the public road network along the underground electrical cabling route (Section 15.1.7 Effect of grid connection on road network),
- A description of traffic management measures of large deliveries (Section 15.1.8 traffic Management of Large Deliveries),
- A geometric assessment of the routes and their capacity to accommodate the abnormal loads associated with the Proposed Development (Section 15.1.9 – Abnormal Load Route Assessment),
- An assessment of the provision for sustainable modes of travel (in this case primarily with respect to the transport of construction staff) (Section 15.1.10 – Provision for Sustainable Modes of Travel),
- A description of potential significant effects on Roads and Traffic (Section 15.1.11 – Likely and Significant Effect and Associated Mitigation Measures).

## 15.1.2 Receiving Environment

### 15.1.2.1 Site Location and Proposed Access Arrangements

The core of the Proposed Development site is located approximately 8 kilometres southwest of Birr, and 12 kms northeast of Borrisokane, in Co. Tipperary. It is proposed to access the Proposed Development site via the N52 National Secondary Road (off the Birr to Borrisokane section), followed by the L-5040 Local road to the southeast of the site. The site is served by a number of existing local and agricultural roads and tracks.

The grid connection includes for the proposed onsite 38kV substation in the townland of Faddan More, Co. Tipperary, Proposed Development site and associated underground 38kV cabling connecting to the existing Dallow 110kV substation located to in the townlands of Clondallow, County Offaly. The underground electrical cabling route, measuring approximately 13.7 km in length, is primarily located within the public road corridor.

The Proposed Development is shown in the context of the national and local highway networks in Figures 15-1a.

For the purpose of construction and operational traffic there is 1 point of access proposed to serve the Proposed Development site which is via a proposed access road off the L5040 local road.

### 15.1.2.2 Proposed Abnormal Load Delivery Route

The proposed port of entry for the large wind turbine components is the Port of Foynes in County Limerick. From the port the delivery route travels east on the N69 before joining the M7 to the southwest of Limerick City. The route then travels south of Limerick on the M7 heading east in the direction of Roscrea and Borris-in-Ossory.

The detailed assessment commences at this point where the proposed turbine delivery route turns left off the M7 junction 21 slip road to travel towards the Proposed Development site on the national and local road network, as shown in Figure 15-1a. The proposed turbine delivery route is as follows;

- Shannon-Foynes Port to the M7 south of Limerick City followed by the M7 towards to Junction 21 south of Borris-in-Ossory.
- From the M7 the turbine delivery route heads north of the R435 for 2.3km to the roundabout with the R445 to the west of Borris-in-Ossory.
- The turbine delivery route then turns left heading west on the R445 for 9.4 kms to the roundabout with the N62.
- From here the route travels west on the N62 for 19.6kms through Roscrea before traveling northwest to the town of Birr.
- Just to the south of Birr town centre the route then turns left onto the N52 travelling southwest for 7.1 kms through Riverstown to the junction with the L5040 Local Road.
- At this location the route heads west on the L-5040 for 1.2kms to the proposed site access junction which is located on the north side of the local road.

An assessment of the turning requirements of the abnormally sized loads transporting the turbine components was undertaken at the various pinch points along the route from Junction 21 on the M7 to the site entrance as identified in Figure 15-1b. The swept path assessments undertaken for these locations are discussed in Section 15.1.9.

### 15.1.2.3 Proposed Construction Traffic Haul Route

In order to facilitate the construction of the Proposed Development, all concrete, rock and hardcore material that will be required during the construction will be sourced from local, appropriately authorised quarries. The most likely quarries for the supply of concrete and stone are located to the north and south of Birr. The potential routes for general construction materials for the purposes of this assessment, is as per the route considered for the turbine components (as described in Section 15.1.2.2 above) with the additional route from the north of Birr via the N52 shown in Figure 15-2a.

### 15.1.3 Existing Traffic Volumes

Traffic volumes are discussed in terms of either vehicle numbers, or Passenger Car equivalent Units (PCUs), where each vehicle is expressed in terms of its demand on the network relative to the equivalent number of cars. For example, an articulated HGV was given a factor of 2.4 passenger car units (as per TII Project Appraisal Guidelines for National Roads Unit 5.2), while one of the extended HGVs transporting the large turbine components was assigned a value of 10.

### 15.1.3.1 Background Traffic Flows

The 8 no. locations included in the link flow assessment and for which base year 2023 traffic count data was collated are shown in Figure 15-2b. The locations included in the assessment are as follows,

- > Link 1 – L5040 to the site access,
- > Link 2 – N52 north of the L5040,
- > Link 3 – N52 south of the L5040,
- > Link 4 – N52 west of Birr,
- > Link 5 – N62 south of Birr,
- > Link 6 – N52 north of Birr,
- > Link 7 – N62 north of Roscrea,
- > Link 8 – R445 at Borris-in-Ossory,
- > Link 9 – M7 at Borris-in-Ossory.

Two sources of data were used to provide all day traffic flows for the links included in the assessment, as set out in Table 15-1. For Link 7 on the N62 north of Roscrea, Link 8 on the R445 at Borris-in-Ossory, and Link 9 on the M7, data obtained from automatic traffic counters (ATC Site) maintained by Transport Infrastructure Ireland (TII) is used. For the remaining Links 1 to 6, all day traffic counts were undertaken at the N62 / N52 roundabout in Birr and the N52 / L5040 junction leading to the site in order to provide 2-way link flows and junction turning count data. These traffic counts were undertaken by Traffinomics Ltd on Thursday 4<sup>th</sup> May, 2023. All base year Traffic count data is included as Appendix 15-1.

The all-day traffic flows observed for the base year 2023 are shown in terms of vehicle numbers in Table 15-2. As would be expected the figures show that there is a considerable range in existing traffic volumes on the proposed turbine delivery route and construction traffic route, ranging from 12,739 vehicles per day on the M7 at Borris-in-Ossory (Link 9), to 14,039 vehicles per day on the N52 north of the roundabout in Birr (Link 6), to 7,710 vehicles per day of the N52 west of Birr (Link 4), reducing to 2,153 vehicles per day on the N52 just north of the L5040 (Link 2), down to 252 vehicles per day on the L5040 heading towards the Proposed Development site.

Table 15-1 Count locations and data source

Link	Data source
1 – L5040 to site	Classified count
2 – N52 north of L5040	Classified count
3 – N52 south of L5040	Classified count
4 – N52 west of Birr	Classified count
5 – N62 south of Birr	Classified count
6 – N52 north of Birr	Classified count
7 – N62 north of Roscrea	TII ATC site
8 – R445 at Borris-in-Ossory	TII ATC site
9 – M7 at Borris-in-Ossory	TII ATC site

Table 15-2 All day traffic flows by location, year 2023 (2-way vehicles)

Link	2023
1 – L5040 to site	252
2 – N52 north of L5040	2,153
3 – N52 south of L5040	2,205
4 – N52 west of Birr	7,710
5 – N62 south of Birr	10,899
6 – N52 north of Birr	14,039
7 – N62 north of Roscrea	5,521
8 – R445 at Borris-in-Ossory	3,647
9 – M7 at Borris-in-Ossory	12,739

### 15.1.3.2 Background Traffic Volumes for the Assumed Construction Year 2028

This section describes the process adopted to produce background traffic forecasts for an assumed construction year of 2028.

Revised guidelines for forecasting annual growth in traffic volumes were produced by TII in October 2021, as set out by county in the Project Appraisal Guidelines (Unit 5.3 – Travel Demand Projections). The annual growth rates for light vehicles for County Tipperary and factors for the years relevant to this study are shown in Tables 15-3 and 15-4. Based on TII growth rates it is estimated that traffic volumes will increase by 6.1% (shown as 1.061 in Table 15-1) during the period from 2023, when the base traffic data was collected, and the year 2028, when the construction of the Proposed Development is forecast to take place. Year 2023 and 2028 all day traffic flows on the study area network are compared in Table 15-5.

It should be noted that while the assumed construction year of 2028 may vary slightly, this will not alter the forecast outcomes and effects presented in this section of the EIAR. This is due to the annual growth rate for background traffic being just 1.19% (as shown in Table 15-3 as 1.0119) and the traffic volumes generated by the Proposed Development will remain unchanged regardless of construction year, as presented subsequently in Section 15.1.4.

TII traffic count data recorded at the TII ATC sites, together with the classified traffic counts undertaken for the purpose of this assessment, were also used to determine the existing percentage of HGVs on the proposed delivery routes. The observed percentage of HGVs are shown in Table 15-6 and range from a minimum of 5.2% observed on Link 4 on the N52 west of Birr, to a maximum of 11.4% observed at Link 9 on the M7 at Borris-in-Ossory. On the L5040, Link 1, leading to the site, 6.3% of the total flow was observed to be HGVs.

While link capacities are discussed for the construction year 2028 in further detail in Section 15.1.6.2, it is worth noting that the link flows observed at the 3 arm roundabout linking the N62 and N52 were observed to be high in the year 2023, as set out in Table 15-5 and summarized below.

- > Link 4 – N52 west of roundabout - All day traffic flow = 7,710 vehicles
- > Link 5 – N62 south of roundabout - All day traffic flow = 10,899 vehicles
- > Link 6 – N52 north of roundabout - All day traffic flow = 14,039 vehicles

As they leave the urban area the link capacity for each link may be estimated based on road types and widths as set out in the TII Standards document DN-GEO-03031 Road Link Design, Table 6/1. For each of these roads it is considered in general that the road type is Type 3 single with a daily capacity of 5,000 vehicles. Based on this capacity and the flows above, it may be determined that Links 4, 5 and 6 are currently operating, in the year 2023, at 154%, 217% and 280% of capacity respectively. While the traffic flows observed on these links are high it is important to consider the following;

- > The link flows were established from an all-day classified turning count undertaken at the N52 / N62 roundabout which is close to a supermarket and other town centre uses. It is therefore likely that many trips observed on the links are very short in nature, with actual flows on the links as they approach the urban boundary of Birr likely to be significantly lower.
- > Observations on site indicate that the N52 / N62 roundabout in Birr operates without significant delays throughout the day.

Based on the above, when assessing the impact of the Proposed Development-generated traffic on link flows on the delivery route, it is important to consider the relative increase due to the Proposed Development. This issue is discussed further in Section 15.1.6.2.

Table 15-3 TII traffic growth forecasts, growth per annum and cumulative, County Tipperary

Year	Lights – Annual Factor			Lights – Cumulative Factor		
	Low	Medium	High	Low	Medium	High
2023	1.0102	1.0119	1.0152	1.000	1.000	1.000
2024	1.0102	1.0119	1.0152	1.010	1.012	1.015
2025	1.0102	1.0119	1.0152	1.021	1.024	1.031
2026	1.0102	1.0119	1.0152	1.031	1.036	1.046
2027	1.0102	1.0119	1.0152	1.041	1.048	1.062
2028	1.0102	1.0119	1.0152	1.052	1.061	1.078

Table 15-4 TII traffic growth rates by growth scenario

Period	New Factors		
	Low	Medium	High
2023 – 2028	1.052	1.061	1.078

Table 15-5 All day traffic flows by location and year (2-way vehicles)

Link	2023	2028
1 – L5040 to site	252	267
2 – N52 north of L5040	2,153	2,284
3 – N52 south of L5040	2,205	2,340
4 – N52 west of Birr	7,710	8,180
5 – N62 south of Birr	10,899	11,564
6 – N52 north of Birr	14,039	14,895
7 – N62 north of Roscrea	5,521	5,858
8 – R445 at Borris-in-Ossory	3,647	3,869
9 – M7 at Borris-in-Ossory	12,739	13,516

Table 15-6 All day flows, percentage HGVs and flows by vehicle type, year 2028

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / lgvs	HGVs	Cars / lgvs	Total
1 – L5040 to site	267	6.3%	17	251	40	251	291
2 – N52 north of L5040	2,284	10.5%	240	2,044	576	2,044	2,620
3 – N52 south of L5040	2,340	10.5%	246	2,094	590	2,094	2,683
4 – N52 west of Birr	8,180	5.2%	425	7,755	1,021	7,755	8,776
5 – N62 south of Birr	11,564	7.2%	833	10,731	1,998	10,731	12,729
6 – N52 north of Birr	14,895	6.8%	1,013	13,882	2,431	13,882	16,313
7 – N62 north of Roscrea	5,858	8.4%	492	5,366	1,181	5,366	6,547
8 – R445 at Borris-in-Ossory	3,869	7.7%	298	3,572	715	3,572	4,287
9 – M7 at Borris-in-Ossory	13,516	11.4%	1,541	11,975	3,698	11,975	15,673

## 15.1.4 Proposed Development Traffic Generation

### 15.1.4.1 Development Trip Generation – During Construction

For the purpose of assessing the effects of traffic generated during the construction of the Proposed Development, the construction phase is considered in two stages.

- Stage 1 – Proposed Development site preparation, groundworks, tree felling, construction of temporary construction compounds, turbine foundations, met mast foundation, onsite substation, internal electrical cabling, and grid connection underground electrical cabling route laying,
- Stage 2 – Wind turbine component delivery and construction.

For the purpose of the traffic impact assessment, projections based on trip generation data collected from other wind farm construction projects regarding the numbers of trips per quantum of material, the number of turbine component parts based on 7 no. turbines, the length of the construction phase and work periods etc. were made to inform the assessment. These projections allow for assessment using the precautionary principle but should not be inferred as prescriptive limitations to the construction phase.

The construction phase of the Proposed Development is expected to last approximately 12-18 months. The traffic generation estimates set out in the following paragraphs is based on a total construction period of 12 months. The shortest potential construction phase duration of 12 months was assumed for the purpose of this assessment in order to test a precautionary scenario. The shortest construction

period will give rise to higher volumes of construction traffic using the public road network at any one time. For assessment purposes a standard 255 working days was adopted for the 12 month construction period.

#### 15.1.4.1.1 Stage 1 – Site Preparation and Groundworks including Cable Laying

For assessment purposes, this stage of the Proposed Development construction, which includes the Proposed Development site preparation and ground works, turbine foundation construction, substation construction and internal cable laying elements, is assumed to last between 10 to 11 month (229 days). The total numbers of deliveries made to the Site during that period are shown in Table 15-7. It is estimated that a total of 24,539 deliveries by truck, cement mixer or standard articulated HGVs will be made to the Site during this period.

During this construction phase there will be two distinct types of days with respect to trip generation. A total of 7 days will be used to pour the 7 concrete wind turbine foundations. Foundations will likely be poured one per day, with circa 107 concrete loads required for each turbine delivered to the Proposed Development site over a 10-hour period, resulting in 11 HGV trips to and from the Proposed Development site per hour.

On the remaining 222 working days for this stage other general materials will be delivered to the Proposed Development site.

The estimated additional daily traffic generated on the road network during these days are shown in Tables 15-8 and 15-9.

The figures show that on the 7 days that concrete will be delivered to the Proposed Development site, an additional 514 two-way PCUs will be added to the network (comprising 107 two-way HGV trips with 2.4 PCUs per movement), as shown in Table 15-8. Similarly, on the 222 days when other materials will be delivered to the Proposed Development site, traffic volumes on the local network will also increase by an average of 514 PCUs, as set out in Table 15-9.

Table 15-7 Trip generation - Stage 1 - Site preparation and groundworks – total loads

Material	Total no. Truck Loads	Truck type
Concrete	749	Concrete mixers
Delivery of plant	27	Large artic
Fencing & gates	2	Large artic
Compound setup	28	Large artic
Steel	19	Large artic
Infill materials (Crushed stone)	16,359	Truck
Ducting and cabling (internal)	205	Large artic
Grid connection cable laying	2,722	Large artic
Tree felling	52	Large artic
Crane (to lift steel)	1	Large artic
Road construction	3,943	Truck

Substation	100	Large artic
Cranes for turbines	12	Large artic
Refuelling for plant	145	Large artic
Site maintenance	105	Large artic
Miscellaneous	70	Large artic
<b>Total</b>	<b>24,539</b>	

Table 15-8 Trip generation - Stage 1 – Concrete foundation pouring – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Concrete	749	Concrete mixers	2.4	1,793	256.0	514.0
* Estimation based on 7 concrete pouring days						

Table 15-9 Trip generation - Stage 1 – Site preparation and groundworks – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Delivery of plant	27	Large artic	2.4	64.8	0.29	0.58
Fencing & gates	2	Large artic	2.4	4.8	0.02	0.04
Compound setup	28	Large artic	2.4	67.2	0.30	0.61
Steel	19	Large artic	2.4	45.6	0.21	0.41
Infill materials	16359	Truck	2.4	39261.6	176.85	353.71
Ducting and cabling (internal)	205	Large artic	2.4	492.0	2.22	4.43

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Grid connection cable laying	2722	Large artic	2.4	6532.8	29.43	58.85
Tree felling	52	Large artic	2.4	124.8	0.56	1.12
Crane (to lift steel)	1	Large artic	2.4	2.4	0.01	0.02
Road construction	3943	Truck	2.4	9463.2	42.63	85.25
Substation	100	Large artic	2.4	240.0	1.08	2.16
Cranes for turbines	12	Large artic	2.4	28.8	0.13	0.26
Refuelling for plant	145	Large artic	2.4	348.0	1.57	3.14
Site maintenance	105	Large artic	2.4	252.0	1.14	2.27
Miscellaneous (incl. waste)	70	Large artic	2.4	168.0	0.76	1.51
<b>Total</b>	<b>23,790</b>			<b>57,096.0</b>	<b>257.19</b>	<b>514.4</b>
* Estimation based on groundwork period of 222 working days						

#### 15.1.4.1.2 Stage 2 – Turbine Construction

During the turbine construction stage, including delivery and assembly, there will be deliveries to the Proposed Development site made by abnormally sized vehicles, referred to in this section as *extended artics*, transporting the component parts of the turbines (nacelles, blades and towers). There will be deliveries made by standard large HGVs, transporting cables, tools and smaller component parts. The types of load and associated numbers of trips made to the Proposed Development site during the turbine construction period are shown in Table 15-10, which summarises that a total of 56 trips will be made to and from the Proposed Development site by extended artics, with a further 28 trips made by standard large articulated HGVs.

Table 15-10 Trip generation - Stage 2 – Wind turbine plant – total loads

Material	Units	Quantity per Unit	Total Quantity	Quantity per Truck	Total Truck Loads	Truck type
Nacelle	7	1	7	1	7	Extended Artic
Blades	7	3	21	1	21	Extended Artic
Towers	7	4	28	1	28	Extended Artic
<b>Sub total</b>					<b>56</b>	
Transformer	7	1	7	1	7	Large Artic
Drive train and blade hub	7	1	7	1	7	Large Artic
Base and other deliveries	7	2	14	1	14	Large Artic
<b>Sub total</b>					<b>28</b>	
<b>Total</b>					<b>84</b>	

For the purposes of this assessment, it is assumed that the turbine delivery element will progress at the rate of 3 extended artic trips made by convoy to the Proposed Development site on 5 days per week, which is a common delivery frequency for large turbine components from the port of entry to the Proposed Development site. This will result in this stage taking 19 days spread over a 4 week period with all deliveries made during the night.

On a further two days per week, lasting for approximately 4 weeks, the remaining equipment required during this phase will be delivered to the Proposed Development site. The additional traffic movements for these two types of days are summarised in Tables 15-11 and 15-12. In Table 15-11 a PCU equivalent value of 10 was allocated to each extended artic movement, resulting in an additional 60 PCUs on the study network on these 24 days, while an additional 19.2 PCUs are forecast to be on the network on 7 other days, as shown in Table 15-12, during the turbine construction phase.

Table 15-11 Trip generation - Stage 2 – Wind turbine plant, extended artics – total movements and volumes per delivery day

Material	Units	Truck Type	PCU Value	Total PCUs	2-way PCUs/ day
Nacelle	1	Extended Artic	10	10.0	20.0
Blades	3	Extended Artic	10	30.0	60.0
Towers	4	Extended Artic	10	40.0	80.0
Total per turbine	8			80.0	160.0

Material	Units	Truck Type	PCU Value	Total PCUs	2-way PCUs/ day
Total per delivery day	3			30.0	60.0
*Estimation based on 3 abnormal sized loads being delivered per night on 5 days per week (total 56 loads will take 19 nights spread over 4 weeks)					

Table 15-12 Trip generation - Stage 2 - Wind turbine plant, standard artic HGVs - total movements and volumes per delivery day

Material	Quantity per Unit	PCU Value	2-way PCUs / day
Transformer	1	2.4	4.8
Drive train and blade hub	1	2.4	4.8
Base & other deliveries	2	2.4	9.6
Total	4		19.2
*Estimation based on equipment for 2 turbines being moved per week spread over 2 days			

### Construction Employee Traffic

It is estimated that up to 70 staff members will be employed on the Proposed Development site during the Site preparation and groundworks stage of construction, with a maximum of 30 staff being on the site at any one time. Construction employee traffic for the Grid connection is dealt with in Section 15.1.7 below. If a precautionary scenario is assumed that all staff will travel to / from the site by car, at an average of 2 persons per car, then a total of 30 PCU movements (each trip is two way) will be added to the network during the groundworks stage (Stage 1) of the Proposed Development, reducing to 10 PCU trips during the turbine construction stage (Stage 2).

### Development Trip Generation – During Operation

It is estimated that the wind farm will be unmanned once operational and will be remotely monitored. The only traffic associated with the operational phase of the Proposed Development will be from maintenance personnel.

It is estimated that the traffic volumes that will be generated by the Proposed Development once it is operational will be minimal, with an estimated 3 staff employed on the Proposed Development site. The impact on the network of these trips during the operational stage is discussed in Section 15.1.6.

### Development Trip Generation – During Decommissioning

Traffic generation during decommissioning will be similar but significantly less than the trip generation estimates presented for the construction phase presented above. This is because much of the materials brought into Site during construction will be left in-situ during the decommissioning stage. A Decommissioning Plan is included as Appendix 4-5 of this EIAR.

### 15.1.5 Construction Traffic Vehicles

The delivery of turbine components including blades, tower sections and nacelles is a specialist operation owing to the oversized loads involved. As detailed in Section 4.3.1 in Chapter 4 of this EIAR, a range of turbine dimensions is being proposed. With respect to the geometric requirements of the road network, the traffic assessment is concerned with the longest blade being proposed, which is 81.5m.

The turbine blades are the longest turbine component and a blade length of up to 81.5 metres has therefore been assessed for the turbine delivery assessment for the Proposed Development.

The critical vehicles in terms of size and turning geometry requirements and used in the detailed route assessment discussed in Section 15.1.9, are the blade transporter and the tower transporter vehicles, with the geometry of each shown in Figures 15-3 and 15-4 respectively.

The key dimensions are as follows:

Transport of Blades – Standard articulated HGV with 10m blade overhang at rear (See Figure 15-3). At one location on the TDR (Location 7, N52/N52 roundabout south of Birr), as is discussed further in Section 15.1.9, it was required to shorten the wheelbase of the blade delivery vehicle by increasing the blade overhang to 15m, in order to negotiate an existing roundabout.

Total length	87.5 m
Length of blade	81.5 m
Inner radius	28.0 m

Transport of Tower – Using low-bed or drop deck trailers (See Figure 15-4)

Total length (with load)	42.8 m
Length of load	30 m
Inner radius	25.0 m

The vehicles used to transport the nacelles will be similar to the tower transporter although will be shorter in length.

All other vehicles requiring access to the site will be standard HGVs, trucks, cement mixers or LGVs and will be significantly smaller than the design test vehicles. Standard HGVs and LGVs will navigate the National and Regional Road networks and access the site off the L5040 at the proposed site entrance.

### 15.1.6 Traffic Effects During Construction, Operation and Decommissioning

As detailed below, transportation of large turbine components will be carried out at night when traffic is at its lightest and in consultation with the relevant Roads Authorities and An Garda Síochána with deliveries accompanied by Garda escort.

It should be noted that for the purpose of the assessment all vehicles travelling to and from the site of the Proposed Development have been assumed to do so from the same single direction. The assessment is therefore based on a precautionary scenario, where all traffic generated by the Proposed

Development site travels to/from the site via the same route, with the maximum increase in traffic volumes assessed on each link shown in Figure 15-2b.

The potential effects of the Grid connection underground electrical cabling route will have on the public road network is considered in Section 15.1.7.

### 15.1.6.1 Effect on Link Flows – During Construction

Background traffic volumes and Proposed Development generated traffic volumes are shown for the typical construction stage scenarios, discussed in Section 15.1.4 in Tables 15-13 to 15-16, with the forecast effects, in terms of the percentage increase in traffic flows in PCUs and the number of days affected, set out in Tables 15-17 to 15-20. As stated previously in this section the actual figures presented in the tables will be subject to change, however, they are considered a robust estimation of likely traffic volumes and effects.

In terms of daily traffic flows the potential effects may be summarised as follows:

#### During Stage 1 – Wind Turbine Foundation Concrete Pouring

For 7 days when the concrete foundations are poured an additional 582 PCUs will travel to/from the Proposed Development site. On the delivery route, it is forecast that the increase in traffic volumes on these days will range from +3.7% on the M7 (Link 9), to +13.6% on the R445 at Borris-in-Ossory (Link 8), to 8.9% on the N62 north of Roscrea (Link 7), to 22.2% on the N52 north of the L5040 (Link 2) approaching the Proposed Development site. On the L5040 leading to the Proposed Development site it is forecast that traffic flows will increase by 200.2% on these 7 days.

#### During Stage 1 – Site Preparation and Groundworks

On the remaining 222 days when the Proposed Development site preparation and groundworks and construction of the grid connection continues, an additional 585 PCUs will travel to and from the Proposed Development site. It is forecast that the increase in traffic volumes will range from +3.7% on the M7 (Link 9), to +13.6% on the R445 at Borris-in-Ossory (Link 8), to 8.9% on the N62 north of Roscrea (Link 7), to 22.3% on the N52 north of the L5040 (Link 2) approaching the Proposed Development site. On the L5040 leading to the Proposed Development site it is forecast that traffic flows will increase by 201.1% on these 222 days.

#### During Stage 2 – Wind Turbine Construction Stage – Delivery of large equipment using extended articulated vehicles

On the 19 days / nights that the abnormal loads carrying the large turbine components travel to the Proposed Development site, an additional 105 PCUs will travel to/from the Proposed Development site. It is forecast that the increase in traffic volumes on these days will range from +0.7% on the M7 (Link 9), to +2.4% on the R445 at Borris-in-Ossory (Link 8), to 1.6% on the N62 north of Roscrea (Link 7), to 4.0% on the N52 north of the L5040 (Link 2) approaching the Proposed Development site. On the L5040 leading to the Proposed Development site it is forecast that traffic flows will increase by 36.1% on these 19 days.

#### During Stage 2 – Wind Turbine Construction Stage – Other deliveries using conventional articulated HGVs

For 9 days an additional 64 PCUs will travel to/from the Proposed Development site. It is forecast that the increase in traffic volumes on these days will range from +0.4% on the M7 (Link 9), to +1.5% on the R445 at Borris-in-Ossory (Link 8), to 1.0% on the N62 north of Roscrea (Link 7), to 2.4% on the N52

north of the L5040 (Link 2) approaching the Proposed Development site. On the L5040 leading to the Proposed Development site it is forecast that traffic flows will increase by 22.0% on these 7 days.

Table 15-13 Daily traffic volumes on during concrete pouring - background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – L5040 to site	251	40	291	70	512	582	321	552	873
2 – N52 north of L5040	2,044	576	2,620	70	512	582	2,114	1,088	3,202
3 – N52 south of L5040	2,094	590	2,683	70	512	582	2,164	1,102	3,265
4 – N52 west of Birr	7,755	1,021	8,776	70	512	582	7,825	1,533	9,358
5 – N62 south of Birr	10,731	1,998	12,729	70	512	582	10,801	2,510	13,311
6 – N52 north of Birr	13,882	2,431	16,313	70	512	582	13,952	2,943	16,895
7 – N62 north of Roscrea	5,366	1,181	6,547	70	512	582	5,436	1,693	7,129
8 – R445 at Borris-in-Ossory	3,572	715	4,287	70	512	582	3,642	1,227	4,869
9 – M7 at Borris-in-Ossory	11,975	3,698	15,673	70	512	582	12,045	4,210	16,255

Table 15-14 Daily Traffic volumes during site preparation and groundworks – background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – L5040 to site	251	40	291	70	515	585	321	555	876
2 – N52 north of L5040	2,044	576	2,620	70	515	585	2,114	1,091	3,205
3 – N52 south of L5040	2,094	590	2,683	70	515	585	2,164	1,105	3,268
4 – N52 west of Birr	7,755	1,021	8,776	70	515	585	7,825	1,536	9,361

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
5 – N62 south of Birr	10,731	1,998	12,729	70	515	585	10,801	2,513	13,314
6 – N52 north of Birr	13,882	2,431	16,313	70	515	585	13,952	2,946	16,898
7 – N62 north of Roscrea	5,366	1,181	6,547	70	515	585	5,436	1,696	7,132
8 – R445 at Borris-in-Ossory	3,572	715	4,287	70	515	585	3,642	1,230	4,872
9 – M7 at Borris-in-Ossory	11,975	3,698	15,673	70	515	585	12,045	4,213	16,258

Table 15-15 Daily traffic volumes during turbine construction, extended artics – background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – L5040 to site	251	40	291	45	60	105	296	100	396
2 – N52 north of L5040	2,044	576	2,620	45	60	105	2,089	636	2,725
3 – N52 south of L5040	2,094	590	2,683	45	60	105	2,139	650	2,788
4 – N52 west of Birr	7,755	1,021	8,776	45	60	105	7,800	1,081	8,881
5 – N62 south of Birr	10,731	1,998	12,729	45	60	105	10,776	2,058	12,834
6 – N52 north of Birr	13,882	2,431	16,313	45	60	105	13,927	2,491	16,418
7 – N62 north of Roscrea	5,366	1,181	6,547	45	60	105	5,411	1,241	6,652
8 – R445 at Borris-in-Ossory	3,572	715	4,287	45	60	105	3,617	775	4,392
9 – M7 at Borris-in-Ossory	11,975	3,698	15,673	45	60	105	12,020	3,758	15,778

Table 15-16 Daily traffic volumes during turbine construction – standard artic HGVs, background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – L5040 to site	251	40	291	45	19	64	296	59	355
2 – N52 north of L5040	2,044	576	2,620	45	19	64	2,089	595	2,684
3 – N52 south of L5040	2,094	590	2,683	45	19	64	2,139	609	2,747
4 – N52 west of Birr	7,755	1,021	8,776	45	19	64	7,800	1,040	8,840
5 – N62 south of Birr	10,731	1,998	12,729	45	19	64	10,776	2,017	12,793
6 – N52 north of Birr	13,882	2,431	16,313	45	19	64	13,927	2,450	16,377
7 – N62 north of Roscrea	5,366	1,181	6,547	45	19	64	5,411	1,200	6,611
8 – R445 at Borris-in-Ossory	3,572	715	4,287	45	19	64	3,617	734	4,351
9 – M7 at Borris-in-Ossory	11,975	3,698	15,673	45	19	64	12,020	3,717	15,737

Table 15-17 Summary daily effects of Proposed Development traffic - concrete pouring - % increase and number of days

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – L5040 to site	291	582	873	200.0%	7
2 – N52 north of L5040	2,620	582	3,202	22.2%	7
3 – N52 south of L5040	2,683	582	3,265	21.7%	7
4 – N52 west of Birr	8,776	582	9,358	6.6%	7
5 – N62 south of Birr	12,729	582	13,311	4.6%	7
6 – N52 north of Birr	16,313	582	16,895	3.6%	7

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
7 – N62 north of Roscrea	6,547	582	7,129	8.9%	7
8 – R445 at Borris-in-Ossory	4,287	582	4,869	13.6%	7
9 – M7 at Borris-in-Ossory	15,673	582	16,255	3.7%	7

Table 15-18 Summary daily effect of Proposed Development traffic - site preparation and ground works - % increase and number of days

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – L5040 to site	291	585	876	201.1%	222
2 – N52 north of L5040	2,620	585	3,205	22.3%	222
3 – N52 south of L5040	2,683	585	3,268	21.8%	222
4 – N52 west of Birr	8,776	585	9,361	6.7%	222
5 – N62 south of Birr	12,729	585	13,314	4.6%	222
6 – N52 north of Birr	16,313	585	16,898	3.6%	222
7 – N62 north of Roscrea	6,547	585	7,132	8.9%	222
8 – R445 at Borris-in-Ossory	4,287	585	4,872	13.6%	222
9 – M7 at Borris-in-Ossory	15,673	585	16,258	3.7%	222

Table 15-19 Summary daily effect of Proposed Development traffic - turbine construction, extended artics - % increase and number of days

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – L5040 to site	291	105	396	36.1%	19
2 – N52 north of L5040	2,620	105	2,725	4.0%	19
3 – N52 south of L5040	2,683	105	2,788	3.9%	19
4 – N52 west of Birr	8,776	105	8,881	1.2%	19
5 – N62 south of Birr	12,729	105	12,834	0.8%	19
6 – N52 north of Birr	16,313	105	16,418	0.6%	19
7 – N62 north of Roscrea	6,547	105	6,652	1.6%	19
8 – R445 at Borris-in-Ossory	4,287	105	4,392	2.4%	19
9 – M7 at Borris-in-Ossory	15,673	105	15,778	0.7%	19

Table 15-20 Summary daily effects of Proposed Development traffic- turbine construction, standard artic HGVs – % increase and number of days

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – L5040 to site	291	64	355	22.0%	7
2 – N52 north of L5040	2,620	64	2,684	2.4%	7
3 – N52 south of L5040	2,683	64	2,747	2.4%	7
4 – N52 west of Birr	8,776	64	8,840	0.7%	7
5 – N62 south of Birr	12,729	64	12,793	0.5%	7
6 – N52 north of Birr	16,313	64	16,377	0.4%	7

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
7 – N62 north of Roscrea	6,547	64	6,611	1.0%	7
8 – R445 at Borris-in-Ossory	4,287	64	4,351	1.5%	7
9 – M7 at Borris-in-Ossory	15,673	64	15,737	0.4%	7

### 15.1.6.2 Link Capacity Assessment

An assessment of the impact on link capacity on the delivery route was undertaken for the various construction stages as set out in Tables 15-21 to 15-23 with the capacity of the links on the route options, as shown in Table 15-21, varying from 52,000 vehicles per day on the M7 down to 5,000 vehicles per day for the sections of the N52 and N62 on the delivery routes. There are no available capacity estimates for the narrow section of the L5040 which will be less than 5,000 vehicles per day, and for the purpose of this assessment is assumed to be 3,000 vehicles per day.

Capacities are based on road types and widths as set out in the TII Standards document DN-GEO-03031 Road Link Design, Table 6/1. It is noted that the link capacities adopted from the TII guidelines correspond to a Level of Service D, which the guidelines describe as being the level where;

*“Speeds begin to decline slightly with a slight increase of flows and density begins to increase somewhat more quickly. Freedom to manoeuvre within the traffic streams is more noticeably limited, and the driver experiences reduced comfort levels”.*

Background, or Do-Nothing Scenario traffic flows, are compared to flows forecast for the various construction delivery stages, in Table 15-22, with the percentage capacity reached for each stage shown in Table 15-23.

As was set out previously in Section 15.1.3.2 are it was determine that Links 4 (N52 west of Birr), 5 (N62 south of Birr) and 6 (N52 north of Birr) are currently operating (year 2023), at 154%, 217% and 280% of capacity respectively, and that when assessing the impact of the Proposed Development-generated traffic on link flows on the delivery route, it is important to consider the relative increase due to the Proposed Development.

Based on this assessment, it is forecast that the delivery route in close proximity to the Proposed Development will operate well within link capacity, with the N52 approaching the site forecast to operate at a maximum of 54% of capacity for the do nothing scenario, increasing to a maximum of 64% during the construction period. Similarly, the L5040 is forecast to operate at 10% for the do nothing scenario, increasing to 29% during construction.

It is noted that sections of the N52 and N62 on the delivery route are forecast to operate significantly over capacity for the do nothing scenario, with the busiest being the N52 north of the roundabout in Birr which is forecast to operate at 326% of capacity for the do nothing scenario, increasing to a maximum of 338% during construction.

Table 15-21 Delivery route carriageway widths, link type and link capacity (at Level of Service D)

Link	Width (m)	Link type	Link capacity (Level of Service D)
1 – L5040 to site	3.0	singletrack	3,000
2 – N52 north of L5040	6.0	Type 3 Single	5,000
3 – N52 south of L5040	6.0	Type 3 Single	5,000
4 – N52 west of Birr	6.0	Type 3 Single	5,000
5 – N62 south of Birr	6.0	Type 3 Single	5,000
6 – N52 north of Birr	6.0	Type 3 Single	5,000
7 – N62 north of Roscrea	6.0	Type 3 Single	5,000
8 – R445 at Borris-in-Ossory	7.3	Type 1 Single	11,600
9 – M7 at Borris-in-Ossory	2 x 7.0	M'way 2 + 2	52,000

Table 15-22 Delivery route link capacity and summary of link flows by construction delivery stage

Link	Link capacity (Level of Service D)	Construction delivery stage				
		Background traffic	Concrete pour	Other site works	Turbine plant	Turbine equipment
1 – L5040 to site	3,000	291	873	876	396	355
2 – N52 north of L5040	5,000	2,620	3,202	3,205	2,725	2,684
3 – N52 south of L5040	5,000	2,683	3,265	3,268	2,788	2,747
4 – N52 west of Birr	5,000	8,776	9,358	9,361	8,881	8,840
5 – N62 south of Birr	5,000	12,729	13,311	13,314	12,834	12,793
6 – N52 north of Birr	5,000	16,313	16,895	16,898	16,418	16,377

Link	Link capacity (Level of Service D)	Construction delivery stage				
7 – N62 north of Roscrea	5,000	6,547	7,129	7,132	6,652	6,611
8 – R445 at Borris-in-Ossory	11,600	4,287	4,869	4,872	4,392	4,351
9 – M7 at Borris-in-Ossory	52,000	15,673	16,255	16,258	15,778	15,737

Table 15-23 Delivery route link capacity and % of link capacity by construction delivery stage

Link	Link capacity (Level of Service D)	Construction delivery stage				
		Background traffic	Concrete pour	Other site works	Turbine plant	Turbine equipment
1 – L5040 to site	3,000	10%	29%	29%	13%	12%
2 – N52 north of L5040	5,000	52%	64%	64%	55%	54%
3 – N52 south of L5040	5,000	54%	65%	65%	56%	55%
4 – N52 west of Birr	5,000	176%	187%	187%	178%	177%
5 – N62 south of Birr	5,000	255%	266%	266%	257%	256%
6 – N52 north of Birr	5,000	326%	338%	338%	328%	328%
7 – N62 north of Roscrea	5,000	131%	143%	143%	133%	132%
8 – R445 at Borris-in-Ossory	11,600	37%	42%	42%	38%	38%
9 – M7 at Borris-in-Ossory	52,000	30%	31%	31%	30%	30%

### 15.1.6.3 Effect on Junctions – During Construction

The capacity of the junction most affected on the delivery route will be the priority junction between the N52 and the L5040 leading to the site. This is the only junction on the delivery route where it is forecast that a temporary increase in traffic flows will exceed 10% during the construction period. A 10% increase in traffic flows is the threshold set out in TII guidelines for Traffic and Transport Assessments, above which a detailed junction capacity assessment is required.

The junction was assessed using the industry standard junction simulation software PICADY, which permits the capacity of any priority junction to be assessed with respect to existing or forecast traffic movements and volumes for a given time period. The capacity for each movement possible at the junction being assessed is determined from geometric data input into the program with the output used in the assessment as follows:

**Queue** – This is the average queue forecast for each movement and is useful to ensure that queues will not interfere with adjacent junctions.

**Degree of Saturation or Ratio of Flow to Capacity (% Sat or RFC)** – As suggested, this offers a measure of the amount of available capacity being utilised for each movement. Ideally each movement should operate at a level of no greater than 85% of capacity.

**Delay** – Output in minutes, this gives an indication of the forecast average delay during the time period modelled for each movement.

#### Scenarios Modelled

The greatest effect will be experienced during peak hours when, during peak construction periods, approximately 11 HGVs (26 pcus) will be between the N52 and L5040 travelling to and from the Proposed Development site. It will be scheduled that construction staff will arrive and leave the Proposed Development site during hours outside the 10 hours that deliveries will be made to the site and will therefore not occur at the same time.

#### N52 / N62 Junction Capacity Test Results

The AM and PM peak hour traffic flows for the base year 2023 and the proposed construction year of 2028 are shown in terms PCUs in Figures 15-5a and 15-5b. The additional HGV movements that are forecast to be generated during the peak hours are shown in terms of HGV movements in Figure 15-5c and converted to PCUS in Figure 15-5d, with proposed construction year 2028 traffic flows including the additional construction traffic shown in Figure 15-5e. These traffic flows were used as input to the N52 / L5040 junction capacity tests.

The results of the junction capacity tests set out in Table 15-24 show that the additional HGV's passing through the junction will be accommodated and have a relatively minor effect on the operation of the junction. It is forecast that the development generated traffic will result in an increasing the maximum ratio of flow to capacity (RFC) from 0.5% to 5.4% during the AM peak hour, and from 1.3% to 6.2% during the PM peak hour, with both applying to the right turn movement from the N52 onto the L5040. The assessment shows that the junction is forecast to operate well within the acceptable limit of 85% in accordance with TII guidelines.

Table 15-24 Junction capacity test results, N52/L5040 junction, AM and PM peak hours, without and with construction traffic, by time period, year 2028

Period	Location	Without construction traffic			With construction traffic		
		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
AM	From L-5040 right turn	1.5%	0.02	0.12	1.8%	0.02	0.15
	From L5040 left turn	1.0%	0.01	0.09	5.3%	0.06	0.09
	From N52 – right turn	0.5%	0.01	0.10	5.4%	0.06	0.10
PM	From L-5040 right turn	2.5%	0.03	0.11	3.2%	0.03	0.14
	From L5040 left turn	1.1%	0.01	0.10	4.9%	0.05	0.09
	From N52 – right turn	1.3%	0.01	0.10	6.2%	0.07	0.11

#### 15.1.6.4 Effect on Link Flows – During Operation

Once the Proposed Development is operational it is estimated that there will be 3 staff members employed on site with a similar number of vehicle trips, that is 3 car/lgv trips to and from the site per day. As stated previously it is likely that the Proposed Development will attract some recreational trips, although it is expected that visitor numbers will be low. It is considered that the traffic impact during this phase will be negligible.

#### 15.1.6.5 Effect on Junctions – During Operation

As discussed in Section 15.1.6 it is forecast that once operational, the Proposed Development is expected to generate a maximum of 3 car/lgv trips to and from the site per day for maintenance purposes. It is also likely that small numbers of amenity traffic will be attracted to the site. It is therefore concluded that the Proposed Development will have a negligible effect on the local network once constructed.

#### 15.1.7 Effect of Grid connection on Road Network Grid connection

A detailed description of the Grid connection is provided in Section 4.3.6.4 and Section 4.9.7 of Chapter 4 of this EIAR. It is proposed that the 38kV onsite electrical substation in the townland of Faddan More, Co. Tipperary, is connected by means of an underground 38kV electricity cable to the existing 110kV Dallow substation located in the townland of Clondallow, north of Birr, Co. Offaly. The

proposed underground electrical cabling route is approximately 13.7km in length and is located predominately within the public road corridor.

The proposed underground electrical cabling route is shown in Figure 15-6 and commences at the proposed onsite 38kV substation in the townland of Faddan More. The 38kV onsite substation is located within the Proposed Development site and as such, have been considered in Section 15.1.6 above. The Grid connection underground electrical cabling route located within the road corridor is addressed below.

For the extent of the underground electrical cabling route that will impact on the public road network the Grid connection is considered in the following 11 sections, as indicated in Figure 15-6, with a summary of section length, construction duration and potential length of diversion during any road closure provided in Table 15-25. The estimated duration of construction for each section is based on one construction crew operating at one works area along the route at any time.

**Section 1** – (length 2.0 kms) – The 38kV Substation will be situated within a commercial forestry plantation located within the Proposed Development site with the cable route linking into the L-5041. From this point the electrical cabling route will continue south-east along the L-5041 for approx. 2.0km before joining the N52 in the townland of Ballaghar, Co. Tipperary. For this section of the underground electrical cabling route, the carriageway widths of the local road are narrow and local road closure at the location where the section of the underground electrical cabling route is being constructed will be required. Based on an average rate of 150m of cable being constructed in one day, it is estimated that this section of the underground electrical cabling route will take up to 13 days to complete. The location of the construction will be transient in nature with the extent of the section of road closed kept to a minimum. Local diversions will be put in place during the construction of this section with a potential detour route indicated in Figure 15-7a. It is estimated that the diversion incurred by local traffic during the construction of this section of ten cable route will be a maximum of 3.9 kms.

**Section 2** – (length 2.6kms kms) – The underground electrical cabling route then continues northeast along the N52 for approximately 2.6kms to a point where it meets the L-9520. While there are locations on this section of the cable grid where a full road closure may be required it is considered that 1 lane of traffic will be retained during most days, with 2-way traffic flow retained by means of a “stop and go” traffic management arrangement. Construction of this section of the underground electrical cabling route will take approximately 17 days. In the event that a full road closure is required the potential diversion route is shown in Figure 15.7b which will result is a diversion of 3.0 kms.

**Section 3** – (length 0.4kms) – This section of the route heads east on the L-9520 for 0.4kms to link into the L-1071. The carriageway is narrow and will require a full road closure during the approximately 3 days required for construction. The potential diversion route shown in Figure 15.7c will not result in any addition distance travelled for local trips.

**Section 4** – (length 1.3kms) – This section of the route heads northeast on the L-1071 for 1.3kms to link back into the N52 just to the west of Riverstown. The carriageway is narrow and will require a full road closure during the approximately 9 days required for construction. The potential diversion route shown in Figure 15.7d will result in an addition length of up to 0.9kms for local trips.

**Section 5** – (length 0.2kms kms) – This section continues on the N52 in a northeast direction between the L-1071 and the R489 in Riverstown. Should a full road closure be required during the construction of this short 0.2km section of the underground electrical cabling route, the diversion, as shown in Figure 15.7e, will be approximately 4.6 kms.

**Section 6** – (length 1.2kms) – The underground electrical cabling route then travels northwest on the R489 for approximately 1.2km to the junction with the L5045 just to the east of Killeen National School. It is considered that during the construction of the section of the electrical cable grid route that 2-way, or one-way with a “stop and go” facility will be retained during the approximate 8 days of construction.

In the event that a road closure is required at any location on this part of the route the potential diversion, which would add a maximum of 4.6km to a local trip, is shown in Figure 15.7f.

**Section 7** – (length 1.7kms) – This section of the route heads north past Killeen National School on the L-5045 to link into the L-70065. The carriageway is narrow and will require a full road closure during the approximately 11 days required for construction. The potential diversion route shown in Figure 15.7g will result in an addition length of up to 3.7kms for local trips.

**Section 8** – (length 1.1kms kms) – The underground electrical cabling route then continues east along the L-70065 for approximately 1.1km where it turns on to the R439 on the northeastern edge of the Birr urban area. It is considered that a one-lane stop and go type arrangement will be retained on all 7 construction days. In the event that a road closure is required, a potential diversion route for this section is shown in Figure 15.7h, which would add 4.9kms to each trip impacted.

**Sections 9 and 10** – (length 0.5 km and 2.0 kms) – Both of these sections of the route are on the R439 heading north out of Birr where a one-lane stop and go type arrangement will be retained on the 3 and 13 days required for construction respectively. Potential diversion routes, should they be required, are shown for Section 9 in Figure 15.7i (7.1kms) and for Section 10 in Figure 15.7j (3.1kms).

**Section 11** – (0.7km) – The final section of the route heads northwest from the R439 on the L-70152 to the access of the existing 110kV Dallow substation, in County Offaly. This section of the L-70152 is narrow and will require to be close during the approximate 5 days required for construction. The potential diversion route is shown in Figure 15.7k which will result in a diversion of approximately 4.2kms to local traffic.

It is estimated that the underground electrical cabling route will take approximately 91 days, or 5 months to construct.

With respect to the traffic volumes that will be generated during the construction of the underground electrical cabling route, it is estimated that there will be approximately 14 daily return trips made by a truck transporting materials, and 4 made by a car to transport 10 construction staff between one of the proposed temporary construction compounds and the Site. By its nature the impacts of these additional trips on the network will be transient and will therefore be temporary and slight.

The construction methodology of providing a grid connection underground electrical cabling route under and along local road networks is well established and accepted nationwide. There are in excess of 300 wind farms currently operational in the Republic of Ireland and the majority of these are connected to the national grid via underground cable connections predominantly along the public road networks.

A detailed **Traffic Management Plan (TMP)**, incorporating all the mitigation measures is included as Appendix 15-2. All measures will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the road's authority and An Garda Síochána prior to construction works commencing on Site.

Table 15-25 Cable grid connection, by Section, length and potential diversion

Section	Length (km)	Duration (days)	Diversion
Section 1 – L-5041	2.0	13	3.9
Section 2 – N52	2.6	17	3.0
Section 3 – L-9520	0.4	3	0.0
Section 4 – L-1071	1.3	9	0.9

Section	Length (km)	Duration (days)	Diversion
Section 5 – N52	0.2	1	4.6
Section 6 – R489	1.2	8	4.6
Section 7 – L-5045	1.7	11	3.7
Section 8 – L-70065	1.1	7	4.9
Section 9 – R439	0.5	3	7.1
Section 10 – R439	2.0	13	3.1
Section 11 – L-70152	0.7	5	4.2
Total	13.7	91	

### 15.1.8 Traffic Management of Large Deliveries

Traffic management measures are included in Section 15.1.12.5 and include the following:

- Identification of a delivery schedule,
- Details of the alterations required to the infrastructure identified in this report and any other minor alteration identified (hedgerows etc),
- A dry run of the route using vehicles with similar dimensions.

The transport of large components is challenging and can only be done following extensive route selection, route proofing and consultation with An Garda Síochána, the local authority and its road section and roads authorities. Turbine components are usually transported at night when traffic is lightest and this is done in consultation with the road’s authorities, An Garda Síochána Traffic Corp and special permits are generally required.

In some cases, minor accommodation works are required along the turbine delivery route such as hedge or tree cutting, temporary relocation of powerlines/poles, lampposts, signage and local road widening. Any upgrades to the public road network will be carried out in advance of turbine deliveries and following consultation and agreement with the relevant authorities, if required. It is not anticipated that any sections of the local road network will be closed.

Refer also to the Traffic Management Plan , Appendix 15-2 of this EIAR.

### 15.1.9 Abnormal Load Route Assessment

A route assessment was undertaken covering the proposed turbine delivery route, with the route and assessment locations shown in Figure 15-1b. The route assessment discussed in this section includes all locations on the proposed turbine delivery route from the left turn off the M7, to the Proposed Development site access junction on the local L5040 Local Road. The locations where the internal site network intersects with the existing local road network are also assessed.

A swept path analysis was undertaken at all locations using Autotrack in order to establish the locations where the wind turbine transporter vehicles will be accommodated, and the locations where some form of remedial measure may be required.

It is noted that a dry run involving a vehicle adapted to replicate the geometry of the extended transport vehicles will be undertaken over the entire turbine delivery route prior to the construction stage of the Proposed Development.

#### Location 1 – M7 junction 21 left slip / R435 junction (Derrinsallagh, Co. Laois)

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-8 and 15-9 respectively. The assessment undertaken for the blade transporter shown in Figure 15-8 indicates that a narrow temporary over-run area on the southern side of the slip road will be required and that the full width of the northern arm of the roundabout will be required for the vehicle to make the left turn. A temporary over-run of the splitter island will also be required. The assessment also indicates that the body of the blade will require to overhang outside the extent of the carriageway on the northwest corner of the roundabout and the blade tip will require to over sail the southern extent of the slip road. All temporary over-run areas are within the public road corridor.

The assessment set out in Figure 15-9 shows that the tower transporter will be accommodated at this location.

#### Location 2 – R435 / R445 roundabout, Borris-in-Ossory (Townparks, Borris-in-Ossory, Co. Laois)

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-10 and 15-11 respectively. Similar to Location 1 the assessment undertaken for the blade transporter shown in Figure 15-10 indicates that the full width of the southern and western arms of the roundabout will be required for the vehicle to make the left turn and that temporary over-run of the splitter islands on the southern and western arms will be required. Minor over-run areas on the east side of the R435 and the north side of the R445 will also be required. The assessment indicates that the body of the blade will require to overhang outside the extent of the carriageway on the southwest corner of the roundabout, and the blade tip will require to over sail the eastern extent of the southern approach to the roundabout. All temporary over-run areas are within the public road corridor.

The assessment set out in Figure 15-11 shows that the tower transporter will be accommodated at this location.

#### Location 3 – R445 / N62 roundabout and bend on N62 (Benamore, Co. Tipperary)

The swept path analysis undertaken for the blade and tower transporters negotiating this location is shown in Figures 15-12 and 15-13. For the blade transporter the assessment set out in Figure 15-12 shows that the full lane width will be required on the R445 approach to the roundabout and on the N62 exit from the roundabout, with temporary over-run areas required on both splitter islands. The blade tip will require to over sail into the southern carriageway on the R445 approach to the roundabout. As the blade transporter turns left at the bend to the north of roundabout the rear wheels of the vehicle will require an over-run strip to the east of the existing carriageway and the blade tip will require to overhang the boundary of the land on the eastern side of the road. The body of the blade transporter will also require to over-hang the carriageway edge on the southwest corner of the bend. A short temporary over-run area will be required on the northern side of the N62 as the vehicle makes the left turn at the bend. All temporary over-run areas are within the public road corridor.

Figure 15-13 shows that the tower transporter will be accommodated at this location.

#### Location 4 – N62 Dublin Road / N62 priority junction and mini roundabout on N62, Roscrea (Castleholding, Co. Tipperary)

The swept path assessment for the blade transporter shown in Figure 15-14 shows that a temporary over-run area will be required on the northeast corner of the priority junction between the carriageway edge and the residential boundary wall, in order to minimise the extent of the blade over-sail that will be required on the southern boundary of the N62 Dublin Road. The over sail of the blade will require to clear existing trees and shrubs. As the route heads northwest on the N62 a temporary over-run area through the centre island of the roundabout will be required as well as on the 2 splitter islands on the approach and exit to and from the roundabout. As shown in Figure 15-15, the assessment shows that the tower transporter will be accommodated at this location. All temporary over-run areas are within the public road corridor.

#### Location 5 – Bend on N62, Roscrea (Townparks, Roscrea, Co. Tipperary)

Figure 15-16, which shows the blade transporter negotiating the bend, indicates that a small strip of temporary over-run will be required on the northern side of the carriageway and that minor over sail of the blade tip over the residential boundary wall will also be required at this location. The body of the blade will require to overhang into the footpath on the southern side of the N62. Figure 15-17 indicates that the tower transporter will be accommodated at this location. All temporary over-run areas are within the public road corridor.

#### Location 6 – N62 / N52 roundabout (Townparks, Birr, Co. Offaly)

The swept path analysis for the blade and tower transport vehicles are shown in Figures 15-18 and 15-19. The swept path for the blade transporter set out in Figure 15-18 shows that a significant area of the existing grassed area on the northwestern corner of the roundabout will be required as a temporary over-run area during the turbine delivery stage of the Proposed Development. Please refer to Chapter 4, Section 4.4.2.2 of this EIAR for details in relation to accommodation area required at this location. In addition, the body of the blade will require to overhang into the public space on the southwest corner of the roundabout. The assessment also indicates that the blade tip will require to over-sail into the carpark on the eastern side of the N62. Figure 15-19 shows that the envelope required for the tower vehicle is significantly smaller than that required for the blade.

#### Location 7 – N52 / N52 roundabout (Townparks and Drumbane, Co. Offaly)

The swept path analysis for the blade transporter shown in Figure 15-20 indicates that a temporary over-run area in the existing grass verge located on the eastern side of the N52 to the north of the roundabout will be required. It is also noted that the body of the blade will require to overhang the wall just to the west of the roundabout. Figure 15-21 shows that the roundabout will accommodate the tower transport vehicles. All temporary over-run areas are within the public road corridor.

#### Location 8 – Bend on N52 (Drumbane, Co. Offaly)

Two narrow strips of temporary over-run area onto the existing footpath will be required on the east side of the N52 at this location in order to accommodate the blade transport vehicle, as shown in Figure 15-22. The blade tip will require a minor over-sail of the wall on the eastern side of the road. On the west side the body of the blade will require to overhang the footpath at the apex of the bend. Figure 15-23 shows that the roundabout will accommodate the tower transport vehicles. The temporary over-run area is within the public road corridor.

### Location 9 – Bend on N52 and bridge, Riverstown (Ballindarra, Co. Offaly and Ballyloughnane, Co. Tipperary)

As the blade transporter travels southwest towards the bend (on the eastern side of the village of Riverstown) the adjacent local access lane that runs parallel and to the south of the N52 will require to be utilised. The blade tip will be required to over-sail the existing wall and property on the eastern side of the N52 at this location, as shown in Figure 15-24.

As the vehicle travels west over the bridge, the full width of the bridge will be required, and the body of the blade and tip will require to over-hang the bridge walls vertically.

The traffic signals located on the east of the bridge will require to be removed temporarily. A short section of over run will be required on the northern side of the N52 to the west of the bridge.

It is noted that the dry run based on a vehicle assembled to represent the geometric requirements of the blade transporter will be essential at this location prior to the construction phase.

Figure 15-25 indicates that the tower transport vehicles will be accommodated at this location.

### Location 10 – N52 / L-1071 junction (Ballyloughnane, Co. Tipperary)

At this location it is proposed that a temporary accommodation area will be provided to avoid the sharp bend on the N52. Please refer to Chapter 4, Section 4.4.2.2 of this EIAR for details in relation to accommodation area required at this location. The proposed route through this location is shown for the blade and tower transporters in Figures 15-26 and 15-27. It is noted that this temporary accommodation area will be utilised only during the delivery of the abnormal loads (such as turbine components) which will be accompanied by a Garda escort and will be closed off by means of fencing and gates during all other times.

### Location 11 – N52 / L5040 junction (Clohaskin, Co. Tipperary)

A temporary accommodation area at the southwest corner of this junction is proposed in order to accommodate the geometric requirements of the abnormally large loads. Please refer to Chapter 4, Section 4.4.2.2 of this EIAR for details in relation to accommodation area required at this location. Figures 15-28 and 15-29 show that the blade and tower vehicles will be accommodated with this arrangement. It is also proposed that this area will be utilised as a dwell area for standard HGVs/ truck and cement mixers as part of the traffic management measures proposed for the general construction stage of the proposed development. This is discussed further in the TMP included as Appendix 15-2 of this EIAR.

### Location 12 – Main Site Access junction on the L5040 (Clohaskin, Co. Tipperary)

The proposed access junction layout on the L5040 and visibility splays are shown in Figures 15-30 and 15-31 respectively. Visibility splays of 90m x 3.0m are provided in accordance with a design (operational) speed of 60 km/h in order to facilitate safe access and egress through the junction. The junction design and visibility splays are in accordance with TII guidelines Geometric Design of Junctions (DN-GEO-03060) and Table 6.2 of the Tipperary County Development Plan 2022 -2028 Development Management Standards. These splays will be kept clear during the construction and operational stages of the Proposed Development.

The swept path analysis indicates that a temporary accommodation area will be required at this junction in order to accommodate the abnormally sized deliveries such as turbine components. These areas will be reinstated following the completion of the construction phase. Autotrack assessments for the blade and tower vehicles shown in Figures 15-32 and 15-33 demonstrate that these vehicles will be accommodated at the access junction.

It is proposed that this junction will serve as the main site access junction for all HGVs and abnormally sized loads during the construction phase. The junction will be closed off using fencing and gates during the operational phase and will only be used in the unlikely event of a turbine blade replacement or other abnormally sized delivery required for the purposes of wind farm maintenance.

### 15.1.10 Internal access junctions

From the access junction there 7 internal access junctions (A to G) that provide access through the site during the construction and operational stages of the proposed development. It is noted that traffic volumes on this section of the L5041 are very low, however, the default will be that junctions are managed on site using flagmen as part of the overall site traffic management plan. At junctions that will be used for the operational stage, 6m junction radii and 3m x 45m visibility splays are provided in order to ensure safe access and egress for maintenance staff. This is based on a design (operational) speed of up to 40 km/h. The internal junctions are shown in Figure 15-34 and are described below.

#### Internal junction A – L5041 / development access road (Cloncorrig, Co. Tipperary)

This junction links the main access road commencing at the L5040 with the existing L-5041 which traverses the site and forms part of the internal road, as shown in Figure 15-35. This junction will provide access through the site for all construction traffic (abnormally sized loads, all HGV's and construction staff) and will be managed by site staff at all times. This junction will be closed on completion of construction of the Proposed Development, and will be opened under exceptional circumstances only, for the replacement of a turbine component for example.

#### Internal junction B – L5041 / access to Turbine 5 (Cloncorrig, Co. Tipperary)

This junction links the section of the L5040 which forms part of the internal development access road at this location, with a proposed new access road that provides access to Turbine 05, as shown in Figure 15-36. This junction will provide for all vehicle types during construction and will revert to providing access for maintenance trips to Turbine No. 5 during the operational stage. Visibility splays of 45m along the nearside of the L-5041, taken from a setback of 3m (appropriate for a 30km/h design speed), will be kept clear during the construction and operational stages.

#### Internal junction C – L5041 / new site access road (Faddan More, Co. Tipperary)

At this bend on the existing L-5041 the site road network continues north through the site onto a new section of the site access road network as shown in Figure 15-37. This junction will provide access through the site for all construction traffic and will be managed by site staff at all times. This junction will be closed on completion of construction of the Proposed Development.

#### Internal junction D – L5041 / new site access road / access to Turbines 6 and 7

This proposed junction, shown in Figure 15-38, provides a route for all construction traffic travelling north, crossing the L5041 by means of a crossroads, to the road providing access to Turbine No's 6 and 7. During the construction stage this junction will require to be managed by construction staff. During the operational stage of the Proposed Development the arm of the construction road approaching from the south will be closed, while the access road to the north serving Turbine No's 6 and 7 will remain open for maintenance access, forming the minor arm of a priority type junction with the L-5041. Visibility splays of 45m along the nearside of the L-5041, taken from a setback of 3m will be kept clear during the operational stage.

### Internal junction E – L5041 / new site access road / access to Turbines 1, 2 and 3

This proposed junction, also shown in Figure 15-38, provides a route for all construction traffic travelling north, crossing the L-5041 by means of a crossroads, to the road providing access to Turbine No's 02 and 03. This junction will require to be managed by during the construction stage, while both arms on the construction route will be closed off during the operational stage of the Proposed Development.

### Internal junction F – L5041 / access to Turbine 1 / access to Turbines 2 and 3

All construction traffic for all vehicle types requiring access to Turbine No. 1 will travel south on the construction road past Turbine No. 2 crossing the L-5041 at Internal Junction F, as shown in Figure 15-39, towards Turbine No 1. During the construction phase this junction will be managed by construction staff at all times. During the operational stage this junction will provide access for maintenance to Turbine No 1 in the south, and Turbine No's 2 and 3 to the north. Visibility splays of 45m along the nearside of the L-5041, taken from a setback of 3m will be kept clear at both approaches to the junction during the operational stage of the Proposed Development.

### Internal junction G – L5041 / access to 38kV substation

Access for all construction and maintenance traffic associated with the proposed 39kV substation will gain access to the sit via Internal Junction G. During the construction phase this junction will be managed by construction staff at all times. Visibility splays of 45m along the nearside of the L-5041, taken from a setback of 3m will be kept clear during the construction and operational stages of the Proposed Development. This junction is also shown in Figure 15-39.

## 15.1.11 Provision for Sustainable Modes of Travel

### 15.1.11.1 Walking and Cycling

The provision for these modes is not relevant during the construction stage of the Proposed Development and travel distances will likely exclude any employees walking or cycling to work.

### 15.1.11.2 Public Transport

There are no public transport services that currently pass the Proposed Development site and car-pooling will be encourage for transporting staff to and from the Proposed Development site in order to minimise traffic generation and parking demand on the Proposed Development site. As the Grid connection underground electrical cabling route is located along the public road network there are a number of public transport services that service this aspect of the Site. However, due to the transient nature of construction works along the underground electrical cabling route, staff will typically be transported to the site by car.

## 15.1.12 Likely and Significant Effects and Associated Mitigation Measures

### 15.1.12.1 'Do-Nothing' Scenario

If the Proposed Development does not proceed there will be no additional traffic generated or works carried out on the road network and therefore no effects with respect to traffic.

### 15.1.12.2 Construction Phase

During the 7 days when the concrete foundations are poured, the effect on the surrounding road network an additional 582 PCUS will travel to and from the Proposed Development site. It is forecast that the effects will be negative, resulting in an increase in traffic volumes ranging from +3.7% on the M7 (Link 9), to +13.6% on the R445 at Borris-in-Ossory (Link 8), to 8.9% on the N62 north of Roscrea (Link 7), to 22.2% on the N52 north of the L5040 (Link 2) approaching the Proposed Development site. On the L5040 leading to the Proposed Development site it is forecast that traffic flows will increase by 200.2% on these 7 days. It is estimated that this will have a temporary, slight, negative effect on the N62 and N52, and a temporary moderate negative effect on the L5040.

During the remaining 222 days when the Proposed Development site preparation and groundworks and construction continues, an additional 585 PCUS will travel to and from the Proposed Development site. It is forecast that the increase in traffic volumes will range from +3.7% on the M7 (Link 9), to +13.6% on the R445 at Borris-in-Ossory (Link 8), to 8.9% on the N62 north of Roscrea (Link 7), to 22.3% on the N52 north of the L5040 (Link 2) approaching the Proposed Development site. On the L5040 leading to the Proposed Development site it is forecast that traffic flows will increase by 201.1% on these 222 days. Similarly, this will have a temporary slight negative effect on the N62 and N52, and a temporary moderate negative effect on the L5040.

With respect to the traffic volumes that will be generated during the construction of the underground electrical cabling route, it is estimated that there will be approximately 14 daily return trips made by a truck transporting materials, and 4 return trips made by a car to transport construction staff, to and from the Site. By its nature the effect impacts of these additional trips on the network will be transient and will therefore be temporary and slight.

During the 19 days / nights that the abnormal loads carrying the large turbine components travel to the Proposed Development site, an additional 105 PCUs will travel on the turbine delivery route. It is forecast that the increase in traffic volumes on these days will range from +0.7% on the M7 (Link 9), to +2.4% on the R445 at Borris-in-Ossory (Link 8), to 1.6% on the N62 north of Roscrea (Link 7), to 4.0% on the N52 north of the L5040 (Link 2) approaching the Proposed Development site. On the L5040 leading to the Proposed Development site it is forecast that traffic flows will increase by 36.1% on these 19 days. It is forecast that there will be a temporary, slight negative effect on traffic flows as the delivery of the abnormally sized loads is undertaken at night.

During the 9 days that an additional 64 PCUs will travel to/from the Proposed Development site delivering smaller component parts using standard HGVs, it is forecast that the increase in traffic volumes on these days will range from +0.4% on the M7 (Link 9), to +1.5% on the R445 at Borris-in-Ossory (Link 8), to 1.0% on the N62 north of Roscrea (Link 7), to 2.4% on the N52 north of the L5040 (Link 2) approaching the Proposed Development site. On the L5040 leading to the site a 22% increase is forecast. On these days it is considered that the additional traffic will have a temporary imperceptible negative effect on the N62 and N52, and a temporary slight negative effect on the L5040.

### 15.1.12.3 Operational Phase

The impacts on the surrounding local highway network will be negligible given that there will only be an average of 3 trips made to and from the Proposed Development site by car or light goods vehicle per day, with none required for the Grid connection underground electrical cabling route. The effects of the maintenance traffic on the surrounding highway network will therefore be imperceptible.

### 15.1.12.4 Decommissioning Phase

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 30 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the site may be decommissioned fully.

Any impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during part of the construction phase when turbines were being erected. The impacts and associated effects will be materially less than during the construction phase as significant ground works are not required to decommission a wind farm.

Following decommissioning of the Proposed Development site, turbine foundations, hardstanding areas and site tracks will be rehabilitated, i.e. left in place, covered over with local soil/subsoil and allowed to re-vegetate naturally, if required. The internal site access tracks may be left in place, as they may serve as useful access to the Agricultural and forestry land. It is considered that leaving these areas in-situ will cause less environmental damage than removing and recycling them.

While the actual number of loads that will require to be removed from the site in the event that the Proposed Development is decommissioned has not been determined at this stage, the impact in terms of traffic volumes will be significantly less than during the construction stage.

The underground electrical cabling connecting the turbines to the on-site substation will be removed from the cable ducts. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The grid connection underground electrical cabling route and onsite substation will remain in place as it will be under the ownership and operation of the ESB and Eirgrid. There are no impacts associated with this.

The works required during the decommissioning phase are described in Section 4.11 in Chapter 4: Description of the Proposed Development and the accompanying Decommissioning Plan included as Appendix 4-5 of this EIAR.

### 15.1.12.5 Mitigation Measures

This section summarises the mitigation measures to minimise the effects of the Proposed Development during both the construction and operational stages (decommissioning will be same as construction where required).

#### Mitigation by Design

Mitigation by design measures include the following;

- Selection of the most appropriate delivery route to transport the wind turbine components, requiring the minimum remedial works to accommodate the vehicles as set out in Section 15.1.8.

## Mitigation Measures During the Construction Stage

The successful completion of the Proposed Development will require significant coordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction stage of the Proposed Development in order to minimize the effects of the additional traffic generated by the Proposed Development. A detailed **Traffic Management Plan (TMP)**, incorporating all the mitigation measures included as Appendix 15-2 of this EIAR, will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the roads authority and An Garda Síochána prior to construction works commencing on Site. In addition, the traffic management measures proposed for the following construction traffic scenarios are set out for the grid connection in Appendix 14-2: Traffic Management Plan for Carrig Renewables Wind Farm Development;

- Delivery of Abnormally sized loads,
- Management of Standard HGVs on L5040 leading to site,
- Traffic management measures during construction of cable grid connection

The detailed TMP will include the following:

**Traffic Management Coordinator** – a competent Traffic Management Co-ordinator will be appointed for the duration of the construction of the Proposed Development and this person will be the main point of contact for all matters relating to traffic management.

**Delivery Programme** – a programme of deliveries will be submitted to Tipperary County Council and other relevant authorities in advance of deliveries of turbine components to the Proposed Development site. Liaison with the relevant local authorities including the roads sections of local authorities that the delivery routes traverse and An Garda Síochána, during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required.

**Information to locals** – Locals in the area will be informed of any upcoming traffic related matters e.g. delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the Contract Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided.

**A Pre and Post Construction Condition Survey** – A pre-condition survey of roads associated with the Proposed Development will be carried out prior to construction commencement to record the condition of the road. A post construction survey will be carried out after works are completed. Where required the timing of these surveys will be agreed with the local authority.

**Implementation of temporary alterations to road network at critical junctions** – At locations where required highlighted in Section 15.1.8.

**Identification of delivery routes** – These routes will be agreed and adhered to by all contractors.

**Travel plan for construction workers to Proposed Development site** – While the assessment above has assumed the worst case that construction workers will drive to the Proposed Development site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of a routes to / from the site and identification of an area for parking.

**Travel plan for construction workers to underground electric cabling route** – Due to the transient nature of the underground grid connection construction site which will generally be on a section of the public road, construction workers will be transported to and from the site by the construction company at the beginning and end of each shift.

**Traffic management measures on L5040** - Marshalling (at site access and eastern end of L5040) and control of traffic will be in operation during all of the 229 construction days, as set out in the TMP included as Appendix 15-2. The holding area proposed at the eastern end of the L5040, and demonstration that existing 3m x 215m visibility splays will be retained at the N52 / L5040 junction, are shown in Figures 15-40 and 15-41. Further details of the proposed measures are provided in the TMP, included as Appendix 15-2.

**Traffic management measures on L-5041 within site boundary** – Short term periodic closures of the sections of the L5041 within the Proposed Development site boundary will be required throughout the construction phase. Alternative diversion routes will be available to all local residents along the L-5041 and L5040, and access will be maintained for landowners and turbary rights holders throughout the construction phase.

**Drivers conduct** – All drivers will follow normal rules of the road and will receive toolbox talk regarding the delivery route and planned holding points prior to any deliveries.

**Normal permitted axial loads** – Will not be exceeded.

**Temporary traffic signs** – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including the access junction on the L5363. All measures will be in accordance with the “*Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works*” (DoT now DoTT&S) and “*Guidance for the Control and Management of Traffic at Roadworks*” (DoTT&S). A member of construction staff (flagman) will be present at key junctions during peak delivery times.

**Delivery times of large turbine components** - The management plan will include the delivery of large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage.

**Re-instatement works** - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.

**Additional measures** - Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including wheel washing facilities on Site and sweeping / cleaning of local roads as required.

It is confirmed that details for the Traffic Management Plan for the subject development will be agreed with the Road Section of Tipperary County Council prior to construction and contact will be maintained with the Road and Traffic Section throughout the construction phase.

### Mitigation Measures During Operational Stage

Due to the very low volumes of traffic forecast to be generated during this stage no mitigation measures are required.

### Mitigation Measures During Decommissioning Stage

In the event that the Proposed Development is decommissioned after the 30 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Section 4.11 of Chapter 4. A Decommissioning Plan has been prepared (Appendix 4-6) the detail of which will be agreed with the local authority prior to any decommissioning. This plan will include a material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning.

## 15.1.12.6 Residual Effects

### Construction Stage

During the 12-18 month construction stage of the Proposed Development, it is forecast that the additional traffic that will appear on the public road network serving the Site will have a short-term slight negative effect on existing road users for the majority of the delivery route, and a short-term moderate negative effect on existing road users and residents on the L5040 approaching the site. While the severity of the traffic effects relates to the additional volumes of traffic movements generated during the construction of the Proposed Development, the implementation of the mitigation measures included in the proposed traffic management plan will ensure a controlled and efficient operation during this stage, and minimise the impacts on local road users.

### Operational Stage

As the traffic impact of the Proposed Development will be imperceptible during the operational stage, there will be no residual effects during this stage.

### Decommissioning Stage

As stated above, in the event that the Proposed Development is decommissioned a decommissioning plan will be prepared and implemented in order to minimise the residual effects during this stage. The residual effect will be less than for the construction stage as set out above and will be slight to imperceptible.

## 15.1.12.7 Cumulative Effects

The extent of the study area to be included in the traffic related cumulative impact assessment was based on the guidance set out in the Traffic and Transport Assessment Guidelines, PE-PDV-02045, May 2014, TII, which states that the assessment should include “*developments granted planning permission, but which are yet to become operational as well as any planning applications that have been submitted but have yet to be determined*”.

The same guidelines are referenced to determine which of the developments that fit the above criteria will have a cumulative impact with the Proposed Development, which is a function of the level of increase on traffic volumes that may be experienced on a common road network.

An assessment of all developments at varying stages in the planning process (from proposed to operational), were assessed for the potential for cumulative traffic effects with the Proposed Development based on the following criteria;

- > Project status (proposed to operational)
- > Degree of overlap on the highway network (low to high)
- > Traffic volumes (low to high).

The developments included in the cumulative impact assessment are considered under the following groups;

- > Other wind farms,
- > Strategic Infrastructure Development (SID) applications made to An Bord Pleanala,
- > Quarries,
- > Other development applications in the Environmental Impact Assessment (EIA) process.

All developments within a 25 km radius of the proposed development were assessed.

### Other wind farms

The other wind farm developments within a 25 km buffer zone around the Proposed Development that were considered to have potential traffic related cumulative impacts are set out below in Table 15-26. Of the 7 wind farm developments listed, 6 are existing and were operational during the time that the base year 2023 traffic data was recorded. It is therefore concluded that there is no potential for additional traffic related cumulative impacts between these wind farms and the Proposed Development.

For the remaining wind farm included in the assessment, Derrinlough Wind Farm (21 turbines) is currently under construction and will be complete prior to the construction phase for the Proposed Development, negating the potential for cumulative impacts between the 2 developments.

Table 15-26 Summary of other wind farms considered in cumulative assessment and potential for cumulative traffic effects with Proposed Development

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential cumulative traffic effects*
1 Carrig Wind Farm (3 turbines)	Operational	High	Low	None, included in base traffic flows
2 Skehanagh Wind Farm (5 turbines)	Operational	High	Low	None, included in base traffic flows
3 Meenwuan Wind Farm (5 turbines)	Operational	Low	Low	None, included in base traffic flows
4 Derrinlough Wind Farm (21 turbines)	Under construction	Medium	Medium	None, will be completed prior to construction phase of Proposed Development
5 Monaincha Wind Farm (modification of existing turbines)	Operational	Medium	Low	None, included in base traffic flows
6 Leabeg Wind Farm (2 turbines)	Operational	Low	Low	None, included in base traffic flows
7 Cloghan Wind Farm (9 turbines)	Operational	High	Medium	None, included in base traffic flows

### Strategic Infrastructure Developments (SIDs)

There is one SID project within the 25km buffer zone around the Proposed Development site currently being considered by An Bord Pleanala, which is for the construction of a 110 kV substation, overhead

lines and associated works, in the townlands of The Sheehy, Monaincha and Corville, Roscrea, Co Tipperary. While there is a high level of overlap with the likely delivery routes for the proposed SID development and the turbine delivery route of the Proposed Development, there is minimal overlap with the N52 from the north of Birr where the bulk of materials required for the Proposed Development will originate. Based on the above, and the fact that the trip generation associated with proposed SID project will be light, it is considered that the potential for cumulative impacts between the 2 developments is imperceptible to slight and will occur only if both developments are constructed simultaneously.

### Quarries

There are 37 quarries that are within the 25km buffer zone of the Proposed Development site. All are, however, existing and were operational during the time that the base year 2023 traffic data was recorded. It is therefore concluded that there is no potential for additional traffic related cumulative impacts between these quarries and the Proposed Development.

### Other development applications in the Environmental Impact Assessment (EIA) process

There are a total of 8 other developments currently within the 25 km buffer zone progressing through the EIA process, as set out in Table 15-27. Of the 8 developments, 4 are constructed and were operational during the time that the base year 2023 traffic data was recorded. It is therefore concluded that there is no potential for additional traffic related cumulative impacts between these developments and the Proposed Development. For the remaining 4 of these, due to a combination of low traffic generation and distance from the Proposed Development, it is considered that the potential for traffic related cumulative impacts are imperceptible.

Table 15-27 Summary of other developments in EIA process considered in cumulative assessment and potential for cumulative traffic effects with Proposed Development

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential cumulative traffic effects*
1 Construction of a reinforced concrete underground storage tank, concrete access road, pumped irrigation system and all associated facilities and site works. Tipperary County Council	Constructed	High	Low	None, included in base traffic flows
2 Erection of 3 pig houses and demolition of 3 existing pig houses.	Constructed	High	Low	None, included in base traffic flows

Tipperary County Council				
3 Erection of 3 pig houses and demolition of 3 existing pig houses (same as above). Tipperary County Council	Constructed	High	Low	None, included in base traffic flows
4 Construction of dwelling garage, treatment plant, entrance and associated siteworks. Tipperary County Council	Proposed	Low	Low	Imperceptible
5 Upgrade and extension of an existing abattoir facility, to also include new drainage systems, water treatment plant, electrical sub-station, truck wash, security hut, waste and by-product area, gas compound, site access roads and all ancillary development. Offaly County Council.	Proposed	High	Low	Imperceptible
6 Amendments to the permitted Cloghan Wind Farm to include amendments to wind turbine height; minor re-siting of turbines; realignment of access tracks; and increased meteorological mast height.	Constructed	High	Medium	None, included in base traffic flows

Offaly County Council.				
7 The installation of approximately 8km of underground electricity line with a capacity of up to 38kV from the permitted Cloghan Wind Farm substation to the permitted Derrycarney electricity substation in the townland of Lumcloon. Offaly County Council	Proposed	Medium	Low	Imperceptible
8 The proposed demolition of three existing pig houses and to construct a second stage weaner house, extend a farrowing house, extend a loose sow house, construct a pre-finisher house, construct a slurry reception tank and all associated site works. Tipperary County Council	Proposed	Low	Low	Imperceptible

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## 15.2 Telecommunications and Aviation

### 15.2.1 Introduction

This section of the EIAR assesses the likely significant effects of the Proposed Development on other material assets such as telecommunications and aviation assets.

The full description of the Proposed Development, including proposed turbine locations and elevations, is provided in Chapter 4 of this EIAR.

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references: ‘Proposed Development’, ‘the Site’, ‘Wind Farm Site’ and ‘Grid Connection’.

Section 15.2.3 describes the way in which wind turbines can potentially interfere with telecommunications signals or aviation activities. Section 15.2.4 presents details on how such effects will be avoided, with the likely significant effects assessed (and mitigation measures proposed) in Section 15.2.5.

#### 15.2.1.1 Statement of Authority

This section of the EIAR has been prepared by Edward Ryan and reviewed by Eoin McCarthy of MKO. This section of the EIAR has been prepared by Edward Ryan and reviewed by Eoin McCarthy, both of MKO. Edward holds a MSc (hons) in Environmental Systems from Atlantic Technological University (previously GMT). Edward is an Environmental Scientist with over 3 years of consultancy experience in the environmental sector. Eoin holds a BSc. (Env.) in Environmental Scientist and is a Senior Environmental Scientist with over 12 years’ experience in the consultancy sector. Eoin has completed numerous Material Assets (Other Material Assets) sections of EIARs for wind farm developments.

### 15.2.2 Methodology and Guidance

This section of the assessment focuses particularly on the scoping and consultation exercise conducted with telecommunications operators and aviation authorities. Scoping was carried out in line with the EPA guidelines, and the ‘*Best Practice Guidelines for the Irish Wind Energy Industry*’ (Irish Wind Energy Association, 2012), which provides a recommended list of telecommunications operators for consultation.

A full description of the scoping and consultation exercise is provided in Section 2.6 of Chapter 2 of this EIAR. Consultation with the telecommunications operators and aviation bodies informed the constraints mapping process, which in turn informed the layout of the Proposed Development, as described in Chapter 3, Section 3.2.6 of the EIAR.

The assessment of likely significant effects on material assets uses the standard methodology and classification of impacts as presented in Section 1.7.2 of Chapter 1 of this EIAR.

### 15.2.3 Background

#### 15.2.3.1 Broadcast Communications

Wind turbines, like all large structures, have the potential to interfere with broadcast signals, by acting as a physical barrier or causing a degree of scattering to microwave links. The most significant effect at a domestic level relates to a possible flicker effect caused by the moving rotor, affecting, for example,

radio signals. The most significant potential effect occurs where the renewable energy development is directly in line with the transmitter radio path.

### 15.2.3.2 Domestic Receivers

Depending on local topography, a domestic receiver may receive broadcast signals from more than one location. The strength of the signals varies with distance from the transmitter, and the receiver's antenna is generally always directed towards the most local, and usually strongest, broadcasting station.

There are two types of potential electromagnetic interference to domestic receivers depending on the location of the receiver in relation to a wind farm. 'Shadowed' houses are located directly behind a wind farm, relative to the location from where the signal is being received. In this case, the main signal passes through the wind farm and the rotating blades can create a degree of signal scattering. In the case of viewers located beside the wind farm (relative to the broadcast signal direction), the effects are likely to be due to periodic reflections from the blade, giving rise to a delayed signal.

In both cases, i.e., shadowed houses located behind the wind farm and those located to the side of it, the effects of electromagnetic interference may depend to some degree on the wind direction, since the plane of rotation of the rotor will affect both the line-of-sight blockage to viewers located behind the wind farm and the degree of reflection to receivers located to the side.

### 15.2.3.3 Other Signal Types

Wind turbines have the potential to affect other signal types used for communication and navigational systems, for example tower-to-tower microwave communication links, and airborne and ground radar systems. Interference with radar systems occurs when wind turbines are located close to an airport or directly in line with the instrument landing approach. The nearest operational airport to the Proposed Development site is Birr Airfield which is located approximately 7km to the northeast of the Proposed Development site. The closest large international airport is Shannon Airport which is located approximately 71km to the southwest of the Proposed Development site.

Both airports listed above are outside the range at which such issues would be expected, and as detailed in Table 15-28 below, the Irish Aviation Authority noted no issues with the Proposed Development however they issued observations as discussed in Section 15.2.5.3.2.

## 15.2.4 Preventing Electromagnetic Interference

### 15.2.4.1 National Guidelines

Both the adopted '*Wind Energy Development Guidelines for Planning Authorities*' produced by the Department of the Environment, Heritage and Local Government (DoEHLG, 2006) (referred to as the Guidelines) and the Draft Wind Energy Development Guidelines for Planning Authorities (DoEHLG, 2019) (referred to as the draft Guidelines) state that interference with broadcast communications can be overcome by the installation of deflectors or repeaters where required.

Developers are advised to contact individual local and national broadcasters and mobile phone operators to inform them of proposals to develop wind farms. This consultation has been carried out by MKO as part of the assessment of the Proposed Development as summarised below in Table 15-28; full details are provided in Section 2.6 in Chapter 2 of this EIAR.

### 15.2.4.2 Scoping and Consultation

As part of the EIAR scoping and consultation exercise, MKO contacted the relevant national and regional broadcasters, fixed and mobile telephone operators, aviation authorities and other relevant

consultees. Consultation was also carried out with ComReg in order to identify any other additional licensed operators in the vicinity of the Wind Farm Site to be contacted, who may not have been on the list of main operators.

The responses received from the telecommunications and aviation consultees are summarised below in Table 15-28.

Table 15-28 Telecommunications and Aviation Scoping Responses

Consultee	Response	Potential for Interference Following Consultation Exercise
2m (RTÉ Transmission Network Ltd.)	22/09/2022	No
BAI	22/09/2022	
Broadcasting Authority of Ireland	19/01/2022	No
Commission for Communications Regulation	26/01/2022	N/A – Provided list of Telecommunications Operators in vicinity of site.
Eir	No Response	No
EMR Solutions	10/10/2022	No
Enet	22/10/2022	No
ESB Telecoms	No Response	
Imagine Group Communications	27/10/2022	No – link located within Proposed Development Site but 131m setback applied and adhered to.
Lighthouse	No Response	
TETRA Ireland Communications Ltd.	No response	
TG4	No response	
Three Ireland Ltd.	No Response	
Towercom	No Response	
Viatel Ireland Ltd.	No Response	
Virgin Media Ltd (previously UPC)	No Response	
Vodafone Ireland Ltd.	10/10/2022	No links traversing the site

Consultee	Response	Potential for Interference Following Consultation Exercise
Department of Defence	22/09/2022 and 11/05/2023	N/A – Refer to Section 15.2.4.2.3 below
Irish Aviation Authority	04/10/2022	N/A – Refer to Section 15.2.4.2.3 below

The scoping responses from the telecommunications and aviation consultees are described below. Relevant copies of scoping responses are provided in Appendix 2-1.

#### 15.2.4.2.1 **Broadcasters**

There are two broadcasters operating in Ireland, RTÉ Transmission Network (operating as 2rn) and Virgin Media.

RTÉ Transmission Network, replied on the 22<sup>nd</sup> September 2022 to a scoping request from MKO stating that the operation of the Proposed Development will not have any impact on RTÉ fixed links and stated that there is a low probability that it will cause any interference to Digital Terrestrial Television (DTT) services and Frequency Modulation (FM) services.

A standard Protocol Document will be prepared by 2rn for the Proposed Development.

No reply was received from Virgin Media.

#### 15.2.4.2.2 **Other Consultees**

Of the scoping responses received from telephone, broadband and other telecommunications operators, those who highlighted an initial potential interference risk are addressed below. The final proposed turbine layout does not overlap with any of the telecoms links or clearance zones requested by these operators. The remaining consultees who responded to scoping, operate links either outside the Wind Farm Site, and therefore are not subject to any interference risk, or do not operate any links in the area.

##### Imagine

Imagine responded to a scoping request from MKO on the 27<sup>th</sup> of October 2022, noting that they had links in the area, however there was no overlap with proposed turbine locations and therefore no interference with their links are anticipated.

##### Vodafone

Vodafone responded to a scoping request from MKO on the 10<sup>th</sup> of October 2022, noting that they had links in the area. However, these links did not traverse the site of the Proposed Development.

### 15.2.4.2.3 Aviation

As noted in Table 15-24 above, scoping responses were received from the following aviation consultees:

- Irish Aviation Authority (IAA)
- Department of Defence (Irish Air Corps)

Pertinent information has been summarised below, however the scoping response should be referenced to for further detail:

#### Irish Aviation Authority

In October 2022, a scoping response was received from the Irish Aviation Authority (IAA). The requirements of the IAA include the following:

1. *Agree an aeronautical obstacle warning light scheme for the wind farm development.*
2. *Provide as-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location. Horizontal extent of turbines and blade length will also be provided.*
3. *Notify the Authority of intention to commence crane operations with a minimum of 30 days prior notification of their erection.*

The nearest operational airport to the Proposed Development site is Birr Airfield which is located approximately 7km to the northeast of the Proposed Development site. The closest large international airport is Shannon Airport which is located approximately 71km to the southwest of the Proposed Development site.

In response to the lighting requirements requested by the IAA, the turbines will be marked on maps, lit at night and entered into aircraft navigation databases and therefore can be avoided during flight.

#### Department of Defence (Irish Air Corps)

The Department of Defence (DoD) replied on the 11<sup>th</sup> May 2023 and provided the following observations:

- The Minister for Defence is responsible for the regulation of military aviation, whereas the Irish Aviation Authority (IAA) is responsible for the safety regulation of civil aviation including aerodromes. The IAA does not have remit for military aviation or installations. Safeguarding of military flight operations and installations is intended to protect both current and future aircraft operations and also to take account of the security requirements associated with some of those operations.
- Single turbines, structures, or turbines delineating the windfarm should be illuminated by Type C, Medium intensity, Fixed Red obstacle lighting with a minimum output of 2,000 candela to be visible in all directions of azimuth and to be operational H24/7 days a week. Obstacle lighting should be incandescent or of a type visible to Night Vision equipment. Obstacle lighting must emit light at the near Infra-Red (IR) range of the electromagnetic spectrum, specifically at or near 850 nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light.
- Any Irish Air Corps (IAC) requirements are separate to Irish Aviation Authority (IAA) requirements.

## 15.2.5 Likely Significant Effects and Associated Mitigation Measures

### 15.2.5.1 'Do-Nothing' Scenario

If the Proposed Development were not to proceed, there would be no change to existing telecommunications and aviation operations in the area.

### 15.2.5.2 Construction Phase

The potential for electromagnetic interference from wind turbines occurs only during the operational phase of the Proposed Development. There are no electromagnetic interference impacts associated with the construction phase of the Proposed Development, and therefore no mitigation required. Potential impacts during turbine erection and commissioning are assessed in the operational phase impact assessment.

### 15.2.5.3 Operational Phase

#### 15.2.5.3.1 Telecommunications

##### Pre-Mitigation Effect

Consultation regarding the potential for electromagnetic interference from the Proposed Development was carried out with the relevant national and regional broadcasters, fixed line and mobile telephone operators and other operators, which confirmed that no turbines are proposed within the areas requested to be left clear of turbines.

##### Mitigation Measures

In the event of interference occurring to telecommunications, the Guidelines acknowledge that '*electromagnetic interference can be overcome*' by the use of diverter relay links out of line with the wind farm.

##### Residual Effect

The Proposed Development will have no residual impact on the telecommunications signals of any other operator, due to distance from or absence of any links in the area.

##### Significance of Effects

There will be no significant effect on telecommunications from the Proposed Development.

#### 15.2.5.3.2 Aviation

##### Pre-Mitigation Effect

The scoping response of the IAA has requested that standard lighting requirements be used at the Proposed Development.

## Mitigation Measures

The scoping response from the IAA and DoD sets out lighting requirements for turbines as detailed above. These requirements will be complied with for the Proposed Development and any further details will be agreed in advance of construction with the IAA, i.e crane erection. The coordinates and elevations for built turbines will be supplied to the IAA, as is standard practice for wind farm developments.

## Residual Effect

The Proposed Development will have no residual impact on aviation as all lighting requirements will be met by the applicant.

## Significance of Effects

There will be no significant effect on aviation operations due to the Proposed Development.

### 15.2.5.4 Decommissioning Phase

As stated in Section 15.2.5.2 above, the potential for electromagnetic interference from wind turbines occurs only during the operational phase of the Proposed Development. There are no electromagnetic interference impacts associated with the construction or decommissioning phases of the Proposed Development, and therefore no mitigation required.

### 15.2.5.5 Cumulative Effect

Chapter 2, Section 2.7 of this EIAR describes the methodology used in compiling the list of permitted or proposed projects and plans in the area, (wind energy or otherwise) considered in the assessment of cumulative effects, and provides a description of each project, including current status, and is set out in Section 2.7 in Chapter 2 of this EIAR. There are no existing wind farms in the surrounding area, the closest proposed wind farm development is located approximately 4km southwest. Therefore, there will be no cumulative effects relating to the Proposed Development and surrounding projects in relation to telecommunications or aviation.

During the development of any large project that holds the potential to effect telecoms or Aviation, the Developer is responsible for engaging with all relevant Telecoms Operators and Aviation Authorities to ensure that the proposals will not interfere with television or radio signals by acting as a physical barrier. In the event of any potential impact, the Developer for each individual project is responsible for ensuring that the necessary mitigation measures are in place. All modern wind farms have lighting requirements agreed with IAA and the turbine locations entered into aircraft navigation databases and therefore can be avoided during flight. It is on this basis that it can be concluded that there would be no cumulative impacts relating to the Proposed Development and surrounding projects in relation to Telecommunications or Aviation.

## 15.3 Other Material Assets

This section of the Material Assets chapter considers other utilities or built services in the area such as electricity supply and transmission, water, gas and underground telecommunications. This section also considers waste management during the construction, operational and decommissioning phases of the Proposed Development.

In order to assess the potential for significant effects on built services and waste management in the vicinity of the Proposed Development, scoping requests were made to EirGrid, Irish Water and

numerous sections of Tipperary County Councils including Water Services and Environment. Refer to Section 2.6 of Chapter 2 of this EIAR for details in relation to the EIA scoping exercise.

A scoping response was received from Irish Water, however, it did not provide details in relation to specific water services within the EIAR Site Boundary. No response was received from EirGrid Water or the local authority sections.

## 15.3.1 Existing Built Services and Utilities

### 15.3.1.1 Electricity

#### 15.3.1.1.1 Infrastructure

One 38kV overhead line traverses the site boundary close to the proposed main site entrance in the townland of Clohaskin. The local rural supply provides electricity from these overhead lines to the local residents within the vicinity of the Proposed Development. A scoping request was issued to Eirgrid in September 2022 and again in May 2023. No response was received to date.

#### 15.3.1.1.2 Supply

Ireland faces significant challenges to its efforts to meet European Union (EU) targets for renewable energy by 2030 and its commitment to transition to a low carbon economy by 2050. The need to decarbonise the economy and reduce emissions has always been imperative, however in recent years the urgency involved has become clearer to all stakeholders. The primary driver behind the Proposed Development is the need to provide additional renewable energy to offset the use of fossil fuels within the electricity generating sector. Further detail can be found in Chapter 2, Section 2.2 of this EIAR. The Proposed Development comprises the provision of a wind farm of 21 no. wind turbines, which is capable of generating and providing a significant amount of renewable energy onto the national grid and capture an additional part of County Tipperary's valuable renewable energy resource.

## 15.3.2 Waste Management

A Waste Management Plan (WMP) has been prepared and forms part of the Construction and Environmental Management Plan (CEMP) in Appendix 4-3 of the EIAR.

The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Development. Disposal of waste will be a last resort.

All waste generated on Site will be contained in waste skips at a waste storage area on Site. This waste storage area will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein. The expected waste volumes generated on Site are unlikely to be large enough to warrant source segregation at the Proposed Development site. Therefore, all wastes streams generated on Site will be deposited into a single waste skip. This waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.

Site personnel will be instructed at induction that under no circumstances can waste be brought to Site for disposal in the on-site waste skip. It will also be made clear that the burning of waste material on Site is forbidden.

### 15.3.3 Likely Significant Effects and Associated Mitigation Measures

#### 15.3.3.1 'Do-Nothing' Scenario

If the Proposed Development were not to proceed the opportunity to generate renewable energy and electrical supply to the national grid would be lost.

#### 15.3.3.2 Construction Phase

##### 15.3.3.2.1 Electricity

There is potential for overhead electricity lines to be impacted through interference or breakage during the construction phase, specifically during the delivery of turbine components and the laying of grid connection cables along the public road corridor. There will also be a requirement, to temporarily relocate the overhead line pole-set nearest the proposed main site entrance during the turbine delivery phase. This will have a temporary, moderate negative impact on local electricity supply. Working in the vicinity of overhead electricity lines, in the absence of the correct safety measures and procedures has the potential to have a significant, negative impact on health and safety.

##### Mitigation Measures

- Goal posts will be established under overhead lines for the entirety of the construction phase. They will not exceed a height of 4.2 metres, unless specifically agreed with ESB Networks
- The suitability of machinery and equipment for use near power lines will be risk assessed.
- All staff will be trained on the routes and operating voltages of overhead electricity lines running across the proposed main site entrance. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the sites are made aware of the location of lines before they come on to site.
- Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire.
- Prior to the delivery of turbines to the Proposed Development site, a dry run of the route using vehicles with similar dimensions will occur. Please see Section 15.1.9 above for details.
- When activities must be carried out beneath overhead lines, e.g. component delivery or grid cable laying, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used is undertaken prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required.
- Information on safe clearances will be provided to all staff and visitors.
- Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on site.
- All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan.
- All health and safety measures as detailed in Section 5 of Construction Environment Management Plan and Chapter 5 Population and Human Health will be adhered to during the construction, operation and decommissioning phases.

### Residual Impact

With the implementation of the above measures, the residual impact is considered to be a temporary, slight negative impact on local electricity supply and a short term, slight negative impact on health and safety.

### Significance of Effects

There will be no significant direct or indirect effect on electricity supply from the Proposed Development during the construction phase.

#### 15.3.3.2 **Other Built Services**

The construction of the Proposed Development will be unlikely to have a significant impact on other built services or waste management.

### Proposed Mitigation Measures

Notwithstanding the above, specific measures are incorporated into the CEMP, included as Appendix 4-3 of this EIAR, to ensure that the construction of the Proposed Development will not have effect on underground electrical cables and built services at the Proposed Development site. The mitigation measures include the following:

- Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works.
- Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified.
- Excavation permits will be completed, and all plant operators and general operatives will be inducted and informed as to the location of any services.
- The contractor must comply with and standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks.

### Residual Impacts

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative residual impact on other services during the construction phase of the Proposed Development.

### Significance of Effects

Based on the assessment above there will be no significant effects.

#### 15.3.3.3 **Operational Phase**

There will be no operational phase impacts or associated effects on built services and waste management associated with the Proposed Development.

#### 15.3.4 **Cumulative Impact Assessment**

The potential cumulative impact of the Proposed Development and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Development will have on the surrounding environment when considered cumulatively and in combination with relevant existing

permitted or proposed projects and plans in the area, in the vicinity of the Proposed Development site, as set out in Section 2.7 in Chapter 2 of this EIAR.

The potential for cumulative effects with these nearby developments are not significant from the perspective of built services and waste management. The construction of the underground electrical cabling connection route for the Proposed Development would be subject to a Road Opening License, as would any other similar nearby grid connection works. The timing of these works would therefore be controlled by the road opening licensing process and would not overlap. It is also likely that the construction phases of these projects will not overlap with the construction phase of the Proposed Development.

On the basis of the assessment above, the Proposed Development will have no impact on built services and waste management. It is on this basis that it can be concluded that there would be a short-term imperceptible cumulative impact on built services and waste management from the Proposed Development and permitted or proposed projects and plans in the area as set out in Section 2.7 in Chapter 2 of this EIAR.

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