

15 TRAFFIC AND TRANSPORT

15.1 INTRODUCTION

15.1.1 Background and Objectives

This chapter assesses the potential traffic and transport effects of the Project, describes the existing transport network, identifies whether there is any potential for significant effects to arise (both in isolation and in combination with other developments) and outlines any mitigation measures as required. The assessment will consider the potential effects during the following phases of the Development:

- Construction of the Project,
- Operation of the Project, and
- Decommissioning of the Project.

For developments of this nature, the construction phase is the critical impact period with impacts experienced on the surrounding road network. These impacts are both the short-term additional traffic volumes and the geometric requirements of the oversized loads associated with the turbine components. The locations on the public road network requiring remedial measures to accommodate turbine delivery will be temporary in nature as shown in **Table 15.12**, apart from the enhancement of the existing junction with the N22, and are outlined in this Chapter.

Construction materials and tree felling for the wind farm and the delivery of turbine components will use the existing public road network as far as the proposed entrance off the N22, which is an existing forestry entrance at Derryreag. Construction materials for much of the grid connection will use an existing access from the N22 to the forest track at Cummeenavrick (see **Figure 15.4**).

While the wind farm site is located in Co. Cork, the site entrance off the N22 at Derryreag is located in Co. Kerry. The site access point for much of the grid connection at Cummeenavrick is located in Co. Kerry (see **Figure 15.4**).

A Swept Path Analysis has been carried out on the Haul Route for the abnormal loads associated with turbine components. The Swept Path Analysis includes an assessment of blade oversail (ie. where the blade protrudes outside the road corridor). The assessment was done using a Siemen SG155 Blade component super wing carrier which is designed to transport the size of blades required for the turbine.

The haul routes proposed for all other construction materials is referred to as the Civil Construction Haul Route.

The grid connection haulage route will overlap with the civil construction route mainly with the entrance to the grid connection works being slightly further North on the N22 in Co. Kerry. The excavation of the grid connection trenches will coincide with the work that will be required on the forest track entrance which will be used as the civil construction haul route.

This chapter outlines potential effects of the Project on traffic and transport based on the Swept Path Analysis which has been undertaken for the abnormal loads Haul Route. It also estimates the number of HGV and other traffic movements on the Civil Construction Haul Route used for materials deliveries and assesses the associated impacts.

Figures are contained in **Volume III**.

Common acronyms used throughout this EIAR can be found in **Appendix 1.2**. This chapter of the EIAR is supported by Figures provided in Volume III and by the following Appendix documents provided in Volume IV of this EIAR:

- **Appendix 15.1: Collett Route Survey Reports of October 2022 and November 2022**
- **Appendix 15.2: Swept Path Analysis Drawings**
- **Appendix 15.3: Road Safety Audit**

15.1.2 Statement of Authority

This chapter of the EIAR has been prepared by David Kiely, Director, Jennings O'Donovan & Partners Limited who holds a BE in Civil Engineering from University College Dublin and MSc in Environmental Protection from IT Sligo. He is a Fellow of Engineers Ireland, a Chartered Member of the Institution of Civil Engineers (UK) and has over 39 years' experience. He has extensive experience in the preparation of EIARs and EISs for environmental projects including Wind Farms, Solar Farms, Waste Water Projects and various Commercial Developments. David has also been involved in the construction of over 60 wind farms since 1997.

The Collett Route Survey Reports for wind turbines were prepared by Spencer Budgen and reviewed by Steven Mangham of Collett & Son, Halifax, West Yorkshire, UK. Collett & Son owns a fleet of over 60 vehicles and 100 trailers and is one of the main transport contractors who deliver wind turbine components to locations in Ireland. They also provide consultancy

services in relation to the assessment of turbine haul routes. Mr. Mangham also oversaw the preparation of the Swept Path Analysis drawings for the turbine haul route between Ringaskiddy and Derryreag, west of Ballyvourney. He completed the survey dated 12th October 2022 with the help of Spencer Budgen (renewables surveyor) and Jacob Halstead (transportation specialist)

Mr. Mangham has a BTech in Civil Engineering from Leeds College of Building and a BSc in Civil Engineering from Leeds Beckett University. He has been employed by Collett & Son for over 12 years and is their Consultancy Manager. He has been involved in transport assessments for over 250 wind farms in the UK and for over 40 wind farms in Ireland.

G. Mohammadi from Collett & Son also prepared Swept Path Analysis drawings between Ringaskiddy Port, Co. Cork and the site access junction off the N22 at Derryreag Td., Co. Kerry.

The Swept Path Analysis and design of the site access junction with the N22 and the upgrading works to the existing forest track were prepared and designed by John Doogan, Senior Designer at Jennings O'Donovan & Partners Limited. John has a National Diploma in Civil Engineering from Bolton Street College of Technology, Dublin and has over 32 years of road design experience. He has worked on over 30 wind farms in Ireland and Sweden.

Topographic surveys of the lands for the proposed site access junction (existing forest access) with the N22 were carried out by Mr. Garry Henebry, Managing Director, GHE Surveying, Mitchelstown, Co. Cork. Garry Henebry is the Managing Director of GHE Surveying and has 20 years' experience of surveying. Garry qualified from St. Johns Central College Cork City in 2001 with a Diploma in Architectural Design and since then has established an extensive background in planning, civil engineering and surveying. GHE operates out of Mitchelstown, Co. Cork and are nationwide throughout Ireland with their services. They provide precise and detailed measurement information at all stages of a project and specialise in the provision of innovative solutions to all aspects of engineering surveying in the civil sector and all aspects of land and measured building surveying. Garry has provided surveying services to contractors engaged in the construction of wind farm and grid connections.

15.2 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

15.2.1 Assessment Methodology

This assessment has involved the following elements, further details of which are provided in the following sections:

- Policy and guidance review;
- Desk study, including review of available maps and published information;
- Site visit (driving the route) including review of road network to be used;
- Topographical Survey of potential ‘constraints’;
- Swept Path Analysis of the Haul Route;
- Establishment of Baseline Scenario;
- Evaluation of potential effects;
- Evaluation of the significance of these effects;
- Identification of measures to avoid and mitigate potential effects;

Existing, permitted and known proposed developments and projects are cumulatively assessed in the EIAR. This includes projects and developments that are pending a decision from the planning authority and other known projects which are in the advanced stages of being prepared to be submitted for planning and have the potential for in combination effects, namely the Cummeennabuddoge Wind Farm. Cummeennabuddoge Wind Farm is at the pre-planning/concept stage and is being prepared by the same client as Inchamore Wind Farm, and including the evaluation of residual effects following implementation of mitigation measures.

15.2.2 Planning Policy and Guidelines/Guidance

In addition to the EIAR standards outlined in **Chapter 1: Introduction**, the following guidance, guidelines and standards have been used in the preparation of this chapter:

Table 15.1: Policy and Guidance

Policy / Author	Title	Policy
Cork County Council	Cork County Development Plan 2022-2028	The CDP states: <i>“Objective TM12-2-2: Promote and facilitate an active travel culture in the County where active travel is a viable choice.</i> <i>f) Where appropriate, identify alternative routes, signposted for cycling and walking, to improve the experience and uptake of active travel.</i> <i>h) Seek to improve connectivity within the County and region for walking routes and commuter cycling routes and recreational amenity functions.”</i>

Policy / Author	Title	Policy
		<p><i>“Objective TM 12.8: Traffic/Mobility Management and Road Safety</i></p> <p><i>a) Where traffic movements associated with a development proposal have the potential to have a material impact on the safety and free flow of traffic on a National, Regional or other Local Routes, the submission of a Traffic and Transport Assessment (TTA) and Road Safety Audit will be required as part of the proposal.</i></p> <p><i>d) Ensure that all new vehicular accesses are designed to appropriate standards of visibility to ensure the safety of other road users.</i></p> <p><i>e) Improve the standards and safety of public roads and to protect the investment of public resources in the provision, improvement and maintenance of the public road network.”</i></p> <p><i>“Objective TM 12.13: National, Regional and Local Road Network</i></p> <p><i>Key Project 2040 projects:</i></p> <ul style="list-style-type: none"> <i>• N22 Ballyvourney to Macroom road</i> <p><i>i) Promote the improvement of strategic Regional and Local Roads throughout the County in accordance with the strategies identified for the main settlements in this plan.</i></p> <p><i>j) Restrict individual access onto national roads in order to protect the substantial investment in the national road network, to improve carrying capacity, efficiency and safety and to prevent the premature obsolescence of the network.</i></p> <p><i>k) Limit access to regional roads where appropriate so as to protect the carrying capacity of the network and have regard to safety considerations, particularly where access to a lower category road is available.</i></p> <p><i>l) Ensure that all route upgrades are planned, designed and constructed to be compliant with EU environmental directives and to minimise impacts on biodiversity, built heritage and landscape.</i></p> <p><i>m) Avoid the creation of additional access points from new developments or the generation of increased traffic from existing accesses onto national roads to which speed limits of greater than 50kph apply.</i></p>
<p>Kerry County Council</p>	<p>Kerry County Development Plan 2022 – 2028</p>	<p>The CDP has the following objectives relevant to traffic and transport aspects of the proposed development:</p> <p>KCDP 14-20 Enhance and improve regional connectivity through upgraded transport infrastructure and effective public transport services.</p> <p>KCDP 14-21 Improve access for all vulnerable road users and people with disabilities to all modes of transport with provision for universal design thereby increasing and improving transport facilities for all users.</p> <p>KCDP 14-22 Protect and sustainably develop the county's principal transportation assets including ports, Kerry Airport, and strategic road and rail corridors.</p> <p>KCDP 14-23 Promote the sustainable development of all transportation links both within and out of the County in co-</p>

Policy / Author	Title	Policy		
		<p>operation with adjacent Local Authorities to integrate different modes of transport.</p> <p>Extract from Section 14.4 “In accordance with Section 2.7 of the DoELG Spatial Planning and National Roads Guidelines for Planning Authorities, particular care must be exercised in the assessment and management of development proposals in the Development Plan relating to development objectives or the zoning of locations at or close to junctions on the national road network in accordance with the provisions of official policy.”</p> <p>Extract from Table 14.3:</p> <table border="1" data-bbox="804 654 1315 721"> <tr> <td data-bbox="804 654 1315 689">National Primary/Secondary Roads projects</td> </tr> <tr> <td data-bbox="804 689 1315 721">N21/N22 Tralee to County Boundary.</td> </tr> </table> <p>KCDP 14-25 Seek to protect and safeguard the significant investment made in strategic economic infrastructure, in particular the network of roads, the existing rail line to Tralee and major water and wastewater projects, through the promotion of appropriate development and settlement patterns and the integration of land use and transportation activities.</p> <p>KCDP 14-26 Strengthen Steady State Investment in our existing road networks to ensure that existing networks are maintained to a high level to ensure quality levels of safety, service, accessibility and connectivity to transport users of all transport modes.</p> <p>KCDP 14-27 Provide, or facilitate the sustainable provision of all road infrastructure projects set out in Table 14.3 with priority given to infrastructure serving the key Towns.</p> <p>KCDP 14-28 Support the development of the Adare, Newcastlewest and Abbeyfeale By-passes and N21 realignment as a strategic link corridor between Co. Kerry and Co. Limerick and support the completion of the Macroom By-pass and further improvements and realignments of the N22 corridor.</p> <p>KCDP 14-29 Protect the capacity and safety of the National Road and Strategically Important Regional Road network in the County and ensure compliance and adherence to the provisions of official Government policy outlined in the Section 28 Ministerial Guidelines ‘Spatial Planning and National Roads Guidelines for Planning Authorities’ (DoECLG, 2012) in order to safeguard carrying capacity and safety of National Primary and Secondary Routes and associated national road junctions.</p> <p>KCDP 14-30 Avoid the creation of any additional access point from new development or the generation of increased traffic from existing accesses to National Roads to which speed limits greater than 60 km/h apply. This provision applies to all categories of development, including individual</p>	National Primary/Secondary Roads projects	N21/N22 Tralee to County Boundary.
National Primary/Secondary Roads projects				
N21/N22 Tralee to County Boundary.				

Policy / Author	Title	Policy
		<p>houses in rural areas, regardless of the housing circumstances of the applicant.</p> <p>KCDP 14-31 Consider proposals for access onto National Roads on the approaches to or exit from urban centres that are subject to a speed limit of 60 km/h before a lower 50 km/h limit (otherwise known as transitional zones) subject to a road safety audit and in accordance with the TII publication; The Treatment of Transition Zones to Towns and Villages on National Roads DN-GEO-03084 (2018).</p> <p>KCDP 14-34 a) Facilitate and support planning applications for economic job creation entitles which require access onto National Primary/Secondary Roads subject to compliance with section 2.5 & 2.6 of the guidelines, with early engagement with the TII. b) Favourably consider new planning applications which require access onto National Primary/Secondary Roads for family members where there are existing entrances which is supported by a detailed Road Safety Audit.</p>
Department of Transport, Tourism and Sport and Department of Environment, Community and Local Government	The Design Manual for Urban Roads and Streets (DMURS)	This document outlines guidelines on the design of urban roads and streets in terms of street networks, street signage, pedestrians and cyclists, carriageways (widths, surfaces, junctions etc.), policies and plans, design process and audits (safety and quality).
Transport Infrastructure Ireland (TII)	Traffic and Transport Assessment Guidelines (PE-PDV-02045, May 2014)	<p>The guidelines provide guidance for developers, planning authorities and the National Roads Authority (NRA) for:</p> <ul style="list-style-type: none"> • Scoping for traffic and transport assessment for future development and development areas, particularly areas in proximity to national roads, • Defining thresholds where studies are recommended to minimise the impact of future proposals on the national road network, • Contributing to the provision of sustainable forms of development and better-informed planning decisions.
Transport Infrastructure Ireland (TII)	Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions) DN-GEO-03060, June 2017)	Design Standards for Junction Design, excl. major interchanges.
Transport Infrastructure Ireland (TII)	Rural Road Link Design (DN-GEO-03031 June 2017)	This Standard applies to Single and Dual Carriageway roads (including Motorways) in rural areas. It also applies to single carriageway Urban Relief Roads and Urban Dual Carriageways and Motorways. The Standard shall be used to derive the Design Speed, and the appropriate values of geometric parameters for use in the design of the road alignment. It sets out the basic principles to be used in co-ordinating the various elements of the road layout, which together form the three-dimensional design of the road.

Policy / Author	Title	Policy
Transport Infrastructure Ireland (TII)	Design Phase Procedure for Road Safety Improvement Schemes (DN-GEO-03030, April 2021)	This Standard sets out the procedures to be followed for the technical aspects of the Design Phase of the following scheme types: <ul style="list-style-type: none"> • Road Safety Improvement Schemes • Urban Road Schemes • Road Safety Improvements aspects • Local authority general improvement schemes which have not been identified as Road Safety Improvement Schemes, schemes led, funded or partly funded by other agencies, development led schemes and/or community schemes.
Transport Infrastructure Ireland (TII)	Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (PE-PAG-02017, May 2019)	This document provides guidance on the development of transport models for use in the appraisal of transport infrastructure. The guidance addresses the scoping and construction of transport models which reflect transport demand and supply in a 'Base Year'. It provides guidance on the preparation of future travel demand projections for use in modelling and appraisal.
Transport Infrastructure Ireland (TII)	Expansion Factor for Short Period Traffic Counts (PE-PAG-02039, October 2016)	This document aims to support the conversion of short period traffic counts to annual average daily traffic (AADT).
Transport Infrastructure Ireland (TII)	Road Safety Audit (GE-STY-01024, December 2017)	This Standard outlines the requirements for Road Safety Audits in the management of the national road infrastructure. It sets out the procedures required to implement Road Safety Audits and defines the relevant schemes and stages in the design and construction at which audits shall be undertaken.
Department of the Environment and Local Government and Department of Transport	Traffic Management Guidelines 2012	This document outlines guidelines for traffic management and sustainability, consultation and monitoring, speed management, junctions, vulnerable road users, public transport and parking. The guidelines recommend that consultation is carried out for schemes that involve a long construction period or area. The guidelines outline the relevant legislation governing different types of road works. The guidelines outline safety measures to be taken in the design of roads and junctions. The guidelines outline the arrangements for temporary traffic management where construction and improvement of roads is taking place and who should be consulted in planning for roadworks and the factors to consider.
Department of Transport, Tourism and Sport	Guidelines for Managing Openings in Public Roads (Second Edition, April 2017)	The document prescribes standards in respect of the work of forming openings, backfilling and the reinstatement of road surfaces and the associated materials to be used on all roads other than National Roads. It also prescribes procedures and requirements in relation to the use of MapRoad Roadworks Licensing (MRL) and its use for all road openings in public roads other than those openings carried out by a road authority.
Transport Infrastructure Ireland (TII)	Spatial Planning and National Roads Guidelines	It is in the public interest, in so far as is reasonably practicable, that the national road network continues to serve its intended strategic purpose. The EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network, in order to demonstrate that the development can proceed

Policy / Author	Title	Policy
		complementary to safeguarding the capacity, safety and operational efficiency of that network.

15.2.3 Scoping Responses and Consultation

Consultation responses are shown in **Table 15.2**.

Table 15.2: Consultation Responses

Consultee	Type & Date	Summary of Response	Response to Consultee
Transport Infrastructure Ireland (TII)	Email dated 7 th December 2020	<p>With respect to EIAR Scoping issues, the recommendations indicated below provide only general guidance for the preparation of EIAR, which may affect the National Roads Network. The developer should have regard, inter alia, to the following:</p> <ol style="list-style-type: none"> As set down in the “Spatial Planning and National Roads” Guidelines, it is in the public interest, in so far as is reasonably practicable, that the national road network continues to serve its intended strategic purpose. The EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network, in order to demonstrate that the development can proceed complementary to safeguarding the capacity, safety and operational efficiency of that network. Consultations should be had with the relevant Local Authority/National Roads Design Office, with regard to locations of existing and future national road schemes. In relation to cabling and potential connection routing, the scheme promoter should note locations of existing and future national road schemes and develop proposals to safeguard proposed road schemes. As outlined above, consult with the Local Authority/National Roads Design Office in relation to any schemes in planning in the area, especially on the N22. 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. In the context of existing national roads, alternatives to the provision of cabling along the national road network, such as alternative routing or the laying of cabling in private lands adjoining the national road, should be considered in the interests of safeguarding the investment in and the potential for future upgrade works to the national road network. The cable routing should avoid all impacts to existing TII infrastructure such as traffic counters, weather stations, etc. and works required 	<p>Addressed by this EIAR / Chapter.</p> <p>Addressed in sections 15.5.16 and 15.6.1 of this Chapter and in Road Safety Audit in Appendix 15.3.</p> <p>Noted, however this is not applicable as the majority (99%) of the grid connection is to be located outside public roads Furthermore there have been</p>

Consultee	Type & Date	Summary of Response	Response to Consultee
		<p>to such infrastructure shall only be undertaken in consultation with and subject to the agreement of TII. Any costs attributable shall be borne by the applicant/developer. The developer should also be aware that separate approvals may be required for works traversing the national road network.</p> <ol style="list-style-type: none"> 4. Clearly identify haul routes proposed and fully assess the network to be traversed. Separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load proposed. 5. Where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment (TTA) 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. TII'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 TII TTA Guidelines, which addresses requirements for sub-threshold TTA. 6. TII Standards should be consulted to determine the requirement for Road Safety Audit and Road Safety Impact Assessment. 7. Assessments and design and construction and maintenance standards and guidance are available at TII Publications, which replaced the National Road Authority (NRA) Design Manual for Roads and Bridges and the NRA Manual of Contract Documents for Road Works. 8. The developer, in conducting Environmental Impact Assessment, should have regard to TII Environment Guidelines that deal with assessment and mitigation measures for varied environmental factors and occurrences. In particular: <ol style="list-style-type: none"> a. 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' (NRA, 2006). b. The EIAR should consider the 'Environmental Noise Regulations 2006' (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see 'Guidelines for the Treatment of Noise and Vibration in National Road Schemes (1st Rev, NRA, 2004). <p>Notwithstanding, any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practice.</p>	<p>recent upgrades in the form of the new N22 from Macroom to Ballyvourney.</p> <p>Addressed in this Chapter</p> <p>Addressed in Sections 15.3.5 and 15.3.6</p> <p>Addressed in this Chapter.</p> <p>Noted and referred to in this Chapter where relevant</p>

Consultee	Type & Date	Summary of Response	Response to Consultee
			Addressed in Chapter 13. Addressed in Chapter 11.
Cork County Council	Pre-Planning Consultation meeting Notes 23/11/2022	No specific comments in relation to traffic and transportation.	No response required in this Chapter.
Kerry County Council	Notes from Pre Planning Call with Kerry County Council dated 03.11.2022	<ol style="list-style-type: none"> 1. KCC noted that the Senior Engineer for TII is Paul Curry but they would advise on who the TII point of contact would be to consult with. 2. KCC noted that the location of the site entrance from a sightline's' perspective should be appropriate. 3. KCC queried how many landowners were involved with the proposed works on the turbine delivery route and if they had been signed up. 4. KCC queried if the proposed development would need to utilise the turning area at the island junction similar to what was being proposed for Gortyrähilly Wind Farm. 	Noted Proposed in this Chapter..

15.2.4 Study Area

The study area for Traffic and Transport assessment is defined as the wind farm Site, the Haul Route for Turbine Components, the Civil Construction Haul Route for the importation of rock, concrete and other construction materials to the Site primarily from local quarries ,the Grid Connection Route and the Tree felling Haul Routes to the Sawmills..

The Turbine Components Abnormal Haul Route is shown on **Figure 15.1** and **Figure 15.2**, the Civil Construction Haul Route is shown on **Figure 15.3**, the Grid Connection Route is shown on **Figure 15.4** and locations for disposal of spoil from construction of the grid connection are shown on **Figure 15.5**.

It is proposed that the turbine and electrical components will be delivered via Ringaskiddy Port, Co. Cork. The following route is proposed and is discussed in further detail in **Appendix 15.1**:

- Exit Ringaskiddy Port onto N28.
- At the roundabout, continue on N28.
- At the roundabout, continue on N28.
- At the roundabout, take the 2nd exit onto N28.
- Continue on N28, then take the slip road onto N40.

- Continue on N40 to N22, use new Macroon By-Pass which ends north-west of Ballyvourney (to be known as Ballyvourney junction).
- Rejoin the existing N22, Continue on N22, then turn left at site access point at Derryreag. At the site access, Continue on c.2.5 km of forest track to the wind farm site.
- Upon exit from the site (c.2.5 km forest track), turn left onto N22, then turn right at the island junction at the South side of Cummeenavrick (Co. Kerry) and complete a 180 degree turning manoeuvre and continue on the N22.

While sub-base and base course materials for the internal wind farm site Access Tracks and Turbine Hardstand construction will be sourced from on-site excavations and an on-site borrow pit, crushed stone will be imported for the final running layer. Specific grades of rock fill will be required as fill under Turbine Foundations. The crushed stone as well as rock fill and concrete for Turbine Foundations, concrete blocks for the construction of the substation building and precast chambers for site cabling will be sourced from one of the local quarries in the area such as the following which are show on Figure 15.3:

- McGroup Keim Quarry;
- Coppeen Concrete, Enniskeane;
- Mid-Cork Quarries, Gortnadiha;
- McSweeney Bros, Kilmichael;
- Keohane Readymix, Ballygurteen, and
- Murray Bros Tarmacadam Ltd, Ardcahan.

These quarries will also be the source of crushed stone and concrete for grid connection works.

The N22 Macroon By-Pass is a dual carriageway Type 2 road with four junctions:

- Baile Bhuirne (Ballyvourney) grade-separated junction: the tie in with the existing N22 at the western end of the road development west of Baile Bhuirne.
- Tonn Láin (Toolane) grade-separated junction and off-line roundabout: This provides access to and from the existing N22, to the east of Baile Mhic Íre.
- Gurteenroe grade-separated junction and off-line roundabout: The location where the proposed route crosses the regional road, R582.
- Coolcour roundabout: This is the tie-in with the existing N22 at the eastern end of the road development in the townland of Coolcour.

Two of these junctions are at each end of the by-pass with only two in between.

The materials delivery routes proposed are such as to maximise use of the new N22 Macroom By-Pass and to avoid centres of population such as Macroom, Ballyvourney and Ballymakeery.

For the quarries to the south, trucks will use the R599, R586, R587, then the R584, then the existing N22 south-eastwards to join the new N22 Macroom By-Pass, will follow the new N22 Macroom By-Pass to the Ballyvourney Junction, then exit onto existing N22 and travel westwards to Derryreag and then enter the wind farm Site (see **Figure 15.3**).

From Keim, trucks will follow the R582 in a south-easterly direction and join the New Macroom By-Pass (N22) at Gurteenroe Junction. They will then follow the new N22 By-Pass to Ballyvourney Junction and then the existing N22 to Derryreag to access the forest track in the wind farm site (see **Figure 15.3**).

Wood from forestry felling required to accommodate part of the Project will be removed from the site once the civil works are complete. Three suitable locations have been identified in Enniskeane and Lissarda (Enniskeane Timber Products LTD., Graingers Sawmills Ltd. and GP Wood Donniskey). The proposed tree feeling route for transporting wood is shown on **Figure 15.6**. This route is effectively the reverse of the civil construction haul route and trucks will leave the wind farm site via the forest track and turn left on the N22, drive Northwards on the existing N22 to the turning area in Cummeenavrick and then travel to the Ballyvourney junction of the new N22 Macroom By-Pass, follow the By-Pass to the ? N22 junction and then either head south-westwards to the R584, or to the Coolcour junction with the existing N22 and then proceed south-eastwards to the L-7489 shown on **Figure 15.6**.

The proposed grid route is largely independent of the haul routes (see **Figure 15.4**). Leaving the wind farm site, the grid route will follow the forest tracks for c.1.5 km as far as the N22 which will be crossed by directional drilling (70 m). It will then follow the old route of the N22 (also by directional drilling) for a short distance (c.0.58 km) before following forestry tracks to the existing Ballyvouskill Substation. Of the total length of 19.9 km, only 0.07 km will be within public roads with a further 0.58 km under former roads.

For the grid connection, general material excavated from trenches will be graded on top of or adjacent to the existing tracks. As the N22 will be crossed by directional drilling, very little waste (c.30 m³) will arise from drilling. This soil waste will be transported to one or more of the following licensed facilities (see **Figure 15.5**):

- Tomas Mullins, Scrahanagown, Coolea, Co. Cork;
- Richard & Dennis Carroll Plant Ltd., Clonfadda, Macroom, Co. Cork;
- Ciaran Ryan Plant Hire Ltd., Ballymacorcoran, Clondrohid, Co. Cork, and
- Séan Ó Luasa, Na Foithrí (Fuhirees), Cúil Aodha, Maighchromth, Co. Chorcaí.

Soil and stone spoil from road widening at the site access from the N22 at Derryreagh will be disposed of to the same facilities.

Grid construction traffic for the section of grid south-west of the N22 will be from the N22 at the site access at Derryreag Townland. For the section of the grid connection north-east of the N22, access will be gained from the N22 at Cummeenavrick Townland. (see Figure 15.6).

15.2.5 Desk Study

Primary Route Assessments for the turbine component haul route were undertaken by Collett & Sons Ltd., Halifax, U.K. who are specialists in the transportation of wind turbine components. This is included in **Appendix 15.1**.

Desk Studies of the Study Area were largely completed in advance of undertaking the route survey. This involved using Google Maps and Streetview to assess the proposed haul route road network from Ringaskiddy Port and from Foynes Port. The civil construction haul route was assessed in a similar manner as was potential traffic associated with the grid route.

Cork County Council and Kerry County Council were consulted as part of the Scoping process. Cork County Council did not have any specific comments in relation to traffic and transport while Kerry County Council had the comments listed in **Table 15.2**.

Traffic count data from TII was used to assess the current Baseline Scenario on the N22 in the area.

15.2.6 Field Work

A Preliminary Route Assessment was carried out in October 2022 for the turbine component haul route between Ringaskiddy Port and the Site, this included the use of the Macroom By-Pass and to reflect the use of a 76.82 m blade component.

The second route survey (Report of November 2022) examined the route between Foynes Port and the Site and was based on the use of a 77.5 m blade. This is further discussed in **Chapter 3: Alternatives Considered**.

In each case, the route was assessed by a two-person team and the various junctions and constraints were photographed. A copy of each report is included in **Appendix 15.1**.

For the range of wind turbines under consideration, the rotor diameters will vary from 149 m to 155 m. For a typical central hub diameter of 3 m, the blade lengths will range from 73 m to 76.82 m. In terms of turbine transportation, the effects of transporting a 76.82 m blade (maximum blade length under consideration) will be similar to those of 73 m. No additional works are required to facilitate their transportation nor any further impacts predicted.

The distance between Ringaskiddy Port and the Site is c.91.6 km while the distance between Foynes Port and the Site is c.216 km. The route from Ringaskiddy using the Macroom By-pass to Site will be generally wider than the route from Foynes. At the proposed site entrance to the wind farm, vehicles from Foynes would have to turn right onto the forest track while being parked in an overtaking lane. This is considered as a dangerous manoeuvre. Accordingly, due to the much shorter length, better quality road and safer entry to the site, the route from Ringaskiddy was selected.

A Topographical Survey of the area for potential works at the proposed site entrance off the N22 at Derryreag was undertaken during October 2022 by GHE Surveying.

This fieldwork enabled the junction design drawing to be prepared by JOD (see Planning Drawing No. 6225-JOD-XX-DR-C-200/LT1).

15.2.7 Evaluation of Potential Effects

The baseline environment is described in **Section 15.3**. The available data will then be utilised to identify and categorise potential effects likely to affect the national and local road network used for the Turbine Component Haul Route, the Civil Construction/Sawmill Haul Routes and the Grid Connection as a result of the Development.

The statutory criteria (EPA, 2002; EPA, 2003) for the assessment of effects require that likely effects are described with respect to their extent, magnitude, type (i.e. negative, positive or neutral) probability, duration, frequency, reversibility, and transboundary nature (if applicable). The descriptors used in this Environmental Impact Assessment Report (EIAR) are those set out in EPA (2002) 'Glossary of Impacts'.

Effects may be categorised as follows:

- Direct: where the existing traffic and transport environment in proximity to the Development is altered, in whole or in part.
- Indirect: where the traffic and transport environment beyond the Project is altered by activities related to the construction or operation of the Project.
- No Effect: where the Development has neither negative nor positive effect upon the traffic and transport environment.

15.2.8 Sensitivity

The sensitivity of the local transport infrastructure has been identified utilising the criteria outlined within the Traffic and Transport Assessment Guidelines (PE-PDV-02045, May 2014) (TII Guidance).). These criteria are outlined within **Table 15.3** below.

Table 15.3: Receptor Sensitivity

Importance	Description
High	Receptors of greatest sensitivity to changes in traffic flow including: People whose livelihood depends upon unrestricted movement within their environment including commercial drivers and companies who employ them, local residents, schools and colleges.
Medium	Traffic flow sensitive receptors including: People who habitually pass through the area, but whose livelihoods are not dependent on free access. Would also generally include: congested junctions, community services, parks, businesses with roadside frontage and recreation facilities.
Low	Receptors with some sensitivity to changes in traffic flow: People who occasionally use the road network. Would also include: public open spaces, nature conservation areas, listed buildings, tourist attractions, residential roads with adequate footway provision and churches.
Negligible	Receptors with very low sensitivity to traffic flows: People not sensitive to transport effects. Would also refer to receptors that are sufficiently distant from the affected roads and junctions.

Table 15.4 below provides the general approach to determining the importance and sensitivity of a resource or receptor based on The Institute for Environmental Management and Assessment (IEMA) Guidelines¹. The assessment of environmental impacts arising from road traffic is not an exact science and a degree of professional judgement is required. The definitions set out in **Table 15.4** below are generally applied. This will partially define the magnitude and significance criteria set out in the sections below, while applying thresholds quoted in the IEMA Guidance. Sensitive receptors are generally areas with key facilities associated with high footfall.

¹The Institute of Environmental Management and Assessment (1993), Guidelines for the Environmental Assessment of Road Traffic

Table 15.4: Determining the Importance / Sensitivity of Receptor

Importance/Sensitivity of Receptor	Resource	Receptor
High	Traffic flows on highway network near schools, colleges, hospitals playgrounds, accident blackspots, retirement homes and roads without footways that are used by pedestrians.	Residents/workers travelling to and from work on foot and by vehicle, school children, leisure walkers.
Medium	Traffic flows at congested junctions and on highway network near shopping areas with roadside frontage, roads with narrow footways, unsegregated cycleways, community centres, parks, recreation facilities.	Residents/workers travelling to and from work on foot and by vehicle, school children, leisure walkers, people visiting shops etc.
Low	Traffic flows adjacent to places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision.	Residents/workers travelling to these places.
Very Low	Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions.	Residents/workers travelling by foot or by vehicle.

15.2.9 Magnitude

The magnitude of potential impacts has been defined in accordance with the criteria provided in the 2022 EPA publication 'Guidelines on the information to be contained in Environmental Impact Statements' as outlined within **Table 15.5**.

The Institute for Environmental Management and Assessment (IEMA) Guidelines contains two broad principles to determine the scale and extent of an assessment, which are:

- Principle 1 – include road links where traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles is predicted to increase by more than 30%).
- Principle 2 – include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

If the predicted increase is lower than these thresholds, then the effects can be considered to be low or not significant. If the increases are above the thresholds, then the increase can potentially be significant and assessment is required.

The Traffic and Transport Assessment Guidelines (PE-PDV-02045, TII, May 2014) were developed to assess the potential effects of major developments on the national road network during their operation. These guidelines are applicable to the national roads relevant to the Project and have been used to assess the construction, operation and decommissioning phases non the N22, N28 and N40.

The IEMA Guidelines acknowledge that there are no commonly agreed thresholds for judging the magnitude of change for the effects assessed, with the exception of severance, for which IEMA suggests thresholds of 30%, 60% and 90% for slight, moderate and substantial impacts respectively.

For the most robust approach, the built-up area thresholds in line with the IEMA guidance have been used to guide assessments of magnitude of change. However, a level of professional judgement has been applied to arrive at a set of common thresholds for ascertaining the magnitude of impact. In respect of the environmental effects of traffic, magnitude, based on increase in total vehicular traffic and/or HGV traffic has been determined on the following basis:

- High – considerable deterioration / improvement in local circumstances (total traffic flows of +/-90%).
- Medium – readily apparent change in conditions (total traffic flows of +/- 60 – 90%).
- Low – perceptible change in conditions of circumstances (total traffic flows of +/- 30 – 60%).
- Very Low — no discernible change in conditions (total traffic flows of less than +/- 30%).

Table 15.5: Magnitude of Change

Magnitude of Effect	Description
Significant	The Development could result in a change of length or duration to the current traffic routes or schedules which could result in hardship.
Moderate	The Development could result in delays or the need to reschedule which may cause inconvenience.
Slight	The Development could occasionally cause minor modifications to routes, or slight delays in current schedules, or on activities in the short-term.
Imperceptible	The Development does not cause an effect on movement of road traffic above normal levels.

15.2.10 Significance of Effects

A combination of the magnitude of the impact under consideration and the sensitivity or value of the receiving environment / receptor, as set out in **Table 15.4** can be used in considering the overall significance of an effect. The general approach adopted for classifying effects is outlined in **Table 15.6**. A Major Moderate effect is seen as '**significant**'. A Minor or Negligible effect is seen as '**not significant**'.

Table 15.6: Significance of Effects

Sensitivity/Value of Receptor	Magnitude of Impact			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

15.3 BASELINE DESCRIPTION

15.3.1 Site Location, Context and the Development

Separate haul routes are proposed for turbine abnormal components and civil construction materials, tree felling haul route to sawmills and for the various elements of the grid connection. Each are described below.

The proposed Turbine Components Haul Route is shown in **Figures 15.1** and **15.2** and the proposed Civil Construction Haul Route (crushed stone, concrete, concrete blocks and precast units) will come from the quarries as shown on **Figure 15.3**. Incidental building materials will be sourced from either Macroom or Killarney. The grid connection route is shown on **Figure 15.4** as well as traffic access points. Disposal routes for soil and stone arising from the directional drilling of 0.65 km of the grid connection and spoil from widening at the site access at Derryreag are shown in **Figure 15.5**. Disposal routes for forestry logs felled at the wind farm Site are shown on **Figure 15.6**.

It is proposed that the turbine nacelles, tower hubs and rotor blades will be landed at Ringaskiddy Port, County Cork. From there they will be transported to the N22 some 5 km north-west of Ballyvourney and then turn left (south-westwards) onto an existing forest track to gain access to the site.

Whilst a final choice of turbine type for the Development has yet to be made, the vehicle used for the Swept Path Analysis is the largest associated with the turbine range proposed (see **Chapter 2: Project Description, Section 2.5.2** for further details). The Swept Path Analysis has been completed for a turbine with 155 m rotor diameter, which has a blade length of 76.82 m. This is the longest blade length of all the turbines currently under consideration² and would have the greatest potential impact on road passage requirements. As the shortest blade under consideration would be 73.0 m, the swept paths would be only marginally different and the effects will be similar to the 76.82 m blade. No additional works are required to facilitate their transportation nor are any further impacts predicted.

² The GE5.3-158 has a larger blade overall but has a two-part construction and so will not be as long for transportation purposes.

While a detailed assessment of the route is presented in this chapter and associated appendices, it should be noted that road signage and street furniture can change between planning and construction stages. So as to confirm the suitability of any changes to the roadway or to street furniture along the route between EIAR and pre-construction, a further survey of the route will be undertaken using a transport vehicle prior to the delivery of turbine components to Site.

For the civils works during construction, crushed stone materials for the running surfaces of the Site Access Tracks and Turbine Hardstands will be sourced from one of the local authorised quarries in the area. Ready-mix concrete for Turbine Foundation construction and substation foundations will also be sourced from one of the local authorised quarries. The local quarries are located either to the north-east at Keim or to the south-east at Kilmichael, Coppeen, Gortnadiya, Ardcahan or Ballygurteen as described in **Section 15.2.4** above. HGV's from any of these quarries will use the same routes between the N22 and the Development Site. The proposed Civil Construction Haul Route is outlined in **Figure 15.3**. Other incidental material deliveries will use standard HGVs and use the local, national and regional road network.

Wood from the Tree Felling activity will be hauled to sawmills shown in **Figure 15.6**. After turning left onto the N22, then turning right at the northern end of the existing island junction at Cumeenavrick and complete a 180 degree turning manoeuvre and continue on the N22, at the end of the Macroom Bypass, Trucks will use either the R584, R587, R585, then the R586, or alternatively the L7489 to the proposed sawmills. There are 3 proposed sawmills for the felled wood obtained on Site.

For the section of grid connection north of the N22, traffic for the delivery of crushed stone, ducting, cables and precast components will access the grid route from the N22 eastwards along forest tracks to Ballyvouskill. Access to the grid route between the N22 and the wind farm Site will be via the forest tracks/site access at Derryreag. **Figure 15.5** shows the grid connection access routes and spoil disposal locations and routes for the relatively small volume of material arising from directional drilling.

Workers employed on the Site will generally use the N22 and the construction traffic routes to reach the Site.

15.3.2 Sensitive Receptors

The Site is generally served by the N22 which runs between Cork City and Tralee. The N22 is approximately 0.9 kilometres (km) to the north-east of the Site and has a speed limit of 100 km / hour (hr). The N22 by-pass opened on the 9th December 2023, and will avoid traffic through Macroom, Ballymakeery and Ballyvourney.

Receptors considered as having 'high' sensitivity are primarily premises which are directly on the N28, N40 and N22 which have significant potential to generate traffic.

Between Ringaskiddy Port and the Wind Farm Site, the sensitive receptors are assessed in **Table 15.7**.

There are no sensitive receptors along the grid connection route. Therefore, a table is not required.

Table 15.7: Sensitivity of Receptors – Turbine Component Haul Route

Receptor	Sensitivity	Reasons/Comments
Various Businesses and Factories on N28 including Pfizer Ireland Pharmaceuticals	Very Low	Located north of N28 but with multiple junctions onto N28.
Shanbally Shop & Deli	Medium	Shop has direct access onto Shanbally Roundabout/N28 with pedestrians crossing.
Shanbally National School	High	Located on Maroon Terrace south of roundabout/N28.
Residences at Shanbally	Low	Roadside residences as well as multiple junctions onto N28 giving access to residential developments.
Church of the Immaculate Heart of Mary, Shanbally, Co. Cork	Medium	The church is located along the N28 and fronts onto the Haul Route. Some mass attendees are highly likely to use the N28 to get to the church and increased traffic on the road may affect access and egress from the church car park.
Shamrock GAA Club	Medium	Located to south of N28, junction onto N28.
Various Businesses/ Factories incl. Enva and Zenith	Very Low	Located north of N28 but with multiple junctions onto N28.
Raffeen Bridge, Accommodation, Monkstown, Co. Cork	Very Low	Located to south of N28, access via Raffeen Road onto N28.
Various Private Dwelling in Raffeen area	Very Low	Located to north and south of N28. Access onto N28 via R610, L2470 and Raffeen Road.
Storage Yard, Raffeen	Low / Very Low	Located to south of N28 with direct access.
Various Businesses and Private Residences in Hilltown Area	Very Low	Access to N28 via L6469, L6477 and other Local Roads.
Maxol Service Station	Medium	Adjacent to N28.

Receptor	Sensitivity	Reasons/Comments
Agricultural Landholdings, Farmsteads and Private Dwelling	Low	Occasional direct access onto N28.
Douglas, Rochestown, Deanrock, Bishopstown, Maryborough, Togher, Urban Areas of Cork City – Residences, Businesses	Very Low	Major junctions only onto N28 and N40/South Ring Road. Most Receptors sufficiently distant from affected roads and junctions.
Marymount University Hospital & Hospice	High	The Hospital is located off the Curraheen Road Junction of the N40. Slow movement of traffic components could delay access to the slip road.
Cork City Football Club; Curraheen Park Greyhound Stadium. Cork Show Grounds, Agricultural landholdings, Farmsteads and Private Dwellings.	Medium / Low	Major junctions only onto N40 & N22 from (Curraheen Road) and Maglin Road.
Urban Area of Ballincollig, Coolroe, Classis Lake,	Very Low	Major junctions only onto N22. Most Receptors sufficiently distant from affected roads and junctions.
Roadstone Quarry, Classis, Co. Cork.	Very Low	Major junctions only onto N22 via R608.
The Ovens Bar, Ovens, Co. Cork	High	Roadside Access onto N22.
Agricultural Landholdings, Farmsteads, Businesses and Private Dwellings between Ovens and Farranavarra.	Very Low	Occasional direct access onto N22.
Roadstone Quarry, Garryhesta	Very Low	Not in commercial use. Direct access onto N22.
White Lodge Bed & Breakfast, and Farran House self-catering accommodation, Farranavarra, Co. Cork; Farranavarra Village.	Medium/Low	Some properties and businesses have direct access onto N22.
Agricultural Landholdings, Farmsteads, Businesses and Private Dwellings between Farranavarra and Crookstown, Co. Cork	Medium/Low	Occasional direct access onto N22.
Crookstown Village	Very Low	To the North of N21 and largely contained within two junctions with N22. Properties to south join N22 via Ryecroft Manor Road.
Roadstone Quarry, Castlemore	Medium / Low	Located to south of N22. Access to N22 is via R585.
Agricultural Landholdings, Farmsteads, Businesses, and Private Dwellings between Crookstown and Lissarda, Co. Cork	Medium / Low	Occasional direct access onto N22.
Lissarda Village & Kilmurray Cross incl. O'Leary's Garage, Circle K	High	Direct access onto N22. Route is through centre of village.

Receptor	Sensitivity	Reasons/Comments
Filling Station, Ma Fitz's Bar & Restaurant, Garden Centre, Chinese Restaurant, Other Business Units, Roadside Residences		
Agricultural Landholdings, Farmsteads, Businesses and Private Residences between Kilmurray Cross and Coolcour	Medium / Low	Occasional Direct Access onto N22.
Fountain House Bed & Breakfast, Mashanageass, Co. Cork	Medium	Close to N22.
The Lee Valley Park	Medium	Amenity Area on R584 west of N22.
Urban area of Macroom between Gurteenroe Coolcour Junction and Junction on Re-aligned N22	Very Low	New By-Pass Road with entry/exit from major junctions only.
Rural Area between Gurteenroe Junction and Toolane Junction on re-aligned N22	Very Low	New By-Pass Road with entry/exit from major junctions.
Villages of Ballymakeery and Ballyvourney between Toolane Junction and Bhaile Bhuirne Junction on re-aligned N22	Very Low	N22 is being realigned so as to avoid villages. However, they will have access junctions onto N22.
Hillview House Bed & Breakfast 1, Coolcower Macroom, Co. Cork	Low/Medium	Close to junction of old and new realignment of N22.
Rural Area between N22 By-Pass (Ballyvourney) junction and Commeenavarick	Very Low	Occasional entry via N22.

For the civil works construction haul route, the sensitive receptors are assessed in **Table 15.8**.

Table 15.8: Sensitivity of Receptors – Civil Construction Haul Route

Receptor	Sensitivity	Reasons/Comments
Agricultural Landholdings, Farmsteads, Businesses and Private Residences on R584, R587, R585, R586 and R599	Medium/Low	Occasional direct access onto Regional Roads.
Agricultural Landholdings, Farmsteads, Businesses and Private Residences on R582	Medium/Low	Occasional direct access onto R582.

Receptor	Sensitivity	Reasons/Comments
N22 Macroom By-Pass between Coolcour Junction and Ballyvourney Junction	Very Low	New By-Pass road with no direct access by sensitive users.
Existing N22 between Ballyvourney Junction and forest entrance/access to windfarm. Agricultural Landholdings, Farmsteads, Business and Private Residents	Medium/Low	Direct access onto N22.
Agricultural Landholdings, Farmsteads, Businesses and Private Residences on existing N22 between Ballyvourney Junction and Cummeenavrick for grid connection.	Medium/Low	Direct access onto N22.

15.3.3 Road Access to the Site

15.3.3.1 Turbine Haul Route

For the turbine haul route, much of journey from Ringaskiddy Port to the Wind Farm Site will be on National Primary Roads shown on **Figure 15.1** and **Figure 15.2**. These include the N28, N40 and N22. These roads vary in terms of width, number of lanes and types of junctions.

Leaving Ringaskiddy Port, the N28 initially has two lanes westwards from the R613 junction. This narrows to one lane prior to the Pfizer Roundabout and continues towards Shanbally in a similar manner with traffic islands at either side of junctions. The speed limit is 50 km/h. Shanbally is the transition from an industrial area to a largely residential area.

After Shanbally, the road has a central reservation (painted) to allow for right turning at junctions while the speed limit is 60 km/h (see **Appendix 15.1**).

From Raffeen, the road widens such that there is a hard shoulder in each direction and the speed limit increases to 100 km/hr.

A central reservation with splitter islands (splitter islands accommodate street furniture which will need to be relocated temporarily to allow passage of turbine blades) is present at the approach to the R611 Roundabout. A contraflow manoeuvre is required at this location, street furniture to be removed and a tree to be pruned at the approach to the R611 Roundabout (see **Appendix 15.2**).

It is also present following the roundabout on the N28/R617 junction. Westwards from that junction, there is a climbing lane prior to the road narrowing to two single lanes without hard shoulders for a short distance before widening again with one lane and hard shoulder westwards and two lanes and hard shoulder eastwards. Approaching N40 junction, the N28 widens to three lanes in each direction.

The N40 (South Ring Road) has two lanes and hard shoulder in each direction, it widens further towards the junction with the N27. All junctions are merge type junctions. At Ballincollig, the N40 becomes the N22. The N22 continues generally as one lane plus hard shoulder in each direction to Lissarda where it narrows to one lane in each direction with no hard shoulders for a short distance. It also narrows approaching the first River Lee crossing and continues as a single lane in each direction (no hard shoulder) to Coolcour.

At Coolcour, a new section of the N22 has opened to general traffic on the 9th December 2022 (N22 Baile Bhuirne to Macroom Road Development). This route will be used for the proposed Inchamore Wind Farm which is likely to start construction in 2025 (should permission be granted).

Turbine delivery vehicles will re-join the existing N22 at Baile Bhuirne Junction which is c.2 km north-west of the village of Ballyvourney. They will then proceed westwards towards the existing forest entrance at Derryreag near the Kerry county boundary. The existing N22 between the proposed Ballyvourney Junction (N22 By Pass) and Derryreag has a hard shoulder in each direction. An overtaking lane in the eastwards direction ends close to the forest entrance. The overall existing surfaced road width at the forest entrance location (proposed access to wind farm) is 15.5 m as follows:

- Westbound hard shoulder 3.0 m
- Westbound lane 4.0 m
- Eastbound overtaking lane 4.0 m
- Eastbound lane 3.5 m
- Eastbound hard shoulder 1.0 m

See Photos 15.1 and 15.2 of the N22 and forest entrance. Delivery vehicles will then follow the forest track to the wind farm, a distance of c.2.5 km, see Photos 15.3, 15.4 and 15.5.



Photo 15.1 – N22 at Derryreag



Photo No. 15.2 – Forest Entrance



Photo 15.3 – Existing Forest Road at Chainage 1000 m



Photo No. 15.4 – Existing Forest Road at Chainage 1800 m



Photo 15.5 – Existing Forest Road near Chainage 2250 m

Photo Locations are shown on **Figure 15.7**.

Vehicles will exit the site and turn left onto the N22, then turn right at the northern end of the existing island junction at Cumeenavrick and complete a 180 degree turning manoeuvre and continue on the N22.

15.3.3.2 Civil Construction Haul Route

From Keim, trucks will follow the R582 in a south-easterly direction to the N22 Macroom Bypass (Gurteenroe Junction), follow the bypass westwards to the Ballyvourney Junction with existing N22, follow the existing N22 westwards to the forestry entrance at Derryreag and then turn left and follow the forest track to the wind farm site or to the grid connection on the southern side of the N22.

For the grid to the northern side of the N22, trucks will follow the same route but go past the forestry entrance to Cummeenavrick, turn right and then follow the forest route of the N22 for c.400 m before following forestry tracks along the route.

For the quarries to the south, trucks would use the R587, then the R584 to the existing N22, proceed south-westwards to the Coolcour Junction of the Macroom By-pass, proceed north-westwards along the bypass to the Ballyvourney Junction with existing N22, follow existing N22 westwards to the forestry entrance at Derryreag and then turn left and follow the forest track to the wind farm site or to the grid connection on the southern side of the N22. For the grid to the northern side of the N22, trucks will follow the same route but go past the forestry entrance to Cummeenavrick, turn right and then follow the forest route of the N22 for c.400 m before following forestry tracks along the route.

The grid connection will be laid within existing/proposed trails for a distance of 1.3 km within the wind farm site. From there, it will follow forest tracks as far as the N22 which will be crossed by directional drilling. It will then follow the old route of the N22 for a short distance (also by directional drilling) (c.0.58 km) before following forestry tracks to the existing Ballyvouskill Substation. Of the total length of 19.9 km, some 19.2 km will be laid within lands and forest tracks.

15.3.4 Delivery Vehicle Specification

Delivery of wind turbine components will be carried out using oversized vehicles. Two different types of loads will arise via very long loads for turbine blades and wide/high loads for tower bottom sections. The longest vehicle used during deliveries will be for the rotor blades and will be an approximately 7 m long articulated vehicle with a trailer length of 55.5 m trailer and a 17 m overhang for the blade. An indicative delivery vehicle schematic is shown in **Figure 15.8** below. The Swept Path Analysis (see **Appendix 15.2**) assesses the extent of obstacles to be removed (e.g. tree pruning) or relocated (street furniture or poles) or the extent of any potential oversail into private lands associated with blade transportation. It was based on the use of a 76.8 m blade which is the longest blade for the range of turbines under consideration. The outcome would be similar for a 73 m blade which is the shortest blade for the range of turbines under consideration. No additional works are required to facilitate their transportation and no further impacts are predicted.

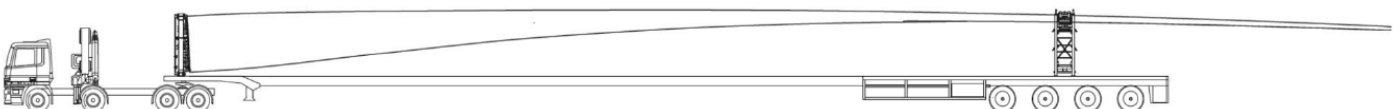


Figure 15.8: Turbine Delivery Vehicle for Turbine Rotor Blades (SG155)

The widest and tallest turbine delivery vehicle from the ground will be for the turbine tower sections. The bottom tower section will be 4.69 m wide which is 0.14 m wider than the blade delivery vehicle. These dimensions will be similar for the range of turbines under consideration. They are 4.435 m tall which is 1.035 m taller than the blade delivery vehicle and 0.335 m taller than the hub delivery vehicle. This vehicle is shown in **Figure 15.9**.

For the tower sections associated with the range of turbines under consideration, no additional works outside of those required for the blades are required to facilitate their transportation and no further impacts are predicted.

A survey of the Haul Route has been undertaken by Collett & Sons (see **Appendix 15.1**) to identify the extent of works required. The blade delivery vehicle has a total height of 3.936 m. The proposed delivery vehicle length, width and height parameters used to complete the SPA are based on the worst-case scenario using the SG 155 Blade component super wing carrier.

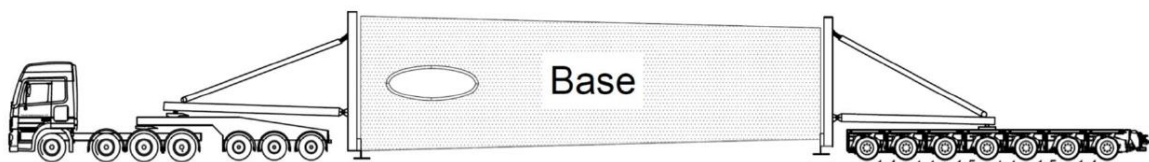


Figure 15.9: Turbine Tower Section Delivery Vehicle (SG155)

Delivery of other materials to Site for the construction of the wind farm will be undertaken using standard HGVs, the largest of which is expected to be a 16.5 m standard 6 axle articulated vehicle.

15.3.5 Existing Traffic Volumes

15.3.5.1 TII DATA

There is one TII traffic counter located (TII count traffic continuously)³ on the N22 at Slieveragh Cross, north-west of Ballyvourney (Station Id: TMU N22 060.0E) and c.5.5 km east of the forest access at Derryreag, see **Figure 15.10**. This is c.0.48 km from the Ballyvourney Junction of the new N22 Macroom By-Pass. The Average Annual Daily Traffic (AADT) volume on the road was recorded as being 7,258 vehicles in 2019 (2020 and 2021 values are less due to Covid Restrictions) as outlined in **Table 15.09**. From this figure, the number of HGVs was 385 with light vehicles making up the remaining 6,873 of the total of 7,258. The 2022 figure reflects traffic counted between 1st January and 28th November 2022 and, when extrapolated forward, is likely to be similar to the 2019 value.

³ <https://trafficdata.tii.ie/public/multinodemap.asp>

Table 15.9: TII Traffic Data

Station Id. TMU N22 060.0E			
Description: N22 Between Killarney and Macroom, Ballyvourney, Co. Cork			
	AADT	% HGV	Coverage
2022*	7,032	5.4%	90.1%
2021	5,784	6.4%	100.0%
2020	4,941	6.9%	99.7%
2019	7,258	5.3%	96.8%
2018	7,159	5.4%	99.7%
2017	6,933	5.1%	99.7%

*Up to 28th November 2022

The TII traffic counter is located on all haul routes to the site and as there are no junctions of significance between the counter and the site entrance at Derryreag and the grid entrance at Cummeenavruck, it is considered as being representative of traffic volumes in the vicinity of the proposed development.

15.3.6 Predicted Future Traffic Volumes

TII publication “Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand projections, PE-PAG-02017, May 2019 can be used to predict future growth in traffic volumes across Ireland. Traffic volumes are predicted to increase in the coming years (predictions are for the period 2016 to 2030) when construction of the Development is likely to take place. **Table 15.10** shows the multiplier for County Cork under different growth rate scenarios.

Table 15.10: Traffic Annual Growth Predictions Formulae (Multipliers) for County Cork 2016 to 2030

Low Sensitivity Growth Rate		Central Growth Rate		High Sensitivity Growth Rate	
LV	HV	LV	HV	LV	HV
1.0173	1.0361	1.0189	1.0377	1.0223	1.0411

LV = Light Vehicles, HV = Heavy Vehicles

Assuming that construction will take place in 2026, under the high sensitivity scenario, the amount of light vehicles on the N22 will increase to 8,020 in 2026 from the 2019 AADT of 6,873 and heavy vehicles will increase to 510 in 2026 from 385 in 2019.

The estimated capacity of the N22 national primary road in the vicinity of Ballyvourney is based on Table 6.1 of the TII publication DN-GEO-03031 – Rural link design which provides a table of recommended rural road layouts and capacities for each cross section.

The N22 at Derryreag and Cummeenavrack is similar in section to a 7.3 m Type 1 single carriageway. A Type 1 carriageway has a guidance capacity of 11,600 AADT for level of service D (approaching unstable flow). The new N22 Macroom By-Pass will be a Type 2 Dual Carriageway. Such a road has a guidance capacity of 20,000 for Level of Service D.

When the growth predictions are applied to the recorded traffic figures, the N22 is predicted to be running at approximately 73.5% capacity at the Derryreag and Cummeenavrack locations (existing N22 west of the by-pass) in 2027 and therefore has capacity to accommodate additional traffic in the future. The N22 Macroom By-Pass is predicted to be running at approximately 11,100 to 11,200 AADT in 2027⁴ or at 56% capacity.

15.3.7 Accident Statistics

The Road Safety Authority publish tables on “Road Casualties and Collisions in Ireland” each year. The last published table for National Routes is for 2017.

Statistics are divided into those occurring “Inside Built-up Areas” and those occurring “Outside Built-up Areas”. **Table 15.11** below presents a summary of accidents for the N22 for the years 2013 to 2017.

Table 15.11: Summary of Accidents for the N22 for the years 2013 to 2017

Year	Inside Build Up Areas			Total	Outside Built Up Areas			Total	Overall Total	Collision Rate per km
	F	SI	MI		F	SI	MI			
2017	1	1	14	16	1	7	21	29	45	0.39
2016	0	4	19	23	2	5	21	28	51	0.44
2015	0	2	23	25	1	7	22	30	55	0.47
2014	0	0	12	12	4	8	21	33	45	0.38
2013	0	1	8	9	4	3	13	20	29	0.25

F = Fatal

SI = Significant Injuries

MI – Minor Injuries

For the N22, historical accidents were more prevalent outside built-up areas than inside them.

⁴ N22 Baile Bhuirne – Macroom (Baile Bhuirne to Coolcour) Environmental Impact Statement, Volume 3 – Figures, McCarthy Hyder Consultants, October 2009

15.4 PROPOSED WORKS

15.4.1 Construction Phase

The construction period of the Project is anticipated to take approximately 21 months. The majority of HGV deliveries to Site will take place during turbine foundation (reinforcing steel and ready-mix concrete), turbine hardstands and Site access track upgrade works. During this period, there will be trips associated with the arrival and departure of construction staff. While much of the stone for site tracks and hardstands will be sourced from on-site borrow pits and from the excavation works, a finishing layer of imported stone will be required prior to turbine delivery.

Staff trips will mainly be made using cars and vans, while deliveries of steel, concrete, and rock and construction materials will be made by HGVs. The majority of deliveries will be during the first half of the construction period. It is important to note that it is anticipated that ready-mix concrete and hardcore materials will be sourced from local quarries in the area either to the north or south of the N22, will use the new N22 Macroom By-Pass to Ballyvourney Junction with N22, then the existing N22 to the forest access to the wind farm Site at Derryreag or will continue to Cummeenavrack for access to the grid connections such that Ballymakeery and Ballyvourney villages will be avoided and the urban area of Macroom will also largely be avoided.

It is expected that construction hours will be between 07:00 and 19:00 Monday to Friday and 07:00 – 13:00 on Saturdays with no working on Sundays or on Bank or Public Holidays unless agreed otherwise with Cork County Council (e.g. for concrete works for foundations which may start before 07:00). Some special deliveries such as turbine components and concrete for Turbine Foundations are likely to be required to be delivered outside of these times in consultation with Cork County Council (see Section 15.4.2).

15.4.2 Turbine Component Haul Route

For abnormal loads between Ringaskiddy Port and the wind farm Site, some minor works will be required to facilitate the delivery of turbine components. Some of these will be relatively minor in nature for example temporary removal (and reinstatement on completion of delivery) of street furniture and signage. The extent of works has been determined by reference to the Collett Report of October 2022 (see **Appendix 15.1** for Swept Path Analysis Drawings prepared by Collett for that part of the haul route between Ringaskiddy Port and Derryreag) and to the results of a swept path analysis prepared by JOD (see **Appendix 15.2**) for the forest entrance off the N22 at Derryreag.

The JOD Swept Path Analysis drawings were created using AutoTrack Software and was informed by the results of topographic surveys carried out by GHE Surveying during October 2022.

The use of special transporter vehicles with rear wheel steering in the delivery of wind turbine components will ensure safe transportation and manoeuvrability on the roads. Extendable transporter vehicles will be retracted on return journeys which allays the need for a SPA of the Cummeenavrick N22 junction at Co. Kerry.

Table 15.12 presents a summary of the works required on the turbine component haul route. Photographs of each location are included in the Collett Report of October 2022.

Table 15.12: Temporary Works Required on Turbine Component Haul Route

Reference Point in Collett Report	Potential Constraint	Works Description	No works required
			Temporary works required
			Permanent works required
1	Exit from Ringaskiddy Port	Flower pots and fencing to be removed. Bollards to be removed. Localised area of road widening required at bollard location. See Collett Drawing 343154-10A1.1.	Temporary works required
2	N28 Roundabout at Pfizer	Signage and Street furniture to be temporarily removed for central area of roundabout and from Splitter Island beyond roundabout. Road widening required into roundabout and at Splitter Island. See Collett Drawing 343154-20A1.1.	Temporary works required
3	Splitter Island on N28	No works required	No works required
4	Splitter Island on N28 at Shanbally	No works required	No works required
5	N28 Roundabout at Shanbally	Signage and bollards to be temporarily removed. Road widening required at Splitter Island. See Collett Drawing 343154-30A1.1.	Temporary works required
6	Splitter Island on N28	No works required	No works required
7	Splitter Island on N28	No works required	No works required
8	Splitter Island on N28	No works required	No works required
9	Splitter Island on N28	No works required	No works required
10	Splitter Island on N28	No works required	No works required
11	Splitter Island on N28	No works required	No works required
12	Splitter Island on N28	No works required	No works required
13	N28 / R611 Roundabout	Signage and Street Furniture to be Temporarily Removed from Entry Splitter Island. Tree to be pruned. See Collett Drawing 343154-10A0.1.	Temporary works required
14	Splitter Island on N28	No works required	No works required
15	N28 / N40 Junction	No works required	No works required
16	Splitter Island on N22	No works required	No works required
17	Splitter Island on N22 at Srelane	Flexi Bollards to be Temporarily Flattened	Temporary works required

Reference Point in Collett Report	Potential Constraint	Works Description	No works required
			Temporary works required
			Permanent works required
18	Splitter Island on N22 near Ovens	Flexi Bollards to be Temporarily Flattened	
19	Splitter Island on N22 at Ovens	No works required	
20	Splitter Island on N22 at Ovens	No works required	
21	Splitter Island on N22 at Ovens	No works required	
22	Splitter Island on N22	No works required	
23	Splitter Island on N22	No works required	
24	Splitter Island on N22	No works required	
25	Splitter Island on N22	No works required	
26	Splitter Island on N22	No works required	
27	Splitter Island on N22	No works required	
28	Splitter Island on N22	Flexi Bollards to be Temporarily Flattened	
29	Splitter Island on N22	No works required	
30	Splitter Island on N22	No works required	
31	Splitter Island on N22	No works required	
32	Splitter Island on N22	No works required	
33	Splitter Island on N22	No works required	
34	Left Bend on N22	No works required	
35	Right Bend on N22	No works required	
36	Macroom By-Pass Interchange	Localised triangular area of Road Widening Required on approach to Roundabout. Signage may need to be temporarily removed =. See Collett Drawing 343154-50A1.1.	
37	N22 By-Pass Interchange at Ballyvourney	Street Furniture/Signage to be temporarily removed. Road bearing surface to be provided across part of Roundabout. See Collett Drawing 343154-60A1.1.	
38	Forest Entrance / Site Access off N22 at Derryreag	Remove vertical hump through junction so as to reduce gradient towards N22.	
38	Forest Junction	Remove earth berm at eastern side of junction so as to increase junction width.	
38	Forest Junction	Remove vegetation at western side of junction so as to increase junction width.	
38	Forest Junction	Provide additional stone for junction tracked area.	
38	Forest Junction	Provide double layer of bitumen macadam surfacing between edge of N22 and some 30 m into junction.	
38	Forest Junction	Provide road drainage incl. heavy duty "ACO" type interceptor drain at interface between widened junction and edge of N22.	
38	Junction	Provide new fencing, road signs and markings	

Reference Point in Collett Report	Potential Constraint	Works Description	No works required
			Temporary works required
			Permanent works required
38	Junction	Provide new road signage.	
n/a	Junction	Widen Forest Track at bend at Chainage 200 (Drawing: JOD-01.1 Survey Inchamore AT Rev0 3D)	
n/a	Forest Track	Grade and stone and fill potholes at Chainage 1000 (Drawing: JOD-01.3 Survey Inchamore AT Rev0 3D)	
n/a	Forest Track	Widen bend at Chainage 1800 (Drawing: JOD-01.5 Survey Inchamore AT Rev0 3D).	
n/a	Forest Track	Widen bend at Chainage 2250. (Drawing: JOD-01.6 Survey Inchamore AT Rev0 3D)	

From **Table 15.12** above, it is evident that very minor temporary works are required between Ringaskiddy Port and the forest entrance at Derryreag. These are shaded in “Orange” in **Table 15.12**. However, works are required at the forest junction and to the existing forest track between Derryreag and the Wind Farm Site – these are shaded in red in **Table 15.12** and shown on Drawings 6226-PL-101 and 6226- PL-102, **Appendix 15.2**.

At the forest entrance at Derryreag, an earth berm is to be removed on the eastern side, vegetation is to be removed on the western side, the track is to be widened and realigned vertically so as to remove a hump and reduce the gradient towards the N22. The junction will be surfaced with a double layer (60 mm base course + 40 mm wearing course) of bitumen macadam), drainage will be provided including a heavy duty ‘Aco’ type drain across the junction near the edge of the N22. New fencing will be provided shown on Drawing 200-LT1. For slow moving HGV’s leaving the site on the forest track construction haul route, a right turn would have to cross the eastbound overtaking lane, which is considered to be a potentially dangerous manoeuvre . To address this, the empty turbine delivery HGV’s will turn left onto N22, then turn right at the northern end of the existing island junction at Cummeenavrick and complete a 180 degree turning manoeuvre and continue on the N22 (See **Figure 15.1**). In addition, it is proposed that a ‘Stop’ sign, a ‘No Right Turn’ sign and road markings will be placed at the exit from the forest road and the N22 such that HGV’s only turn left (westwards) and will turn around at the former N22 area at Cummeenavrick which is c. 2.5 km from the wind farm (see **Appendix 15.1**).

The upgrade to the forest track works are shown on Drawing 6226-PL-210. For the c.2.5 km distance between the Cummeenavrick N22 junction and the wind farm road, the forest track is generally in a good condition. However, bends need to be realigned at three locations. These works are shown on Drawings 6226-PL-101 and 6226- PL-102.

15.4.3 Civil Construction Haul Route

No upgrade works are necessary to the N22 to facilitate the delivery of materials. However, preparatory works such as signage and directions to the wind farm Site will be installed pre-construction on the approach to the site entrance on the N22 in accordance with Chapter 8 of the Traffic Management Guidelines. August 2019 (see **Section 15.6 Mitigation Measures**).

A condition survey of the existing N22 between Ballyvourney Junction and Cummeenavrick will be carried out prior to commencement of construction and another post-construction. The Developer will lodge a bond with Kerry County Council (and Cork County Council if required) prior to commencement of construction in the amount to be agreed with the Council(s) for the possible repair/upkeep of the road. During the construction period, the road will be inspected weekly by the Developer's Resident Engineer. The Contractor will be instructed to repair any defects within the following week. At the end of the construction period, any further defects will be remedied to the satisfaction of Kerry County Council, Cork County Council and TII.

Similar to returning turbine delivery vehicles discussed above, for slow moving HGV's leaving the site on the forest track construction haul route, a right turn would have to cross the eastbound overtaking lane which is considered to be a potentially dangerous manoeuvre. To address this, empty turbine delivery HGV's will turn left onto the N22, then turn right at the northern end of the existing island junction at Cummeenavrick and complete a 180 degree turning manoeuvre and continue on the N22 (see **Figure 15.1**). In addition, it is proposed that a 'Stop' sign, a 'No Right Turn' sign and road markings will be placed at the exit from the forest road and the N22 such that HGV's only turn left (westwards) and will turn around at the former N22 area at Cummeenavrick.

15.4.4 Grid Connection

No road upgrade works are proposed to facilitate the delivery of materials.

No trenches or joint bays will be installed within public roads.

15.4.5 Wind Farm Internal Access Tracks

Within c.50 m of entering the wind farm site, the road splits into two branches, each giving access to three turbines.

The eastern branch will give access to turbines T4 and T5 as well as to the 38 kV substation and to the borrow pit.

The western branch will give access to the temporary site compound, turbines T1, T2 and T3 as well as the anemometer mast.

One borrow pit (located north of Turbine T5) will service the Site.

15.5 ASSESSMENT OF POTENTIAL EFFECTS

15.5.1 HGV Deliveries

15.5.1.1 The estimated timescale for the completion of the construction phase is 21 months, inclusive of all works to Site Access Tracks, access routes, substation building and erection and commissioning of turbines and grid connection works.

Tables 15.13 to **Table 15.16** present a summary of the estimated HGV and abnormal load deliveries of materials required to construct the wind farm, the turbine component haul route improvement works and the grid connection.

15.5.1.2 It is estimated that 840 m³ of structural concrete and 60 m³ of blinding concrete will be required for each turbine foundation and that an additional 360 m³ will be required for the substation buildings and plinths, met mast foundation and other miscellaneous works. This gives a total volume of concrete of 4,860 m³. . Based on 6 m³ per concrete truck, some 810 loads will be required.

15.5.1.3 It is estimated that 90t of reinforcing steel will be required for each turbine foundation and that an additional 50t will be required for the substation, met mast foundation and miscellaneous works. These total 500t. At 20t/load, some 25 deliveries of reinforcing steel will be required. Obtaining the reinforced steel from Cork is an option.

15.5.1.4 For the proposed area of new Site tracks of 15,998 m² (see **Chapter 2: Project Description**, Section 2.5.5, - 3,555 m long x 4.5 m wide), some 1,599 m³ of imported crushed stone will be required for a 100 mm finishing layer. Allowing for additional stone at bends and junctions, the total volume is estimated at 1,700 m³.

For the upgrading works to 3,102 m of existing track, some 1396 m³ will be required. Allowing for widening at bends, the total volume is estimated at 1400 m³.

For the total hardstand area of $5 \times 4,740 \text{ m}^2$ (see **Chapter 2: Project Description**, Section 2.5.3), some $2,844 \text{ m}^3$ of imported stone will be required for the finishing layer.

These volumes of imported stone total $5,470 \text{ m}^3$. At $12 \text{ m}^3/\text{load}$, some 456 deliveries will be required.

15.3.1.5 For the substation area of $50.24 \text{ m} \times 23.251$, (see TLI Drawing 05836-DR-226 in the planning drawings), a volume of 233 m^3 or 12 loads are required.

15.3.1.6 Depending on the soil/rock profile, imported crushed stone (engineering fill) may be required under turbine foundations as upfill. Allowing 0.3 m depth per foundation, then 766 m^3 is required. At $12 \text{ m}^3/\text{load}$, some 64 loads are required.

15.3.1.7 For the 38 kV on-site substation, most of the deliveries will be crushed stone, building materials, electrical switchgear and equipment. However, there will be a transformer (38 kV/20 kV) which will be an abnormal load but can be accommodated on the Civil Construction Haul Route.

For the 38 kV substation, it is estimated that 20 loads will be required for concrete blocks, precast concrete elements, timber, steel doors, rendering materials, fencing, electrical cabling, panels, transformer and other equipment. The majority of these (18 No.) are expected to come from Cork.

15.3.1.8 Two electrical circuits are proposed within the wind farm site, one to serve Turbines T1, T2 and T3 and the other to serve T4 and T5. Each circuit will connect to the on-site substation at 20 kV. The total length of 20 kV single circuit is estimated at $3,900 \text{ m}$ while there will be 900 m of double circuit to the substation. Imported bedding/backfill material will be required within the trenches. This will give a requirement of 76 loads. Each single circuit trench will have 4 No. 110 mm diameter ducts and the double circuit will have 8 No. Thus, the total length of ducts is estimated at 22.8 km . This is typically delivered in 6 m lengths at 3 km per load which would give rise to 8 loads. Ducting will be imported via Ringaskiddy.

For 20 kV cables, the total length will be 17.1 km . For a typical mass/metre of 5.8 kg , the total mass is 99.18 t which will require 5 loads. These will be imported via Ringaskiddy.

For fibre optic cable, one load will be required. This will be imported via Ringaskiddy.

For precast concrete joint bays, one load will be required.

The total of the above related to the internal electrical circuits is 91 loads (76+8+5+1+1).

15.3.1.9 Four loads are estimated for met/anemometer mast materials while 30 loads are estimated for general civil engineering materials such as geofabrics, drainage pipes, water crossings, fencing etc. These will be delivered via Cork.

15.3.1.10 Forest felling will be required in advance of construction works. It is anticipated that brash will be left on site and that logs will be removed off site following felling and will not be left stacked on site.. During the delivery period, if turbines are delivered at night, then logs will be removed by day using the Site access tracks.

The total felling area is estimated at 32.36 ha and the total volume of wood is estimated at 11,140 m³. This is equivalent to 5,013 tonnes. This is equivalent to 251 loads. Allowing for part loads, voids etc., the total allowance is for 300 loads over a 12-week period equivalent to 5 loads per day. Good quality logs will be used for timber manufacture and transported to:

- Grainger's Sawmills, GP, Enniskeane, Ballymoney, Co. Cork;
- Enniskeane Timber Products Ltd., Ballineen, Co. Cork, and
- GP Wood, Lissarda, Co. Cork.

These locations are shown on **Figure 15.6**.

Should the quality be poor, the timber will be transported to either Clonmel or Waterford for sheeting board manufacture via the N22.

15.5.1.11 Very little waste is envisaged from the construction phase and likely to result from offcuts of timber, electrical cables, cable drums and packaging. These materials will be segregated on site and removed to a licensed recycling facility listed in Section 15.2.4above, once a load accumulates. On average, 1 load/month is envisaged. Cable drums will be transported to the cable manufacturer for re-use.

15.5.1.12 Based on the quantities of materials described above, it is estimated that during civil construction, approximately 1, 781 HGV loads will be delivered to the wind farm Site. Much of these deliveries will be over the 11-month period between months 2 to 12. This equates to approximately 162 loads per month or an average of 7 to 9 loads per day. The peak

number of deliveries per day will occur during the concrete pour for turbine foundation construction. An estimated 140 concrete deliveries will be required per turbine foundation as the entire concrete pour has to be placed within 8-10 hours. Some other materials will also be delivered on such days, so a realistic estimation of peak deliveries is approximately 150 deliveries per day (for at least 6 separate days in the construction programme when the turbine foundations will be poured). On these concrete pour days, some 14-18 deliveries per hour will be required.

A summary of estimated loads for the Civil/Electrical Construction Works is presented in **Table 15.13**.

Table 15.13: HGV and Abnormal Load Deliveries – Associated with Civil/Electrical Construction Works

Materials	Quantity	No. of Deliveries
Site Establishment and Removal	10 no.	10
Concrete	4,860 m ³	810
Reinforcing Steel	500t	25
Substation Building and electrical equipment	-	20
Other – Geotextile Mats, Tools, Fencing etc.	-	30
Internal Cabling Materials incl. bedding	-	91
Met Mast Materials	-	4
Imported Crushed Stone (engineering fill) as Uphill to Foundations	766 m ³	389
Imported Crushed Stone for Substation, 200 mm thick	233 m ³	12
Imported Crushed Stone for Site Access Track and Turbine Hardstands (assumes 100 mm thick wearing course)	5,470 m ³	456
Forestry Removal	11,140 m ³	300
Site Reinstatement	-	5
Waste – 1 container/month	-	21
Total	-	1,848

15.5.1.13 Turbine components will be delivered to Site over a period of approximately 8-10 weeks after civil works are completed. It is estimated that approximately 48 loads of turbine components and 50 loads of crane parts will be delivered/removed during this period. The majority of these loads will be classified as abnormal loads and the relevant approvals and permits⁵ will be obtained by the turbine supplier or by its appointed haulage contractor before deliveries take place.

⁵ Abnormal Loads Permit

The expected number of HGV deliveries for turbine components are based on specifications from the potential turbine manufacturers, on best estimates of trips generated by similar sized windfarms and previous experience in windfarm planning and civil construction. These figures are likely to vary to some degree depending on the individual lengths of tower sections offered by different manufacturers, but not to the extent that impacts are likely to be significantly changed. A summary of the estimated HGV loads to Site associated with wind turbine components is presented in **Table 15.14**.

Following completion of the construction works, it is estimated that approximately 10 loads will be needed to remove all temporary equipment and materials used onsite e.g. temporary compound, fencing, cabins, storage containers, etc.

The total number of HGV loads associated with turbine components and the N22/Forestry Junction upgrade works is estimated at 175.

Table 15.14: HGV and Abnormal Load Deliveries – Associated with Wind Turbine Components And Associated Works

Materials	Quantity	No. of Deliveries
Site Establishment and Removal	10	10
Anchor Cages & Foundation Templates	5	5
Tower Sections	-	20
Nacelles	5	5
Rotor Blades	15	15
Transformers, Panels and Cabling	-	3
Tools etc.	-	1
Crane Deliveries to Site, including ballast, booms, etc. and removal of same	2 Cranes	50
Road Widening on Turbine Haul Route N22 Forest Access – Soil Disposal	500 m ³	25
Crushed Stone for Widening and Strengthening of Turbine Haul Route at N22 Forest Access	400 m ³	20
Road Surfacing for Turbine Haul Route at N22 Forest Access	200 t	10
Fencing and Miscellaneous Deliveries to N22 Forest Access	2	2
Total		166

15.5.1.14 For the grid works, it is assumed that 0.92 m³ of concrete blinding is required per joint bay and 0.16 m³ per communication/link chamber. These will require 20 m³ lean mix concrete or 4 loads at up to 6 m³ per load. The locations of joint bays are shown on **TLI Drawing No. 05934-DR-201 to 05934-DR-210** included in **Volume III: Figures**.

Some 20 loads of precast components are required for joint bay walls and roof slabs as well as complete communication and link chambers.

For joint bay floor slabs, some 51 m³ concrete is required which is equivalent to 9 loads.

For 38 kV cables, 800 mm² aluminium, the weight per km of cable is 6.251 t. For a total length of 61.0 km (19.85 km x 3 phases plus 2.5% for wastage), the weight will be 381 t and will require 20 loads. Allowing another load for fibre optic cables brings the total to 21 loads. These will be delivered via Ringaskiddy.

Some 80 km of ducting is required which is typically delivered in 6 m lengths, typically 3 km per load. Thus, some 27 loads are required. These will be delivered via Ringaskiddy. Some 30 m³ of material will arise from directional drilling under the N22 for disposal off site at a licenced facility.

Some 0.290 m³ of lean mix concrete is required per linear metre of trench. This will give a requirement for 5,597 m³ of lean mix concrete which is equivalent to some 932 deliveries to Site for the complete grid connection route.

Table 15.15 provides a break down of the various deliveries relevant to the grid connection.

Table 15.15: 38 kV Grid Connection between On-Site Substation and Ballyvouskill Substation

Length of Grid Connection in Roads by Directional Drill	650		
Length of Grid Connection in Tracks, Lands	19,200		
Number of Joint Bays	18		
Materials	Quantity	Unit	No. of Deliveries
Site Establishment and Removal	8	No.	8
Concrete Blinding for Joint Bays, Comms Chambers and Link Boxes	20	m ³	4
Concrete for Floors of Joint Bays	51	m ³	9
Pre-Cast Concrete Joint Bays and Communication Chambers	20	No.	20
Other – Steel mesh, Geotextiles, Silt Fencing, Fencing, Danger Tape, etc.	4	No.	4
Grid Connection Cables	381	t	20
Grid Connection Ducting	80	km	27
Disposal of Excavated materials from Directional Drill Trenches in Public Roads	30	m ³	2
Lean Mix Concrete for Trenches	5,597	m ³	932
Total No. of Deliveries	-	-	1,026

15.5.1.15 **Table 15.16** shows an indicative potential breakdown of loads delivered to Site over a 21 month period. The total number of loads is estimated at 3,040.

Table 15.16: Indicative No. of HGV and Abnormal Load Deliveries Over 21 Month Construction Period

Activity	Month																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Wind Farm Site Establishment/ Fencing of Environmental Areas, Buffer Zones, etc.	5	15	10	5																5	
Internal Access Road Upgrade & Construction (imported stone)			90	90																12	
Substation & Compound Construction Civil Works			2	2	2	2	2	12													
Substation Electrical Works									2	2	2	2	2								
Substation Commissioning																					
Excavation and Construction of Turbine +Met Mast Foundations			26	41	175	145	145	145	145	145											
Excavation and Construction of Hardstands										97	98										
Forestry Removal													100	100	100						
Internal Cabling Installation										21	21	21	21	2	5						
Road Widening, Turbine Haul Route – Forest Entrance			25	20		10	2														
Turbine Delivery and Erection			5								4	37	11	23	2					24	4
Grid Connection						97	93	93	93	93	93	93	93	93	93	88	4				
Energisation																					
Turbine Commissioning																					

Activity	Month																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Met Mast Delivery and Erection																		4			
Site Reinstatement and Finishing Works																					5
Waste Management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Totals	6	16	159	159	178	255	243	251	241	359	219	154	228	219	201	89	5	5	1	42	10

Based on the indicative timetable outlined above the peak times for HGV deliveries will be in months 5 to 10 when the turbine foundations will be constructed, hardstands and Site tracks will be finished in imported stone and the grid connection works will be ongoing. This is estimated to result in a maximum of 359 trips during month 10 with an average of 16 HGV trips per day in this period. Peak deliveries are expected to be during the period of concrete pours for turbine foundations when there will be approximately 140 loads per Turbine Foundation. If one foundation is poured per month, then the balance of the loads in the busiest month would be 219 loads or 10 loads per day over the remaining days of the month.

15.5.2 Staff/Worker Light Goods Vehicle Traffic

For the wind farm construction, a peak workforce of 40 persons are anticipated on the main Site (see **Chapter 4: Table 4.7**). There will be peaks and troughs in the numbers, with the peak workforce during the general Site works.

In addition to the onsite construction workforce, additional construction staff will be required for the grid connection cable laying works. Two gangs will be required for the grid connection. A maximum of 20 construction staff are anticipated. Thus, up to 60 workers could be employed at peak times between the wind farm and grid connection.

The 60 workers will generally travel to the Site via light vehicle (LV) (i.e. car or small van) assuming 1 person per vehicle, or 60 trips to and 60 trips from the site per day. This is made up of:

- 40 trips each way to/from wind farm Site.
- 20 trips each way to/from grid construction works.

15.5.3 Predicted Additional Traffic on Roads During Construction Phase, Magnitude and Significance of Impacts

Based on the analysis in **Section 15.5.1** above, **Table 15.17** below has been prepared which summarises the peak additional HGV deliveries per road element while **Table 15.18** provides a summary of the peak additional traffic movements (ie. HGV and LGV and one delivery equating to two traffic movements). **Figure 15.11** Shows the various road nodes referred to in these tables.

For each road element, the maximum potential for load deliveries is assumed e.g. from B to A, it is assumed that all deliveries will come from suppliers to the south while for Keim to C, it is assumed that all deliveries will come from suppliers to the north.

It is assumed that 92% of grid connection deliveries will be via Cummeenavrick in direct proportion to the length of grid connection to the north of the N22.

It is assumed that all HGV's leaving the wind farm site will turn westwards and then proceed to turn at Cummeenavrick so as to turn eastwards.

Table 15.17: Summary of Peak Additional HGV / Abnormal Load Deliveries to Site Per Road Element

Node	Road	Civil & Electrical	Turbine	Grid	Total
Ringaskiddy to A	Ringaskiddy Port to Coolcour Junction of New N22 Macroom By-Pass	66	98	48	212
B to A	Existing N22 between R584 Junction and Coolcour Junction with New N22 By-Pass	1,923	48	978	2,949
Keim to C	Keim to Gurteenroe Junction on New N22 By-Pass	1,923	48	978	2,949
A to C	New N22 By-Pass between Coolcour Junction and Gurteenroe junction	1,989	146	1,026	3,161
C to D	New N22 By-Pass between Gurteenroe Junction and Ballyvourney Junction	1,989	146	1,026	3,161
D to E	Existing N22 between Ballyvourney Junction of New N22 By-Pass and Forest Access at Derryreag	1,989	146	1,026	3,161
E to F	Existing N22 between Forest Access at Derryreag and Grid Entrance at Cummeenavrick	1,989	146	1,026	3,161
F to G	Forest Track	0	0	944	944

Table 15.18: Summary of Peak Additional HGV / Abnormal Traffic Movements on Roads

Node	Road	Total No. Of Deliveries	Peak Deliveries/ Month	Peak Deliveries/ Day	Staff	Peak Traffic Movements/ Day ⁶
Ringaskiddy to A	Ringaskiddy Port to Coolcour Junction of New N22 Macroom By-Pass	212	45	5	0	10
B to A	Existing N22 between R584 Junction and Coolcour Junction with New N22 By-Pass	2, 949	480	150	40	380
Keim to C	Keim to Gurteenroe Junction on New N22 By-Pass	2, 949	480	150	40	380
A to C	New N22 By-Pass between Coolcour Junction and Gurteenroe junction	3, 161	485	150	60	420
C to D	New N22 By-Pass between Gurteenroe Junction and Ballyvourney Junction	3, 161	485	150	60	420
D to E	Existing N22 between Ballyvourney Junction of New N22 By-Pass and L Forest Access at Derryreag	3, 161	485	150	60	420
E to F	Existing N22 between Forest Access at Derryreag and Grid Entrance at Cummeenavrick	3, 161	485	150	60	420
F to G	Forest Track	944			20	60

The numbers of HGVs generated by the Development (420 movements per day at peak) could be considered a significant increase on the numbers of HGVs which are predicted to use the existing N22 in 2026 (510) (see Section 15.3.6). However, the construction stage traffic movements between Ringaskiddy Port and Macroom (node Ringaskiddy Port to A)

⁶ On the basis of each delivery equating to two traffic movements.

(N28, N40 and N22 to Macroom) will be low at 10 movements (5 deliveries) per day. Assuming that the majority of the route between Ringaskiddy and Macroom has a capacity of 11,600 AADT, the change would be 0.1%. The magnitude of change is considered as being “Very Low” (see **Section 15.2.9**).

The magnitude of change is summarised within **Table 15.19** below.

For the existing N22 near Macroom between the R584 and the Coolcour Junction of the new N22 Macroom By-Pass (Nodes B to A), an additional 380 traffic movements per day will arise during concreting of turbine foundations. The predicted flows (see **Section 15.3.6**) for the N22 for 2027 would be 8,900 – 9,500 AADT around Macroom. Assuming a guidance capacity of 11,600 AADT, adding a further 380 traffic movements would increase flows to 9,280 – 9,880 which would still be within the guidance capacity of 11,600 AADT. The flows would increase by 4.1% which, in terms of magnitude, are considered as being “Very Low” (see **Section 15.2.9**).

For the new N22 Macroom By-Pass, the peak additional 420 traffic movements per day will arise during concreting of turbine foundations. The peak only occurs on 5 days when the concrete foundations are being poured. The predicted flows for the N22 Macroom By-Pass for 2027 are 11,100 to 11,200 AADT (see **Section 15.3.6**). This is 56% of the guidance capacity of 20,000 AADT. Adding a further 420 movements would increase the 2027 flows to 11,490 to 11,590 which is still well within the guidance capacity of 20,000. The flows would increase by 3.8% which, in terms of magnitude, are considered as being “Very Low” (See **Section 15.2.9**) x.

For the existing N22 between the new Ballyvourney Junction and Derryreag/Cummeenavruck (node A to F), an additional 420 traffic movements will arise. As discussed in **Section 15.3.6**, flows on the existing N22 would be 8,356 AADT in 2026. As discussed in **Section 15.3.6**, the guidance capacity of this section of the N22 is 11,600 AADT. The predicted additional flows would increase flows by 5.0% to 8,776 which is still well inside the AADT of 11,600. In terms of magnitude, the change is considered as “Very Low” (see **Section 15.2.9**).

From the wind farm Site to the Forest track/N22 junction (node F to G), an additional 60 traffic movements will arise. As discussed in **Section 15.3.6**, flows on the existing N22 would be 8,356 AADT in 2026. As discussed in **Section 15.3.6**, the guidance capacity of this section of the N22 is 11,600 AADT. The predicted additional flows would increase flows

by 1.0% to 8,416 which is still well inside the AADT of 11,600. In terms of magnitude, the change is considered as “Very Low” (see **Section 15.2.9**).

From the analysis above, the significance of the impacts are assessed (with reference to **Table 15.6**) and are presented in **Table 15.19**. The significance of the impacts are “Negligible” to “Minor” on the N22 (existing and new Macroom By-Pass).

Table 15.19: Magnitude and Significance of Impacts

Node	Road	Sensitivity ⁷	Magnitude	Significance of Effects	Duration
Ringaskiddy to A	Ringaskiddy Port to Coolcour Junction of New N22 Macroom By-Pass	Very Low to High	Very Low	Negligible to Minor	Short Term
B to A	Existing N22 between R584 Junction and Coolcour Junction with New N22 By-Pass	Medium to Low	Very Low	Negligible	Short Term
Keim to C	Keim to Gurteenroe Junction on New N22 By-Pass	Medium to Low	Low	Negligible to Minor	Short Term
A to C	New N22 By-Pass between Coolcour Junction and Gurteenroe junction	Very Low	Very Low	Negligible	Short Term
C to D	New N22 By-Pass between Gurteenroe Junction and Ballyvourney Junction	Very Low	Very Low	Negligible	Short Term
D to E	Existing N22 between Ballyvourney Junction of New N22 By-Pass and Forest Access at Derryreag	Low	Very Low	Negligible	Short Term
E to F	Existing N22 between Forest Access at Derryreag and Grid Entrance at Cummeenavrick	Low	Very Low	Negligible	Short Term
F to G	Forest Track	Low	Very Low	Negligible	Short Term

⁷ Sensitivity referenced to Table 15.3 and Table 15.4.

Therefore, the effects on the local road network (including abnormal turbine delivery route, civil construction haul route, grid connection route and tree felling haul route) can be predicted to be direct, negative, negligible to minor (depending on the section of road as detailed in **Section 15.5.3**) but short-term in nature as it will arise for less than two years.

15.5.4 Works on the Haul Route

As outlined in **Table 15.12**, works will be required at a number of locations along the Turbine Components Haul Route from Ringaskiddy Port to the Site. These works may cause some short-term disruption to local road users. However, these effects will be confined to a relatively short period during the construction phase, prior to the delivery of turbine components and hence are not predicted to have a significant effect. Street furniture will be adjusted (where necessary) such that it is socketed into the ground. Street furniture will be removed daily in advance of turbine delivery (which will occur at night) and be replaced immediately following the passage of the abnormal vehicles such that daytime traffic can continue as normal. The proposed works on the forest junction off the N22 at Derryreag and at the grid entrance at Cummeenavrick can be carried out without the need for traffic disruption. Signage will be provided warning of the new site entrances and that there are construction sites ahead.

Tie-in surfacing works to the edge of the N22 at Derryreag will be carried out during periods of low traffic flows.

15.5.5 Works on the Grid Connection

For the grid connection, all of the works will be constructed off the public roads.

15.5.6 Light Vehicles/Vans and Construction Personnel

The number of staff on the Site will vary according to the phase of works, peaking at up to approximately 40 during turbine foundation construction. It is expected that the majority of workers will arrive onsite in mini-buses and crew vehicles which are used to transport teams of workers from the various contractors. Subject to public health conditions, vehicle sharing will be actively encouraged to reduce vehicular movements.

It is expected that a maximum of 40 vehicles will visit the Wind Farm Site on a daily basis during the peak construction period (Turbine Foundation construction). This is estimated to be an increase of 0.8 % on predicted levels for 2026 on the N22. Parking for staff will be provided at the Temporary Construction Compound. Given the distance between the Site and the public roadway, no parking is expected or will be allowed on the N22. A number of additional unscheduled visits may be required throughout the construction period for site

inspections, site meetings, and unforeseen circumstances. The predicted effect is negligible to low due to the relatively low increase in traffic over the baseline situation.

15.5.7 Air Quality

Good local air quality is essential for the health and quality of life of residents along the Haul Route. Transport accounts for a significant proportion of pollutants in the atmosphere namely, CO₂ emissions, nitrogen dioxide (NO₂) and particulate matter (PM₁₀). NO₂ emissions can also be harmful to vegetation and ecosystems in the vicinity of the Haul Route. The increase in traffic movements on the local road network of an average of approximately 76 (average 16 HGV's + 60 cars and vans) trips per day over a short-term period is low relative to the baseline and therefore the effect of the Development on air quality will be imperceptible.

15.5.8 Noise and Vibration

There is likely to be some noise and vibration from HGV movements along the Haul Route on the regional roads, particularly on the R587, R584 and R582 which can cause disturbance to residents living along these roads. Due to the relatively low number of trips generated per day, (apart from the six days when concrete pours are taking place) the restrictions on working hours and the short-term nature of the construction phase, the effects of noise and vibration are not predicted to be significant. Mitigation measures are discussed in **Section 15.6** and in **Chapter 11: Noise**.

15.5.9 Pedestrians and Vulnerable Road Users

Pedestrian intimidation can occur where there are large changes to traffic flow and composition. No local roads will be used and there is no significant pedestrian traffic in the area.

15.5.10 Driver Delay

The existing N22 is estimated to be at 73.9 % of its capacity in 2026 with HGV and LGV traffic for the Development taking it to 77.2% considering peak movements. No delay is envisaged due to capacity. Apart from the presence of the additional volumes of slower moving HGVs on the road, no specific driver delay is envisaged.

There is potential for some driver delay on the turbine component haul route during the delivery of abnormal load components. Abnormal load deliveries will be timed to take place outside of peak times, possibly at night, and therefore the potential effects are not considered to be significant.

15.5.11 Severance

As all haul routes are either Regional or National Roads which are well established and as no road closures are proposed, severance (i.e. the separation of residents from local amenities or social networks) is unlikely to arise.

15.5.12 Mud and Debris on the Local Road Network

HGVs leaving the Site have the potential to transport mud, stones or other debris from the Site to the surrounding road network on wheels of the vehicles. This could cause nuisance to local road users or damage to vehicles from loose debris. This effect can be predicted to be direct, negative, minor and short-term in nature, confined to the initial decommissioning and construction phases only and will be subject to mitigation measures. Mitigation measures are also prescribed in **Section 15.6** and in **Chapter 10: Air Quality and Climate**.

15.5.13 Effects on Road Network during Construction Phase

Traffic numbers during construction are outlined in **Section 15.5.1**. As the roads are estimated to have sufficient spare capacity, the overall potential effect on the roads is assessed to be minor to negligible, negative effect of short-term duration and high probability during construction of the Development.

15.5.14 Operational Phase – Traffic

During the operational phase of the Project, the wind farm will normally be unmanned. Operational and remote monitoring activities will be carried out on an ongoing basis via telephone and computer links. However, regular visits to the Site will be necessary for maintenance and routine inspections. A car or van will normally be required for these routine inspections. Under normal circumstances the operation of the windfarm would require 1-2 visits to the Site per week by trained personnel and/or accompanied visitors. Parking will be provided outside the electrical compound at the onsite substation. In the case of a major fault e.g. breakdown of a turbine component, larger machinery, including possibly mobile cranes, will require access to the Site. Should a major turbine component need to be replaced e.g. wind turbine blade, the blade can be transported to site using the same route as for the construction of the turbines. Typically, once every 5 years, paintwork may need to be touched up on turbines and the blades cleaned. A Mobile Elevating Work Platform (MEWP) will be used for such activities.

The remaining forestry on Site i.e. surrounding the footprint of construction works will not be felled until 2035.

There will be a low volume of traffic generated during the operational phase of the Project. The effect of traffic associated with the operation of the Development on the existing public road network will be imperceptible due to the type of traffic and the low volume of traffic generated during operation. However, there will be slight temporary short-term effects should major turbine components need to be replaced.

The grid connection will, following commissioning, be taken in charge by ESB Networks and no regular ongoing maintenance is predicted. Due to the strict requirements of ESB Networks Functional Specification, the level of supervision normally provided by the Developer and by ESB Networks, and the extent of testing prior to commissioning, the probability of the occurrence of faults on 38 kV cable connections is very low. However, should a fault occur it would most likely be within a joint bay which could be exposed and the joint repaired over 3-4 days.

Warning signage for drivers exiting the development together with advance stop signage will be installed at the N22 junction. A suitable surface friction will be provided and maintained on the forest track/N22 junction approach, though a bound surface to the access road will need to be provided. The turning area will not appear as a continuation of the National Road under any lighting conditions.

15.5.15 Traffic Impact During Decommissioning Phase

During decommissioning, it is envisaged that the total volume of HGV traffic will be relatively small compared to the construction period (5 – 10 HGV per day) on the basis that the Site Access Tracks will remain in place to serve ongoing forestry and agriculture activity and the turbine hardstands will be allowed to revegetate into the surrounding habitat with only the turbines being removed from Site for recycling/reconditioning. This phase could be expected to last approximately 12-24 weeks. With the site access tracks and turbine hardstands left in place and revegetated, the effect is predicted to be an imperceptible effect on traffic. As the turbine blades can be cut into manageable lengths on decommissioning, there are requirements to adjust street furniture on the turbine supply haul route for decommissioning.

15.5.16 Need for a Road Safety Audit

A Road Safety Audit is required for all National Road Schemes. TII Publication GE-STY-01024, Dec. 2017 sets out two categories of scheme:

- Road Scheme – A scheme which results in new road construction or permanent change to the existing road or roadside layout.

- Development Scheme – A Scheme which results in a change to the road or roadside layout that is indicated and/or executed for commercial or private development.

The Development will use and cross the N22 National Road but does not propose any modifications to the National Road. None of the modifications in TII Publication GE-STY-01024, (Dec. 2017) Appendix A – Scheme Type and Audit Stage of GE-STY-01024 are proposed.

Objective TM 12.8 of the Cork County Development Plan 2022-2028 requires that:

“Where traffic movements associated with a development have the potential to have a material impact on the safety and free flow of traffic on a National, Regional or other Local Routes, the submission of a Traffic and Transport Assessment (TTA) and Road Safety Audit will be required as part of the proposal”.

Sight distance at the forest entrance at Derryreag is excellent in both directions (i.e. several hundred metres). However, the existing forest entrance/junction will be expanded and traffic will be intensified during the construction and decommissioning phases. The existing road layout is such that vehicles exiting the site entrances would have to cross an overtaking lane. Vehicles entering the site from the west could potentially have to park in the overtaking lane while awaiting a gap in traffic. Both of these scenarios are considered as potential to have a material impact on safety. Accordingly, a Road Safety Audit has been completed (please see **Appendix 15.3**).

A stage 1 Road Safety Audit was done in April 2023 and highlights the following as results from the audit:

Collision Data

Road Collision Data is not currently available on the Road Safety Authority Database, therefore no collision trends in the immediate vicinity of the proposed site can be analysed.

National Road Climbing Lane

Problem: The proposals indicate barriers to be provided to close down the national road southbound offside lane, where the climbing lane exists. This area of the national road is up a steep gradient.

Hazard: Faster moving traffic may attempt to overtake slower moving vehicles that are particularly slow due to the road gradient, and cut back in just prior to the temporary barriers. Collisions with the barriers or side swipe collisions with the slow moving vehicle may result.

Recommendation:

- Retain the dual lane set up for the full extent of the climbing lane.
- Adjust the refuge island within the mouth of the development junction such that right turning into the junction is near impossible for long vehicles.
- Ensure all drivers destined for the development are instructed to approach from the south only.

National Road Signage

Problem: Users may attempt to turn right into the development from the national road. These users are likely to wait in the N22 offside lane for gaps in opposing traffic.

Hazard: The stationary vehicle may be subject to rear end shunts from through traffic.

Recommendation: Provide suitable signage prohibiting right turning into the development junction. Additionally, provide signage guiding development traffic to a suitable turning location further to the east.

Development Junction – Gradient

Problem: The development junction is to a steep downhill gradient. Users exiting the development may proceed towards the National Road at excessive speed and fail to stop for the junction.

Hazard: Overshoot incidents may result.

Recommendation: Provide suitable warning signage for drivers exiting the development together with advanced stop signage and also ensure suitable surface friction is provided and maintained on approach to the junction.

Vehicle Swept Paths

Problem: It is not clear from the drawings if delivery vehicles have sufficient space to enter the development left from the National Road.

Hazard: Users may slow/stop with the tail of the vehicle protruding into the National Road. Rear-end shunts may result.

Recommendation: Undertake swept path analysis and adjust the paved area accordingly.

Turning Area

Problem: The audit team have been advised that vehicles departing the development will turn left from the development junction and undertake a turn at a location further to the north. The formation of the inbound junction for turning may appear as a continuation of the National Road during hours of darkness.

Hazard: Northbound National Road drivers may errantly divert from the mainline to enter this new junction. Impact with southbound National Road traffic may result.

Recommendation: Ensure this junction does not appear as a continuation of the National Road under any lighting conditions.

15.6 MITIGATION MEASURES

15.6.1 Construction Phase

The potential effects of the construction of the Project have been identified as being negligible to minor (see **Table 15.19**), but temporary in nature. The following mitigation measures are proposed:

- A Traffic Management Plan (TMP) has been developed (see Management Plan 7 attached to the CEMP). Prior to construction and once the Contractor's have confirmed their suppliers, the TMP will be updated in consultation with Cork County Council, Kerry County Council and An Garda Síochána as necessary to take account of any conditions attached to a grant of p55ermission. All drivers will be made aware of the location and presence of sensitive receptors at an induction session prior to construction activities taking place and will be made aware of the speed limits of the various roads on the route which are contained in the TMP and on the traffic arrangements for entering and exiting the site. This is to ensure compliance with speed limits, and traffic management arrangements.
- At the forest junction at the N22 (wind farm access) bitumen macadam surface will be provided some 30 m into the junction with room to park HGV's clear of the N22.
- The forest access track will be regraded so as to reduce the gradient towards the N22. An "Aco" type drain shall be provided to intercept rainfall run-off.

- All the traffic to the wind farm site will approach from the east such that they turn left at the forest access. All traffic leaving the wind farm site will turn left only and, if required, can turn around at Cummeenavrick turning area. Signage and road markings will be provided to facilitate/promote these manoeuvres.
- The new N22 Macroom By-Pass will be used to transport turbine components, materials for upgrading the turbine haul route, materials for construction of the civil and electrical works to and from the wind farm site, as well as materials for the grid connection so as to minimise traffic through built-up areas such as Macroom, Ballymakeery and Ballyvourney.
- All significant traffic likely to be generated by Inchamore Wind Farm will be during the construction of the Project and will be temporary in nature. It is envisaged that the construction period for the wind farm will span a 21-month period with the underground cable being installed over a concurrent 12-month period. The construction-phase Traffic Management Plan will mitigate these impacts. A number of mitigation measures are embedded within the design:
 - The design is such as to minimise the extent of the new build requirement by using existing forestry tracks where possible, thereby minimising materials requirements.
 - The design is such as to maximise the use of onsite resources (particularly stone material for track construction) to minimise the requirement for material import. Some 49,842 of stone is proposed to be won from the borrow pit which equates to a 4,154 HGV trips to the site avoided (see **Chapter 2: Table 2.4a**).
 - Retaining surplus excavated material on the Site so as to reinstate the borrow pits, thereby eliminating traffic associated with the disposal of same. Some 50,276 m³ of spoil are proposed to be stored in the on-site borrow pit or in roadside berms, resulting in a saving of 4,190 HGV trips off the site (see **Chapter 2: Table 2.4b**).
 - Designing the cable for installation in pre-laid ducts, rather than directly installing the cable in the ground. The latter would require the entire trench from joint bay to joint bay to be fully open for cable laying.
- There will be special transporter vehicles with rear wheel steering used in delivery of wind turbine components to ensure safe transportation and manoeuvrability on the roads. Extendable transporter vehicles will be retracted on return journeys.
- Prior to the delivery of abnormal loads i.e. turbine components, the Applicant or their representatives, will consult with An Garda Síochána and Cork and Kerry County Council Roads Departments to discuss the requirement for a Garda escort.
- The Developer will confirm the intended timescale for abnormal deliveries and every effort will be made to avoid peak times such as school drop off times, church services,

sporting events, peak traffic times where it is considered this may lead to unnecessary disruption.

- Abnormal loads are likely to travel at night and outside the normal construction times as may be required by An Garda Síochána. Due to the relatively modest distance between Ringaskiddy Port and the Site of c.92.8 km, the journey is achievable within a 2-3 hour timeframe. Accordingly, locations for resting will not be required. Local residents along the affected route will be notified of the timescale for abnormal load deliveries.
- A condition survey of the existing N22 between Cummeenavrick and the Ballyvourney Junction of the Macroom Bypass will be carried out prior to commencement of construction and another will be undertaken post-construction. The Developer will lodge a bond with Kerry County Council and or Cork County Council prior to commencement of construction in the amount to be agreed with the respective Council for the possible repair/upkeep of the road. During the construction period, the road will be inspected weekly by the Developer's Resident Engineer and the Contractor will be instructed to repair any defects within the following week. At the end of the construction period, any further defects will be remedied to the satisfaction of Kerry Council Council, Cork County Council and Transport Infrastructure Ireland.
- Wheel cleaning equipment will be used at the exit from the wind farm Site at Derryreagh and also at the exit from the Grid Connection Works at Cummeenavrick to prevent any mud and/or stones being transferred from Site to the public road network. All drivers will be required to see that their vehicle is free from dirt and stones prior to departure from the construction Site.
- The Site entry point will also be appropriately signed. Access to the wind farm construction Site will be controlled by on Site personnel and all visitors will be asked to sign in and out of the Site by security / Site personnel on entering and exiting the Site. All Site visitors will undergo a Site induction covering Health and Safety issues at the Contractor's temporary compound and will be required to wear appropriate Personal Protective Equipment (PPE) while onsite.
- Any dust generating activities will be minimised where practical during windy conditions, and drivers will adopt driving practices to minimise the creation of dust. Where conditions exist for dust to become friable, techniques such as damping down of the potentially affected areas will be employed.
- To reduce dust emissions, vehicle containers/loads of crushed stone will be covered during both entrance and egress to the Site.
- A survey of the turbine component haul route will be undertaken prior to commencement to identify if any new overhead lines or broadband lines will need to be

raised along the route to allow abnormal loads such as tower sections and nacelles to be delivered.

- During the construction phase, clear construction warning signs will be placed on the N22 as necessary, which will advise road users of the presence of a construction Site and of the likelihood of vehicles entering and exiting the Site or road construction areas. This will help improve road safety.
- Works on public roads on the turbine delivery haul road and grid connection will be strictly in accordance with “Guidance for the Control and Management of Traffic at Road Works – 2nd Edition 2010” as well as “Traffic Signs Manual 2010-Chapter 8- Temporary Traffic Measures and Signs at Roadworks”.
- Where required, . Road Opening Licence will be obtained for the directional drill of the grid connection under the N22.
- All vehicles using or while in operation at the wind farm site shall either have roof mounted flashing beacons or will use their hazard lights.
- A speed limit of 25 km/h shall apply to all vehicles within the wind farm site.

15.6.2 Operational Phase

Effects during operation have been assessed as being imperceptible. However, it is still important that any effect is minimised as far as is possible. Therefore, the following measures are recommended:

- All vehicles using the wind farm site shall either have roof mounted flashing beacons or will use their hazard lights.
- A speed limit of 25 km/h shall apply to all vehicles within the wind farm site.
- Locational signage shall be maintained throughout the operational period.
- Road surfaces shall be inspected on a quarterly basis and will be repaired within one month of the inspection.
- Safety arrangements at the forest road entrance/exit at Derryreag shall be reviewed every two years to confirm that traffic management arrangements are adequate.

15.6.3 Decommissioning Phase

As the turbine blades can be cut into manageable lengths on decommissioning, there are no requirements to adjust street furniture on the turbine supply haul route for decommissioning.

The wind turbines proposed as part of the proposed Development are expected to have a lifespan of up to 35 years. Following the end of their useful life, the wind turbines may be replaced with a new set of machines, subject to planning permission being obtained, or the site may be decommissioned fully, with the exception of the electricity substation.

Upon decommissioning (4 - 6 months) of the proposed wind farm, the wind turbines will be disassembled in reverse order to how they were erected. All above ground turbine components will be separated, cut and removed off-site for recycling. Turbine foundations will remain in place underground and allowed to revegetate or reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in potentially significant environment nuisances such as noise, dust and/or vibration. The site roadways will be in use for additional purposes to the operation of the wind farm (e.g. for forestry and recreational use) by the time the decommissioning of the project arises and therefore the site roads will remain in situ for future use. .

The grid connection, when completed, will be handed over to ESB Networks as the Distribution System Operator and thus it will not be removed.

The traffic management of the decommissioning phase will be informed by the road conditions at the time of decommissioning. It is not possible to predict the changes to the public road infrastructure and policies in the next 30-40 years. It is envisaged that a Traffic Management Plan will be developed for the decommissioning phase.

Nevertheless, the following traffic management measures are likely to be required:

- Signage will be erected at the site entrance and on the N22 approaching the site.
- Construction traffic associated with decommissioning will be scheduled so as to avoid school drop off and collection times.
- All vehicles using or while in operation at the wind farm site shall either have roof mounted flashing beacons or will use their hazard lights.
- A speed limit of 25 km/h shall apply to all vehicles within the wind farm site.

15.7 CUMULATIVE EFFECTS

15.7.1 Construction Phase

Table 2.1 of **Chapter 2: Project Description** as well as **Figure 2.2** sets out the existing and proposed wind farms within 20 km of the Site.

The Cork County Council Planning portal and the Kerry County Council Planning Portal were accessed to check planning permissions granted within a 20 km radius of the wind farm.

Various wind farms have been granted permission and amendments/additions (e.g. Battery Energy Storage) to consented wind farms have also been granted.

Much of the non-wind planning permissions relate to (see **Appendix 2.4**):

- Dwelling houses;
- Extensions to dwelling houses;
- Agriculture buildings;
- Sports/Recreation facilities, and
- School Extensions.

In terms of their scale, it is considered that the construction of the dwelling houses or extensions to dwelling houses or the agricultural buildings or the sports/recreation facilities or the school extensions would only have a negligible to minor localised impact on traffic should their construction be concurrent with the Project because the roadways have capacity to handle the increase in traffic volumes.

Should any projects to the north of the N22 be developed concurrently with the Project then the most likely effects will be on the N22 and on the N28/N40/N22 from Ringaskiddy. In such an event, deliveries from the port and concrete deliveries will be co-ordinated such that there will not be any intensification of deliveries.

The Sites identified as being within 20 km of the proposed Development (see Figure 2.3) which are permitted but not yet constructed or which are proposed or which are at pre-planning are:

- **Coolea – Single turbine, 3.17 km to south-west – Status: Permitted**
Likely to use N22 as haul route. Potential for cumulative effects.
- **Coolknoohil Inchee – Two turbines, 3.93 km to south-west – Status: Permitted**
Likely to use N22 as haul route. Potential for cumulative effects.
- **Curraglass – Seven turbines 14.97 km to south-west – Status: Permitted**
The roads to be used for Inchamore are remote from this Site and no cumulative impact on roads or traffic is envisaged.
- **Cummeenabuddoge – Seventeen turbines, 4.72 km to north-east – Status: Pre-Planning/Concept Stage**
Likely to use N22 as haul route and likely to use same grid connection route to Ballyvouskill. Potential for cumulative effects.

- Gneeves Milstreet – Four turbines, 10.20 km to north-east – Status: Operational**
 The haul route to be used for Inchamore are remote from this Site and no cumulative impact on roads or traffic is envisaged.
- Gortnakilla – Four turbines, 1.87 km to west – Status: Permitted**
 Likely to use N22 as haul route. Potential for cumulative effects.
- Gortyrhilly – Fourteen turbines, 4.95 m to south – Status: Proposed/SID project pending decision from An Bord Pleanála**
 Likely to use same grid connection route to Ballyvouskill and turbine delivery route as the Project . Potential for cumulative effects.
- Knocknamork – Seven turbines 4.42 km north-east – Status: Permitted**
 Likely to use N22 for haul route and likely to use same grid connection route to Ballyvouskill. Potential for cumulative effects.

The proposed Gortyrhilly, Cummeenabuddoge and Knocknamork wind farms are also likely to connect to Ballyvouskill substation. The proposed grid routes are shown in **Figure 15. 12**. All three will share the forest track with the Inchamore grid connection. The above information is summarised in **Table 15.20** below.

Table 15.20: Potential for Cumulative Effects from the Construction of Neighbouring Wind Farms

Proposed Wind Farm	Use of N22 Between Coolcour and Cummeenavrick	Use of Forest Track for Grid Connection
Coolae	Yes	No
Coolknoohil Inchee	Yes	No
Curraglass	No	No
Cummeenabuddoge	Yes	Yes
Gneeves Hillstreet	No	No
Gortnakilla	Yes	No
Gortyrhilly	Yes	Yes
Knocknamark	Yes	Yes

Any of the six wind farms shown in **Table 15.20** which will use the N22 will have the potential for similar impact during days when concrete pours for turbine foundations are scheduled.

Should four wind farms have a concrete pour on the same day, then the existing N22 would be close to its guidance capacity for those particular days. However, it is unlikely that it would be possible for any more than two to proceed in any one day with one project being serviced from Keim and the other from a quarry to the south of the N22 as these have limited capacity to supply more than that.

Construction activity between the various developers will need to be scheduled such that, ideally, concrete pours will only take place on one site on any particular day.

Construction activities along the forest track to be used for the four grid connections (Inchamore, Gortyrhilly, Cummeenabuddoge and Knocknamork) , will be scheduled through cross project communication such that there is free access for traffic along the forest track and such that no queues will arise on the N22 should the wind farms be constructed in the same timeframe.

There could also be cumulative effects should blades need to be replaced in an operational wind farm during the construction phase. However, in the unlikely event of such a scenario the replacement blades would have a 3-4 month lead time and deliveries can be co-ordinated. It would not lead to significant effects. Wind farms do not generate a significant amount of traffic during operation as outlined in **Section 15.5.13**.

If the construction phases of the consented but not yet constructed windfarms were to overlap, then there is potential for cumulative effects on the road network from construction traffic and turbine delivery. However, the Coolae and Coolknoohil projects are already consented and so are likely to be constructed prior to the construction of the Development. Should there be overlap, the projects are relatively small with localised works and the effect is predicted to be low, negative, direct but short-term on the N22 with the potential increase in HGV movements. Accordingly, any cumulative impact will be limited and is considered as being slight to moderate and of short duration.

It is possible that a blade (or set of blades) could require replacement if damaged for example by lightning on the nearby wind farms such as Grousemount or Derragh Wind Farms. Should this coincide with the construction period for Inchamore, then there is the potential for cumulative transport affects. However, these are considered as being of low probability, slight impact and of short duration.

15.7.2 Operational Phase

The level of maintenance traffic is normally 1-2 visits per week per wind farm with 5-6 visits per week for a month per year during servicing.

Traffic during the operation periods of Inchamore Wind Farm as well as neighbouring sites will be low and in the range of 0 – 10 trips per day. The effect is rated as being insignificant.

15.7.3 Decommissioning

All of the wind farms listed in **Table 15.20**, have operational periods (generally 25-35 years following commissioning) prescribed by their planning permissions and application documents. No two wind farms will be connected at the same time by ESB/EirGrid due to issues of electrical safety. Therefore, the operational life of the various wind farms will expire on different dates. The decommissioning periods are relatively short (4-6 months). Accordingly, only slight impacts over those assessed in **Section 15.5.14** are predicted. It is unlikely that any significant cumulative impacts will arise.

15.8 RESIDUAL EFFECTS OF THE DEVELOPMENT

15.8.1 HGV Deliveries and Construction Phase Residual Effects

On the turbine component haul route, there is likely to be a slight, negative, short-term residual effect on the national road network with an increase in traffic volumes on the roads and works at a number of locations as outlined in **Table 15.12**.

The potential effects of the construction of the Project have been identified as being negligible to minor (see **Table 15.19**), but temporary in nature. The mitigation measures are highlighted in **Section 15.6.1**.

The Project is likely to have a minor/negligible effect on the N22 road given increased traffic volumes are unavoidable. However, with the mitigation outlined, these will be minimised.

15.8.2 Operational Phase Residual Effects

There will be no residual effects during the operational phase as only occasional light vehicles and mobile elevation work platforms (MEWP's) are envisaged to visit the wind farm Site during operation for routine checking and maintenance should a significant component of the wind farm require replacing.

15.8.3 Final Decommissioning Phase Residual effects

On the Turbine Component Haul Route, there is likely to be a slight, negative, short-term residual effect on the road network with an increase in traffic volumes on the roads and works at a number of locations as outlined in **Table 15.12** assuming the turbine components are transported back to Ringaskiddy Port. However, the extent of such works will be less than for the construction stage as blades can be cut prior to transportation.

Effects during the decommissioning phase have been assessed to be low compared to the construction phase if hardstand areas are left in place and revegetated. In this case, the effect can be assessed as being imperceptible.

15.9 MONITORING

The condition of the road surface of the N22 near the Site (between Cummeenavrack and the Ballyvourney Junction of the Macroom By-Pass) used to transport construction materials will be monitored during construction so that any damage caused by construction traffic associated with the Project can be identified and maintenance works carried out as soon as practicable to avoid issues for other road users and the local population of the area.

The appointed Contractor will be responsible for seeing that HGV drivers travelling to and from the Site obey the designated speed limits, rules of the road and that they only use the designated civils construction haul route. This will be undertaken through regular tool box talks for drivers during the construction of the Project

15.10 SUMMARY OF SIGNIFICANT EFFECTS

This section has assessed the significance of potential effects of the Project on traffic and transport. The construction stage of the Project has generally been assessed as having the potential to result in effects of a negative to minor, direct, short-term, high probability effect or lower (depending on the road element) during the construction phase only. After mitigation, the residual effects have been assessed as minor to negligible, negative and short-term in nature.

The operational stage impacts are considered as being imperceptible.

The decommissioning stage impacts are considered as being slight, negative, direct, negative to minor probability and short-term in nature.

Potential cumulative effects as detailed in **Section 15.7** were assessed as being slight to moderate, negative, short-term and low probability in nature.

Given that only effects of significant effect or greater are considered “significant” in terms of national legislation, the potential effects of the Project on traffic and transport are considered to be **not significant**.

15.11 STATEMENT OF SIGNIFICANCE

This assessment has identified that the potential effects of the Project on traffic and transport are considered to be **not significant**, given the mitigation measures embedded in the design and proposed for the implementation of the Project.