15. MATERIAL ASSETS

Material Assets are defined in the '*Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (EPA, 2022) as '*built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure'.* They may be either of human or natural origin. The cultural assets of Archaeology and Cultural Heritage are addressed in Chapter 14 of this Environmental Impact Assessment Report (EIAR). Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are addressed in Chapter 8: Land, Soils and Geology, Chapter 9: Water, and Chapter 10: Air Quality. Tourism and amenity resources, which are also considered material assets, are addressed in Chapter 5 on Population and Human Health. The Population and Human Health chapter also addresses existing land-uses (economic assets), including forestry and agriculture.

This chapter of the EIAR addresses the likely significant effects of the Proposed Development on transportation infrastructure (Section 15.1 Traffic and Transport), on Telecommunications and Aviation (Section 15.2) and Other Material Assets (Section 15.3), which are economic assets of human origin. Waste Management is also considered within the EPA 2022 Guidelines as part of Material Assets. EPA Waste Management pertaining to the construction, operation and decommissioning of the Proposed Development is summarised in Section 4.3.11.7 of Chapter 4 of the EIAR. Traffic volumes generated by the removal of waste from the Proposed Development to fully authorised waste facilities, is considered in Section 15.1 below.

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

15.1 Traffic and Transport

15.1.1 Introduction

15.1.1.1 Background and Objectives

The purpose of this section is to assess the effects on roads, traffic and transport of the traffic movements that will be generated during the construction, operational and decommissioning phases of the Proposed Development.

For developments of this nature, the construction phase is the critical period with respect to the traffic effects experienced on the surrounding road network in terms of the additional traffic volumes that will be generated on the road network, and the geometric requirements of the abnormally large loads associated with the wind turbine components. The requirements of the additional traffic and abnormal loads generated during the construction stage were assessed on the external highway network that will provide access to the Proposed Development. Locations where remedial measures are required to accommodate the abnormal loads are identified.

The magnitude of the increase in traffic volumes experienced on the surrounding network is identified during the various construction stages of the Proposed Development. A preliminary traffic management plan is also provided in Sections 15.1.7 and 15.1.11.5.2 aimed at minimising the traffic impact on the local highway network.

15.1.1.2 Statement of Authority

This section of the EIAR has been prepared by Alan Lipscombe of Alan Lipscombe Traffic and Transport Consultants Ltd. Alan is a competent expert in traffic and transport assessments. In 2007 Alan set up a traffic and transportation consultancy providing advice for a range of clients in the private

and public sectors. Prior to this Alan was a founding member of Colin Buchanan's Galway office having moved there as the senior transportation engineer for the Galway Land Use and Transportation Study. Since the completion of that study in 1999, Alan has worked throughout the West of Ireland on a range of projects including: major development schemes, the Galway City Outer Bypass, Limerick Planning Land-Use and Transportation Study, Limerick Southern Ring Road Phase II, cost benefit analyses (COBA) and various studies for the University of Galway. Before moving to Galway in 1997, Alan was involved in a wide variety of traffic and transport studies for CBP throughout the UK, Malta and Indonesia. He has particular expertise in the assessment of development related traffic, including many wind farm developments including the following; Ardderoo, Derryadd, Derrinlough, Knocknamork, Shehy More, Cloncreen, Derrykillew, Coole, Ballyhorgan, Cahermurphy, Lettergull, Barnadivane, Cleanrath and Knockalough.

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

15.1.1.3 Guidance on Assessment of Effects

This section of the EIAR has been completed in accordance with the EIA guidance set out in Chapter 1 Introduction. The assessment uses standard terminology to describe the likely significant effects associated with the Proposed Development. Further information on the classification of effects used in this assessment is presented in Section 1.7.2 of this EIAR.

15.1.1.4 Scoping and Consultation

Transport Infrastructure Ireland

Transport Infrastructure Ireland (TII) responded to scoping by emails on the 25th of July 2022 and 15th November 2022, in which it provided a list of recommendations to be followed when preparing the EIAR. All relevant TII guidelines and policies have been adopted in the preparation of this assessment, including the following;

- PE-PDV-02045, Transport Assessment Guidelines, Transport Infrastructure Ireland, May 2014
- PE-PAG-02017, Project Appraisal Guidelines, Unit 5.3, Travel Demand Projections, Transport Infrastructure Ireland, October 2021
- DN-GEO-03060, Geometric Design of junctions, Transport Infrastructure Ireland, May 2023.

Specific issues raised by TII include the following;

Table 15-1 TII Scoping Responses

ID	TII Scoping Response	Response
1	Consultations should be had with relevant Local Authority / National Roads Design Offices with regards to locations of existing and future national roads schemes.	It is confirmed that consultation has been undertaken with Cork County Council as set out in Section 15.1.1.4 below.
2	TII would be specifically concerned as to potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the Proposed Development.	The impacts of the Proposed Development on the delivery routes in terms of link flows are set out is Section 15.1.6.1 and 15.1.6.2 of the EIAR, while an assessment of the capacity of the N22

ID	TII Scoping Response	Response
		/ Kilgarvan Wind Farm access junction is set out in Section 15.1.6.4. A swept path analysis undertaken for the abnormally large loads on the Turbine Delivery Route is set out in Section 15.1.8 of the EIAR. The assessment sets out the temporary local measures that will be required on the national and regional road networks during the construction of the Proposed Development.
3	The developer should assess visual impacts from existing national roads.	The visual impacts of the Proposed Development are set out in Chapter 13 of this EIAR.
4	The developer should have regard to any EIAR / EIS and all conditions and or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should, in particular, have regard to any potential cumulative impacts.	It is confirmed that all An Bord Pleanála conditions will be adhered to, and the cumulative traffic related impacts are assessed in Section 15.1.11.7.
5	The developer, in preparing an EIAR, should have regard to TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works).	It is proposed that the Existing Kilgarvan Wind Farm access junction off the N22 will be used for the Proposed Development.
6	The developer, in preparing an EIAR, should have regard to TII's Environmental Assessment and Construction Guidelines, including the "Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes' (NRA, 2006).	It is confirmed that the impacts of the Proposed Development with regards air quality is set out in Chapter 10 of this EIAR.
7	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).	It is confirmed that the impacts of the Proposed Development with regards noise set out in Chapter 12 of this EIAR.
8	It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment be carried out in accordance with relevant guidelines, noting traffic volumes attending the Proposed Development site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. In relation to national	It is confirmed that the assessment presented in Chapter 15 of the EIAR is undertaken in accordance with Traffic and Transport Assessment Guidelines, TII (2014).

ID	TII Scoping Response	Response
	roads, the Authority's Traffic and Transport Assessment Guidelines (2014) should be referred to in relation to Proposed Development with potential impacts on the national road network. The scheme promoters are advised to have regard to Section 2.2 of the NRA/TII TTA Guidelines which addresses requirements for sub-threshold TTA. Any improvements required to facilitate development should be identified. It will be the responsibility of the developer to pay for the costs of any improvements to national roads to facilitate the private development proposed as TII will not be responsible for such costs.	
9	The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required.	It is noted that there are no new access junctions proposed on the national road network as part of the Proposed Development.
10	In the interests of maintaining the safety and standard of the national road network, the EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network.	All construction will be undertaken in accordance with current guidelines including the "*Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works"* (DoT now DoTT&S) and "*Guidance for the Control and Management of Traffic at Roadworks*" (DoTT&S).
11	TII recommends that that applicant/developer should clearly identify haul routes proposed and fully assess the network to be traversed. Where abnormal 'weight' loads are proposed, separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route through all the relevant County Council administrative areas should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal 'weight' load proposed.	The proposed haul routes are identified in this Chapter 15 of the EIAR. While it is proposed that the delivery stage of the Proposed Development will involve abnormally large loads, the axle loadings will not exceed accepted limits. A program of pre-delivery condition and structural assessment of the route is however proposed, as set out in the Traffic Management Measures set out in Section15.1.7 and 15.1.11.5.2.
12	The applicant/developer should also consult with all PPP Companies, Motorway Maintenance and Renewals Contractors (MMaRC) and road authorities over which the haul route traverses to ascertain any operational requirements, including delivery timetabling, etc. to ensure that the strategic function of the national road network is safeguarded.	The applicant agrees with this condition.
13	Additionally, any damage caused to the pavement on the existing national road arising from any temporary works due to the turning	The applicant agrees with this condition, as set out in Section 15.1.11.5.2 of this EIAR.

ID	TII Scoping Response	Response
	movement of abnormal loads (e.g. tearing of the surface course, etc.) shall be rectified in accordance with TII Pavement Standards and details in this regard shall be agreed with the Road Authority prior to the commencement of any development onsite.	
14	Any grid connection and cable routing proposals should be developed to safeguard proposed road schemes as TII will not be responsible for costs associated with future relocation of cable routing where proposals are catered for in an area of a proposed national road scheme. In that regard, consideration should be given to route options, use of existing crossings, depth of cable laying etc.	There is no new grid connection required as part of the Proposed Development.

Department of Transport

A response to scoping was received from The Department of Transport on the 4th of August 2022. The response stated that the Department had no observations to make on the project and requested to be kept informed of any updates in relation to the Proposed Repowering of the Existing Kilgarvan Wind Farm.

Cork County Council

A response to scoping was received from Cork County Council on the 4th of August 2022. Cork County Council requires that access for all traffic generated by the Proposed Development access the site via the Existing Kilgarvan Wind Farm Access junction on the N22, and that no traffic should access the site through Coolea or the Top of Coom. As set out in the assessment presented in this EIAR, it is proposed that all traffic generated by the Proposed Development will use the existing wind farm access junction on the N22.

15.1.1.5 Methodology and Section Structure

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

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

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

- A review of the existing and future transport infrastructure in the vicinity of the Proposed Development, including the proposed turbine delivery route, an assessment of 2023 traffic flows and traffic forecasts during an assumed construction year of 2028 (Section 15.1.2 Receiving Environment and 15.1.3 – Existing Traffic Volumes),
- A description of the nature of the Proposed Development and the traffic volumes that it will generate during the different construction stages, the removal of existing turbines, and when the Proposed Development is operational (Section 15.1.4 – Proposed Development Traffic Generation),
- A description of the abnormally large loads and vehicles that will require access to the site (Section 15.1.5 Construction Traffic Vehicles),

- A review of the effects of development generated traffic on links and junctions during construction and when the facility is operational (Section 15.1.6 –Traffic Effects During Construction and Operation),
- Traffic management of large deliveries and a geometric assessment of the routes and their capacity to accommodate the abnormal loads associated with the Proposed Development (Section 15.1.7 – Traffic Management of Large Deliveries and Section 15.1.8– Abnormal Load Route Assessment),
- Roads Safety Audit requirements, Section 15.1.9,
- An assessment of the provision for sustainable modes of travel (in this case primarily with respect to the transport of construction staff) (Section 15.1.10 – Provision for Sustainable Modes of Travel),
- A description of potential significant effects on Roads and Traffic (Section 15.1.11 – Likely and Significant Effect and Associated Mitigation Measures).

15.1.2 Receiving Environment

15.1.2.1 Site Location

The Proposed Development is located in County Kerry in the townlands listed in Table 1-1 of Chapter 1. The Proposed Development is on the Existing Kilgarvan Wind Farm site and will utilise the existing site access junction which is located on the southern side of the N22 at a point approximately 26 kms west of Macroom and 22 kms southeast of Killarney in County Kerry.

15.1.2.2 Proposed Abnormal Size Load Delivery Route

The port of arrival for the wind turbine plant will be Ringaskiddy with the proposed Turbine Delivery Route shown in Figure 15-1. The proposed TDR is approximately 80.8 kms in length, is predominantly in County Cork and comprises the following route;

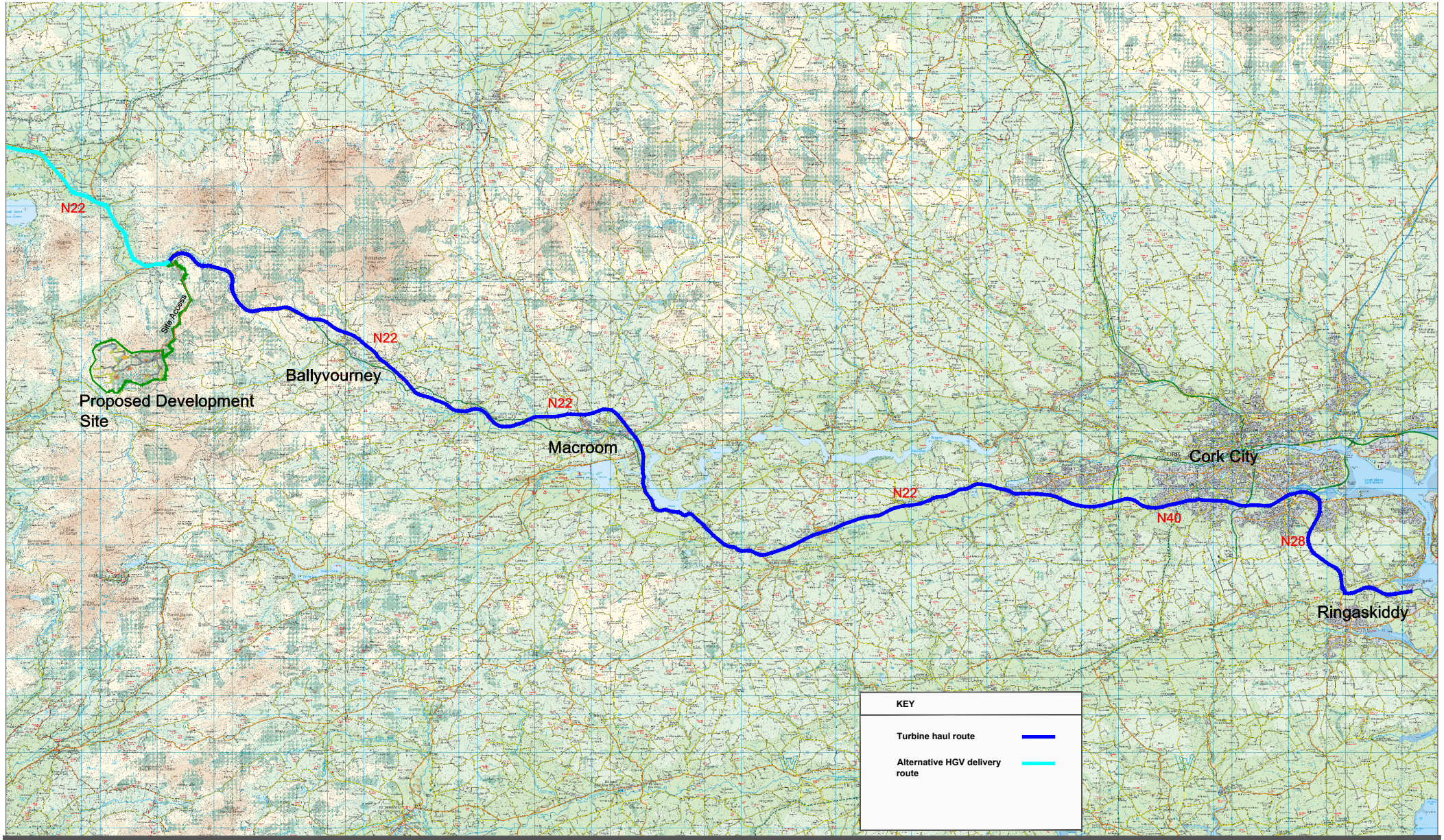
- The N28 from the port at Ringaskiddy to the N40 Cork Southern Ring Road.
- The route then heads west on the N40 Cork Southern Ring Road to join the N22 south of Ballincollig,
- The route continues west on the N22 through Ovens, Farran, Farnanes, Lissarda to the eastern side of Macroom,
- From the eastern side of Macroom the route follows the recently opened N22 Macroom to Ballyvourney Road that bypasses Macroom to the north and links back into the former N22 to the west of Ballyvourney,
- From this point the route continues on the N22 to the Existing Kilgarvan Wind Farm site access junction.

An assessment of the turning requirements of the abnormally large loads transporting the turbine components was undertaken at the various pinch points along the TDR, as identified in Figure 15-2a. The swept path assessment undertaken for these locations is discussed in Section 15.1.8.

It is noted that at the Existing Kilgarvan Wind Farm access junction on the N22 it is required to lift the blade to 60º using a blade adapter in order to negotiate the existing access road junction. The route assessment presented in Section 15.1.7 includes swept path assessments based on both methods of transportation for the blade. This strategy would not necessitate the any facilitation or upgrade works along the turbine delivery route.

Another option which is being considered is to utilise a section of the old N22 approximately 4km to the east of the existing entrance to the Proposed Development, to switch the blade over from the blade trailer to a blade adapter in order to transport the blade from the site entrance to their intended set-down area within the site. While there are no enabling works being applied for as part of this strategy, any potential impacts associated with this strategy will be assessed within this EIAR. It may be the case

that the turbine delivery vehicles will veer into the old section of the N22 and swap blade to blade adapter trailer In order to utilise this method, existing soil berms, fences, gates and some vegetation will need to be removed. It may also be the case that the turbine transport vehicles may reverse back into this section of the N22 from the Killarney side. In this case, it will also be necessary to remove some soil berms and place some hardcore surfacing on the verge of the new road section. This alternative option has been considered in Section 15.1.4 below.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-1 Site location and delivery routes

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	NTS
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

15.1.2.3 Proposed Construction Traffic Haul Route

The proposed route to the site of the Proposed Development, for general HGV construction traffic, is as per the access route options considered for the turbine plant traffic. The option of accessing the site via the N22 from the west, as also shown in Figure 15-1, is also considered in this assessment.

15.1.2.4 Proposed Grid Connection Route

The Proposed Development will utilise the Existing Kilgarvan Wind Farm onsite 110kV Coomagearlahy electrical substation, along with the existing 110kV overhead line to Clonkeen 110kV Substation. There is therefore no grid connection or substation required as part of the Proposed Development and it has not been considered any further in this assessment.

15.1.3 Existing Traffic Volumes

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

15.1.3.1 Background Traffic Flows

The 4 locations included in the link flow assessment and for which base year 2023 traffic count data was collated are shown in Figure 15-2b. The locations included in the assessment are as follows,

- Link 1 – N28 Ringaskiddy
- Link 2 – N22 between Lissarda and Macroom,
- Link 3 – N22 Macroom Bypass,
- Link 4 – N22 between Killarney and Islandmore.

The source of the traffic data used to provide all day traffic flows for the links included in the assessment are set out in Table 15-1. For Links 1 to 4 data obtained from automatic traffic counters maintained by Transport Infrastructure Ireland (TII) was used. The base year 2023 traffic count data is included as Appendix 15-1.

The all-day traffic flows observed for the base years 2023 are shown in terms of vehicle numbers in Table 15-2. The figures show that traffic volumes on the proposed turbine delivery route and construction traffic route, range from a minimum of 8,414 vehicles per day on the N22 Macroom Bypass (Link 3) to a maximum of 14,214 vehicles per day on the N22 between Lissarda and Macroom (Link 2). A 2-way flow of 10,924 vehicles per day was observed on the N28 just west of the port of Ringaskiddy (Link 1), while 9,206 vehicles were observed on the N22 from the direction of Killarney (Link 4).

While link capacities are discussed for the construction year 2028 in further detail in Section 15.2.6.2, it is worth noting that the link flows observed on part of the TDR were observed to be high in the year 2023, when compared to link capacity, as set out in Table 15-3. Link capacities for each road may be estimated based on road types and widths as set out in the TII Standards document DN-GEO-03031 Road Link Design, Table 6/1. Based on the capacities and the flows set out in Table 15-3 it may be determined that the N28 in the proximity of Ringaskiddy (Link 1) is currently operating at 127% of capacity, and the N22 between Lissarda and Macroom (Link 2), at 123% of capacity. While the traffic flows observed on these links are high it is important to consider the relative increase compared to background traffic levels when assessing the impacts of the Proposed Development. This issue is discussed further in Section 15.1.6.2.

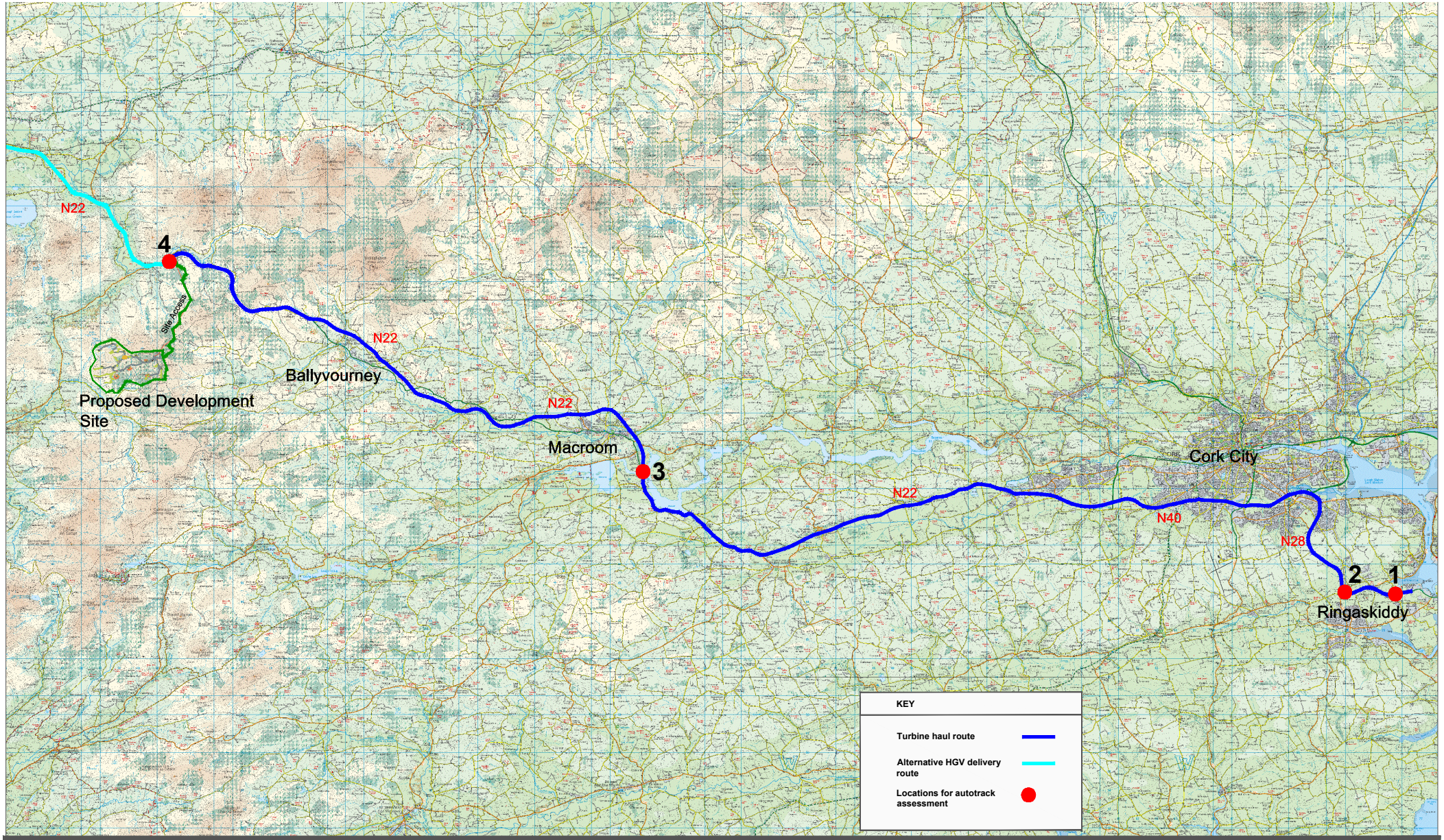


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Figure 15-2a Route assessment location plan

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	NTS
PROJECT NO: 9990	DATE: 29.02.24	DRAWN BY:	AL

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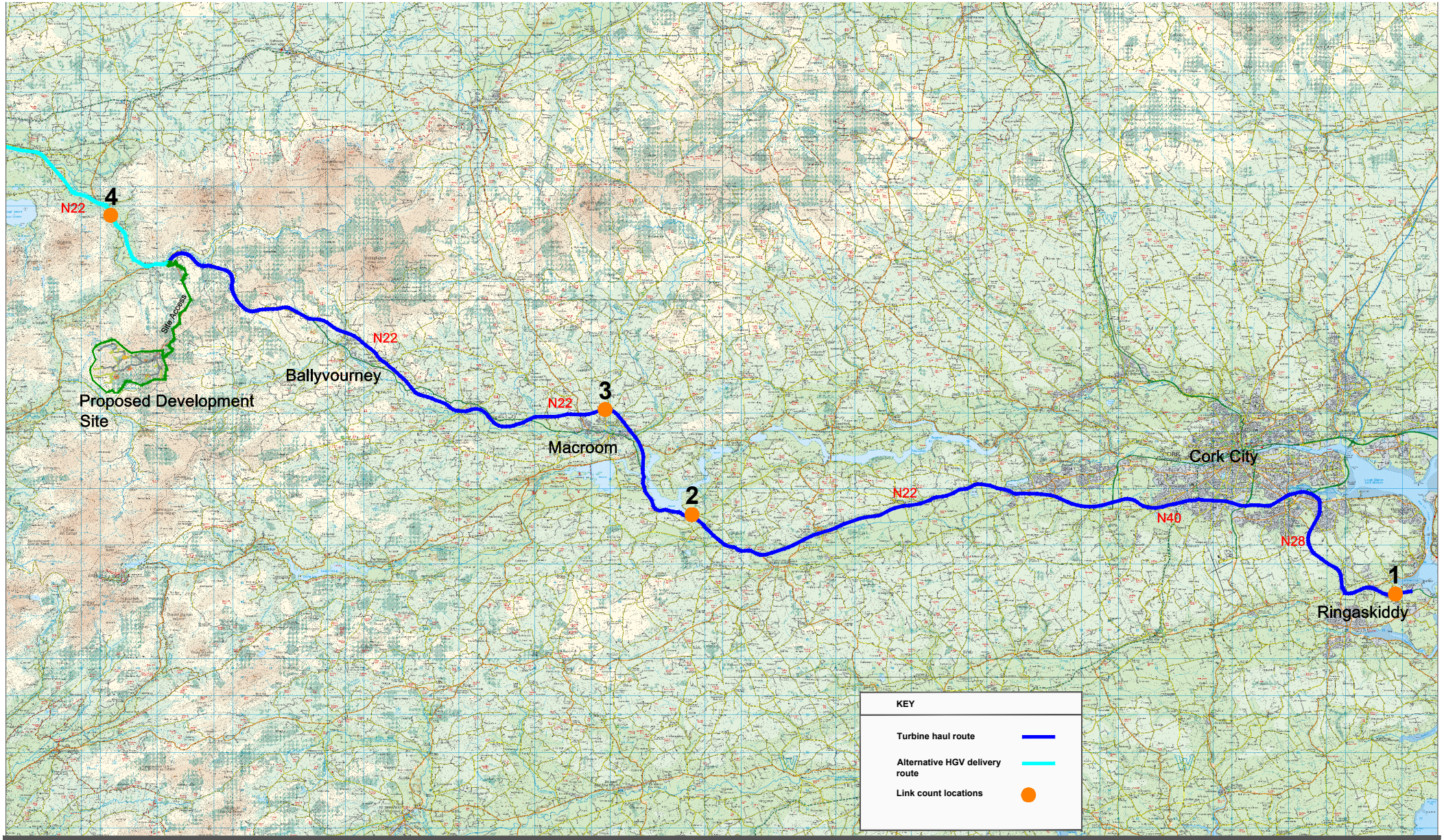

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Figure 15-2b Link count locations

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	NTS
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

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Table 15-2 Count locations and data source.

Link	Data source
1 – N28 Ringaskiddy	TII ATC site
2 – N22 Lissarda to Macroom	TII ATC site
3 – N22 Macroom Bypass	TII ATC site
4 – N22 Killarney to Islandmore	TII ATC site

Table 15-3All day traffic flows by location, years 2023 (2-way vehicles)

Link	2023
1 – N28 Ringaskiddy	10,924
2 – N22 Lissarda to Macroom	14,214
3 – N22 Macroom Bypass	8,414
4 – N22 Killarney to Islandmore	9,206

Table 15-4 All day traffic flows by location, years 2023 (2-way vehicles), link capacity and % capacity

Link	2023	Link capacity	% capacity
1 – N28 Ringaskiddy	10,924	8,600	127%
2 – N22 Lissarda to Macroom	14,214	11,600	123%
3 – N22 Macroom Bypass	8,414	20,000	42%
4 – N22 Killarney to Islandmore	9,206	11,600	79%

15.1.3.2 Background Traffic Volumes for the Assumed Construction Year 2028

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

Revised guidelines for forecasting annual growth in traffic volumes were produced by TII in October 2021, as set out by county in the Project Appraisal Guidelines (Unit 5.3 – Travel Demand Projections). The annual growth rates for light vehicles for County Cork and factors for the years relevant to this study are shown in Tables 15-5 and 15-6. Based on TII growth rates it is estimated that traffic volumes will increase by +9.8% during the period from 2023 to 2028, when the construction of the Proposed Development is forecast to take place. Year 2022 / 2023 and 2030 all day traffic flows on the study area network are compared in Table 15-7.

It should be noted that while the assumed construction year of 2028 may vary within the 10-year period for which planning permission is sought, this will not alter the forecast outcomes and effects presented in this section of the EIAR. This is due to the annual growth rate for background traffic being 1.89% by the year 2030 (as shown in Table 15-5 as 1.0189) and the traffic volumes generated by the Proposed Development will remain unchanged regardless of construction year, as presented subsequently in Section 15.1.4. For example, in the event that the construction year is 2030 rather than 2028, background traffic volumes will increase from the base year of 2023 by 12.8% rather than 9.8%, as also shown in the below tables.

TII traffic count data recorded at the TII count sites were also used to determine the existing percentage of HGVs on the proposed delivery routes. The observed percentage of HGVs are shown in Table 15-7 and range from a minimum of 4.6% observed on Link 2 on the N22 between Lissarda and Macroom, to a maximum of 8.5% observed on the N28 just west of the port at Ringaskiddy (Link 1).

Table 15-5 TII traffic growth forecasts, growth per annum and cumulative, County Cork

Year	Lights – Annual Factor			Lights – Cumulative Factor		
	Low	Medium	High	Low	Medium	High
2023	1.0173	1.0189	1.0223	1.000	1.000	1.000
2024	1.0173	1.0189	1.0223	1.017	1.019	1.022
2025	1.0173	1.0189	1.0223	1.035	1.038	1.045
2026	1.0173	1.0189	1.0223	1.053	1.058	1.068
2027	1.0173	1.0189	1.0223	1.071	1.078	1.092
2028	1.0173	1.0189	1.0223	1.090	1.098	1.117
2029	1.0173	1.0189	1.0223	1.108	1.119	1.141
2030	1.0173	1.0189	1.0223	1.128	1.140	1.167

Table 15-6 TII traffic growth rates by growth scenario

Period	New Factors		
	Low	Medium	High
2023 – 2028	1.090	1.098	1.117

Table 15-7 All day traffic flows by location and year (2-way vehicles)

Link	2023	2028
1 – N28 Ringaskiddy	10,924	11,995
2 – N22 Lissarda to Macroom	14,214	15,607
3 – N22 Macroom Bypass	8,414	9,239
4 – N22 Killarney to Islandmore	9,206	10,108

Table 15-8 All day flows, percentage HGVs and flows by vehicle type, year 2028

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / lgvs	HGVs	Cars / lgvs	Total
1 – N28 Ringaskiddy	11,995	8.5%	1,020	10,975	2,447	10,975	13,422
2 – N22 Lissarda to Macroom	15,607	4.6%	718	14,889	1,723	14,889	16,612
3 – N22 Macroom Bypass	9,239	6.1%	564	8,675	1,353	8,675	10,028
4 – N22 Killarney to Islandmore	10,108	4.7%	475	9,633	1,140	9,633	10,773

15.1.4 Proposed Development and Traffic Generation

15.1.4.1 Proposed Access Junctions

All traffic requiring access to the site during the removal of the existing 28 wind turbines and the construction of the proposed 11 wind turbines, will gain access to the site via the Existing Kilgarvan Wind Farm site access junction on the N22.

15.1.4.2 Development Trip Generation – During Construction

For the purpose of assessing the effects of traffic generated during the construction of the Proposed Development, the construction is considered in 2 Phases, as detailed in the development construction programme included in Section 4.7, shown in Figure 4-15 and summarised below.

Construction Phase 1

It is proposed that the existing 28 wind turbines on-site will continue to be operate during Construction Phase 1.

It is estimated that Construction Phase 1 will last 27 weeks (135 working days) and will involve general civil works, and will be split into the following types of days;

- **Civils - Concrete foundation pours** – On 11 days when one turbine concrete foundation will be poured each day resulting in approximately 9 deliveries per hour over a 12 hour day.
- **Civils – General construction** – On the remaining 124 days of Phase 1, general construction civils construction works will be undertaken, including the construction of compounds, new roads and hardstands.

The total number of deliveries that are forecast to be delivered to the site for the Civils element of the Proposed Development are set out in Table 15-9. It is estimated that a total of 2,559 deliveries by truck

or standard articulated HGVs will be made to the site during this period. Of the total 2,559 loads they are split into the following;

- 1,173 loads will be generated during the 11 days that the concrete foundations are poured,
- The remaining 1,386 loads will be generated by the 2 periods that civils works will be undertaken on the site, one during Phase 1 and the other during Phase 2. For the purpose of this assessment, it is estimated that 693 loads will be delivered to the site during each of these civils work phases.

The estimated additional daily traffic generated on the road network during these days are shown in Tables 15-9 and 15-10. The figures show that on the 11 days that concrete will be delivered to the site, an additional 512 two-way PCUs will be added to the network (comprising 107 two-way HGV trips with 2.4 PCUs per movement), as shown in Table 15-9. Similarly, on the 124 days when all other materials required for Construction Phase 2 are delivered to the site, traffic volumes on the local network will increase by an average of 27 PCUs, as set out in Table 15-10.

On the completion of Construction Phase 1 there will be a period of approximately 25 weeks (105 days) when no construction deliveries will take place and the existing 28 turbines will continue to be operational.

Table 15-9 Trip generation - Construction Phase 1 - Site preparation and groundworks – total loads

Material	Total no. Truck Loads	Truck type
Concrete	1,173	Trucks
Delivery of plant	43	Large artic
Fencing & gates	4	Large artic
Compound setup	44	Large artic
Steel	31	Large artic
Ducting and cabling (internal)	264	Large artic
Tree felling	90	Truck
Crane (to lift steel)	3	Large artic
Road construction	400	Truck
Substation	1	Large artic
Cranes for turbines	4	Large artic
Refuelling for plant	227	Large artic
Site maintenance	165	Large artic
Miscellaneous	110	Large artic
Total	2,559	

In summary, the total 2-way traffic volumes that will be generated by deliveries during the various delivery days for Construction Phase 1 are set out in terms of 2-way vehicles and PCUs in Tables 15-10 and 15-11 and are as follows;

- Construction Phase 1 – Civils, concrete foundation pours – 11 days, 2-way flows of 213 vehicles, or 512 PCUs per day
- Construction Phase 1 – Civils, general construction – 124 days, 2-way flows of 11 vehicles, or 27 PCUs per day

Table 15-10 Trip generation - Construction Phase 1 – Civils, Concrete foundation pours – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	Days	2-way vehicles/day	2-way PCUs/day
Concrete	1,173	Trucks	2.4	2,815	11	213	511.9

Table 15-11 Trip generation - Construction Phase 1 – Civils, General construction – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	Days	2-way vehicles/day	2-way PCUs/day
Various	693	Trucks	2.4	1,663	124	11.2	26.8

Construction Phase 2

It is estimate that Construction Phase 2 will last 56 weeks (280 days) and will comprise the following types of delivery day;

- **Removal of existing turbines –** On the first 15 weeks (75 days) the existing 28 wind turbines will be taken down and the blades cut into sections. All materials will be removed from the site using standard HGVs. On these days it is forecast that on average 8 vehicle movements or 18 PCUs will be generated travelling to and from the site.
- **Civils – General construction** – On the first 31 weeks (155 days) of Phase 2 general civils works will be undertaken for the proposed new 11 turbines including, the upgrade and widening of existing site roads, construction of the new access road and the installation of cable ducts. On these days it is forecast that on average 9 vehicle movements or 22 PCUs will be generated travelling to and from the site.

It is noted that for the first 15 weeks of Phase 2 both of the above work streams and associated deliveries will progress simultaneously.

On completion of the above the turbine delivery phase will commence. The traffic volumes that will be generated during the turbine delivery stage are set out in Tables 15-12 to 15-14, with deliveries undertaken on the following days;

- Turbine delivery - abnormally sized loads – For the purpose of this assessment, it is assumed that the turbine delivery element will progress at the rate of 3 extended artic trips made by convoy to the Proposed Development site on 5 days per week, which is a common delivery frequency for large turbine components from the port of entry

to the site. This will result in this stage taking 29 days spread over a 6 week period with all deliveries made during the night. The actual trip number will be determined following consultations with An Garda Síochána.

- Turbine delivery – standard HGV – Smaller turbine components will be delivered to the site by standard HGVs over 11 days at the rate of 2 days per week over a 6 week period.

The additional traffic movements for these two types of days are summarised in Tables 15-12 and 15-13. In Table 15-12 a PCU equivalent value of 10 was allocated to each extended artic movement, resulting in an additional 60 PCUs on the study network on these 29 days, while an additional 19.2 PCUs are forecast to be on the network on 11 other days, as shown in Table 15-13, during the turbine construction phase.

Table 15-12 Trip generation - Phase 2 – Wind turbine plant – total loads

Material	Units	Quantity per Unit	Total Quantity	Quantity per Truck	Total Truck Loads	Truck type
Nacelle	11	1	11	1	11	Extended Artic
Blades	11	3	33	1	33	Extended Artic
Towers	11	4	44	1	44	Extended Artic
Sub total					***88***	
Transformer	11	1	11	1	11	Large Artic
Drive train and blade hub	11	1	11	1	11	Large Artic
Base and other deliveries	11	2	22	1	22	Large Artic
Sub total					***44***	
Total					**132**	

Table 15-13 Trip generation - Phase 2 – Wind turbine plant, extended artics – total movements and volumes per delivery day

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

Material	Units	Truck Type	PCU Value	Total PCUs	2-way PCUs/ day
*Estimation based on 3 abnormal sized loads being delivered per day on 5 days per week (total 88 loads will take 29 nights spread over 6 weeks)					

Table 15-14 Trip generation – Phase 2 - Wind turbine plant, standard artic HGVs - total movements and volumes per delivery day

Material	Quantity per Unit	PCU Value	2-way PCUs / day
Transformer	1	2.4	4.8
Drive train and blade hub	1	2.4	4.8
Base & other deliveries	2	2.4	9.6
Total	4		19.2
*Estimation based on equipment for 2 turbines being moved over 11 days spread over 2 days for 6 weeks			

In summary, the total 2-way traffic volumes that will be generated by deliveries during the various delivery days for Construction Phase 2 are set out in terms of 2-way vehicles and PCUs in Tables 15-15 to 15-18 and are as follows;

- Phase 2 – Removal existing turbines – 75 days, 2-way flows of 8 vehicles, or 18 PCUs per day
- Phase 2 – Civils, general construction – 155 days, 2-way flows of 9 vehicles, or 22 PCUs per day
- Phase 2 - Turbine delivery, abnormally sized loads – 29 days, 2-way flows of 6 vehicles, or 60 PCUs per day
- Phase 2 - Turbine delivery, standard HGVs – 11 days, 2-way flows of 8.0 vehicles, or 19 PCUs per day

Table 15-15 Trip generation - Phase 2 – Removal existing turbines – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	Days	2-way vehicles/day	2-way PCUs/day
Disassembled existing turbine components	280	HGVs	2.4	672	75	7.5	17.9

Table 15-16 Trip generation - Phase 2 – Civils, General construction – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	Days	2-way vehicles/day	2-way PCUs/day
Various	693	Trucks	2.4	1,663	155	8.9	21.5

Table 15-17 Trip generation - Phase 2 – Turbine delivery, abnormally sized loads – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	Days	2-way vehicles/day	2-way PCUs/day
Large turbine components	88	Extended artics	10	880	29	6	60.7

Table 15-18 Trip generation - Phase 2 – Turbine delivery, standard HGVs – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	Days	2-way vehicles/day	2-way PCUs/day
Smaller turbine components	44	HGVs	2.4	106	11	8	19.2

Construction Employee Traffic

During the construction of the Proposed Development, it is estimated that 100 jobs will be created. Of this total it is estimated that up to 100 staff members will be employed at any one time during the site preparation and groundworks stage of construction, reducing to a maximum of 80 staff at any one time during the turbine construction stage. If a precautionary scenario is assumed that all staff will travel to / from the site by car, at an average of 2 persons per car, then a total of 100 PCU movements (each trip is two way) will be added to the network during Phase 1 of the Proposed Development, reducing to 80 PCU trips per day Phase 2.

15.1.4.3 Development Trip Generation – During Operation

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

It is estimated that the traffic volumes that will be generated by the Proposed Development once it is operational will be minimal, with an estimated 1-2 staff employed on the Proposed Development site at any time. The impact on the network of these trips during the operational stage is discussed in Section 15.1.6.

15.1.4.4 Development Trip Generation – During Decommissioning

Traffic generation to the Proposed Development site during decommissioning will be similar but significantly less than the trip generation estimates presented for the construction phase presented above. This is because much of the materials brought into the Proposed Development during construction will be left in-situ during the decommissioning stage.

There will be no traffic generation as a result of the existing grid connection as it will not be decommissioned.

15.1.5 Construction Traffic Vehicles

The delivery of turbine components including blades, tower sections and nacelles is a specialist operation owing to the oversized loads involved. As detailed in Chapter 4, Section 4.3.2.2 of this EIAR, a range of turbine dimensions is proposed. With respect to the geometric requirements of the road network, the turbine blades are the longest turbine component and the traffic assessment is concerned with the longest blade being proposed. The turbine model to be installed on the Proposed Development site will have a maximum overall ground-to-blade tip height of 200 metres; a maximum blade rotor diameter of 163 metres and a maximum hub height of 125 metres. The turbine blades are the longest turbine component and a maximum blade length of 81.5 metres has been assessed for the turbine delivery assessment for the Proposed Development.

It is noted that at the Existing Kilgarvan Wind Farm access junction on the N22 it is required to lift the blade to 60º using a blade adapter on order to negotiate the existing access road. The route assessment presented in Section 15.1.7 includes swept path assessments based on both methods of transportation for the blade.

The critical vehicles in terms of size and turning geometry requirements and used in the detailed route assessment discussed in Section 15.1.7 are the blade transporter and the tower transporter vehicles, with the geometry of each shown for the largest vehicles shown in Figures 15-3 and 15-4 respectively.

The key dimensions are as follows:

Transport of Blades – Articulated HGV with blade lowered

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

Transport of Blades – Blade adapter lifted to 60º

Total length	47.2 m
Length of blade (in plan)	81.5 m blade is 40.8m in plan
Inner radius	28.0 m

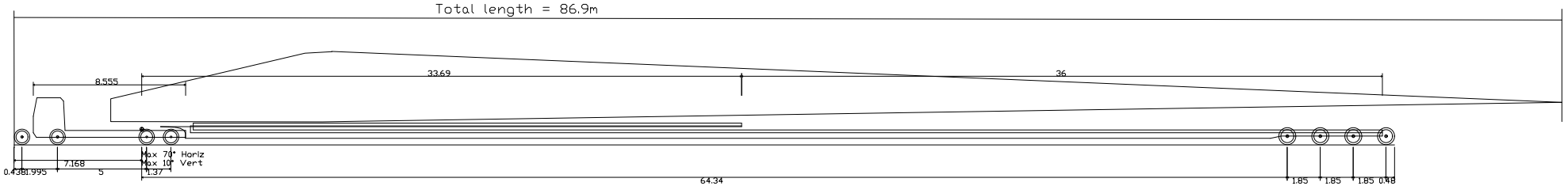
Transport of Tower – Using low-bed or drop deck trailers

Total length (with load)	49.5 m
Length of load	29 m

Inner radius	25.0 m

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

All other vehicles requiring access to the site will be standard HGVs or LGVs and will be significantly smaller than the design test vehicles. Standard HGVs and LGVs will navigate the National and Regional Road networks and access the site via the existing site entrance on the N22.



81.5m blade	
Overall Length	77.537m
Overall Width	2.550m
Overall Body Height	2.661m
Min Body Ground Clearance	0.375m
Track Width	2.500m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

FIGURE 15-3 Design blade extended artic profile

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	NTS
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

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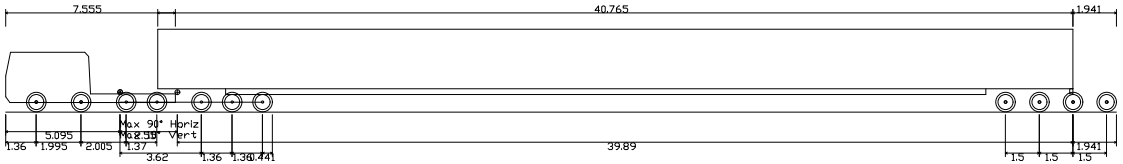

Tower	
Overall Length	49.476m
Overall Width	2.550m
Overall Body Height	3.695m
Min Body Ground Clearance	0.427m
Max Track Width	2.520m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

FIGURE 15-4 Design tower extended artic profile

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted		SCALE: NTS
PROJECT NO: 9990	DATE: 29.04.24		DRAWN BY: AL

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15.1.6 Traffic Effects During Construction, Operation and Decommissioning of the Proposed Development

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

It should be noted that for the purpose of the assessment all vehicles travelling to and from the site of the Proposed Development have been assumed to do so from the same single direction. The assessment is therefore based on a precautionary scenario, where all traffic generated by the Proposed Development travels to/from the site on the same route with the maximum increase in traffic volumes assessed on each link shown in Figure 15-2b.

15.1.6.1.1 *Effect on Link Flows – During Construction*

Background traffic volumes and Proposed Development generated traffic volumes are shown for the six typical construction stage scenarios, discussed in Section 15.1.6 and shown in Tables 15-19 to 15-24, with the forecast effects, in terms of the percentage increase in traffic flows in PCUs and the number of days affected, set out in Tables 15-25 to 15-30. As stated previously in this section the actual figures presented in the tables will be subject to change, however, they are considered a robust estimation of likely traffic volumes and effects.

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

Traffic volumes - Construction Phase 1

The existing 28 wind turbines on-site will continue to be operational during Construction Phase 1. It is estimated that Construction Phase 1 will last 27 weeks (135 working days) and will involve general civils works, and will be split into the following types of days;

- **Civils - Concrete foundation pours** – On 11 days one turbine concrete foundation will be poured on each day, during which 107 loads will be delivered to the site, resulting in approximately 9 deliveries per hour over a 12-hour day.
- **Civils – General construction** – On the remaining 124 days of phase 1, general construction civils construction works will be undertaken, including the construction of compounds, new roads and hardstands.

On the completion of Phase 1 there will be a period of approximately 25 weeks (105 days) when no construction will take place and the existing 28 turbines will continue to be operational.

Traffic volumes - Construction Phase 2

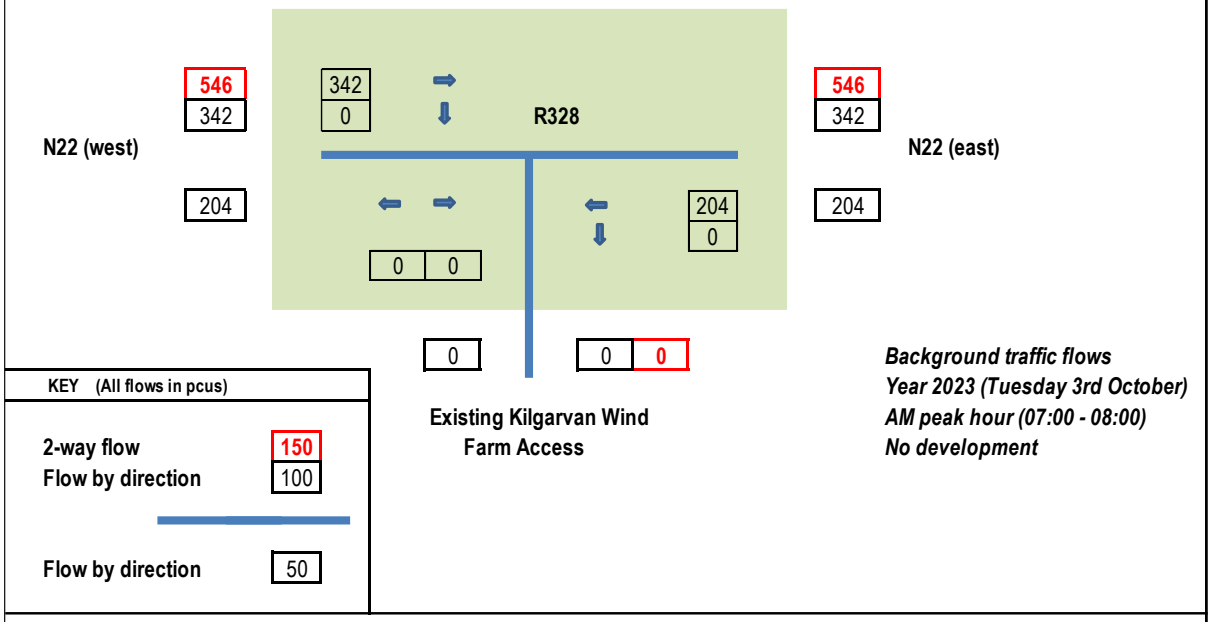
The second phase will 56 weeks (280 days) and will comprise the following types of delivery day;

- **Removal of existing turbines –** On the first 15 weeks (75 days) the existing 28 wind turbines will be taken down and the blades cut into sections. All materials will be removed from the site using standard HGVs.
- **Civils – General construction** – On the first 31 weeks (155 days) of Phase 2 general civils works will be undertaken for the proposed new 11 turbines including, the upgrade and widening of existing site roads, construction of the new access road and the installation of cable duction.

It is noted that for the first 15 weeks of Phase 2 both of the above work tasks will progress simultaneously.

On completion of the above the turbine delivery phase will commence comprising of the following days;

- **Turbine delivery - abnormally sized loads** – Over 29 nights spread over a 6 week period a convoy of 3 abnormally sized loads will be delivered to the site.
- **Turbine delivery – standard HGV** – Smaller turbine components will be delivered to the site by standard HGVs over 11 days at the rate of 2 days per week over a 6 week period.



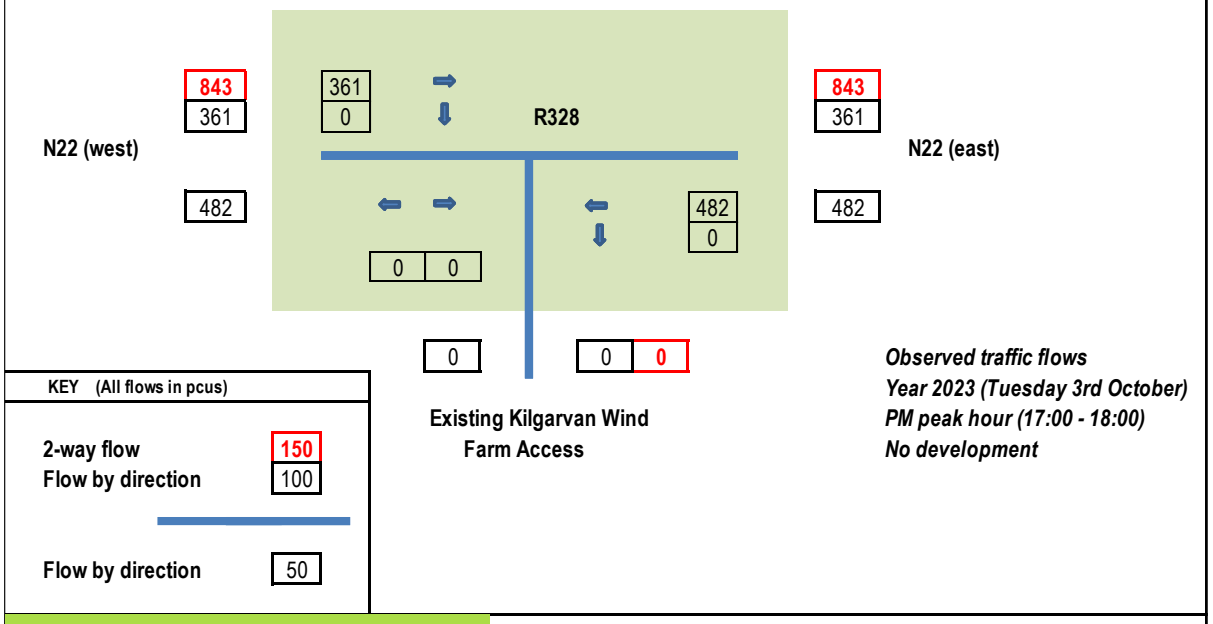


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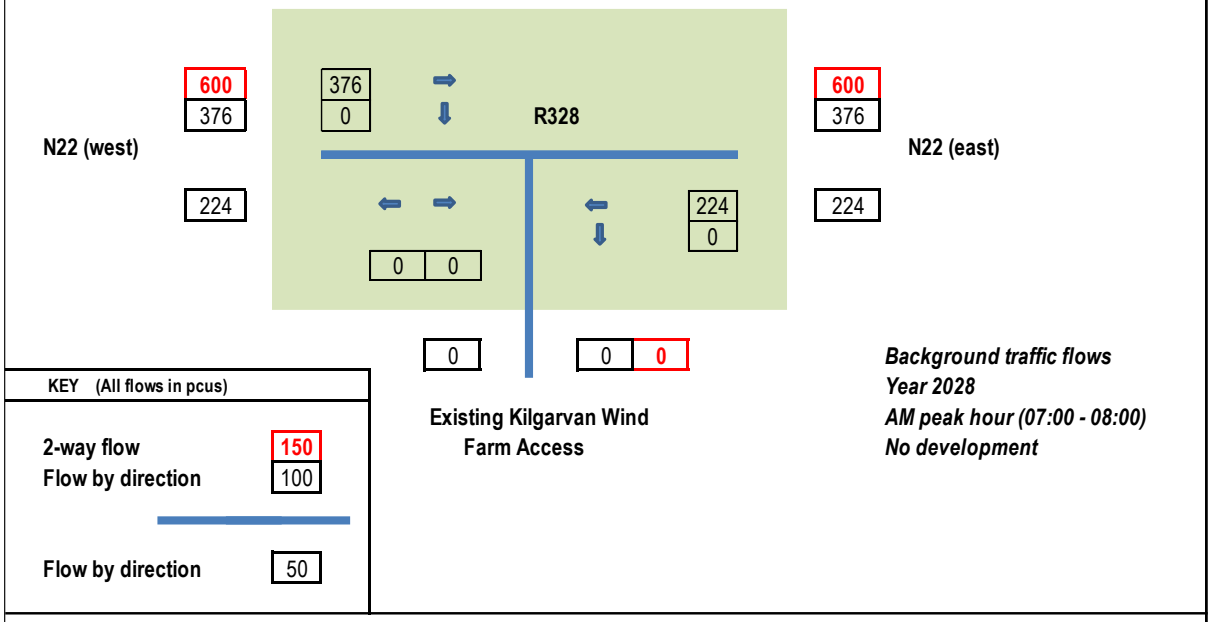
Figure 15-5a Observed traffic flows, N22 / site access junction
AM and PM peak hours, year 2023, pcus



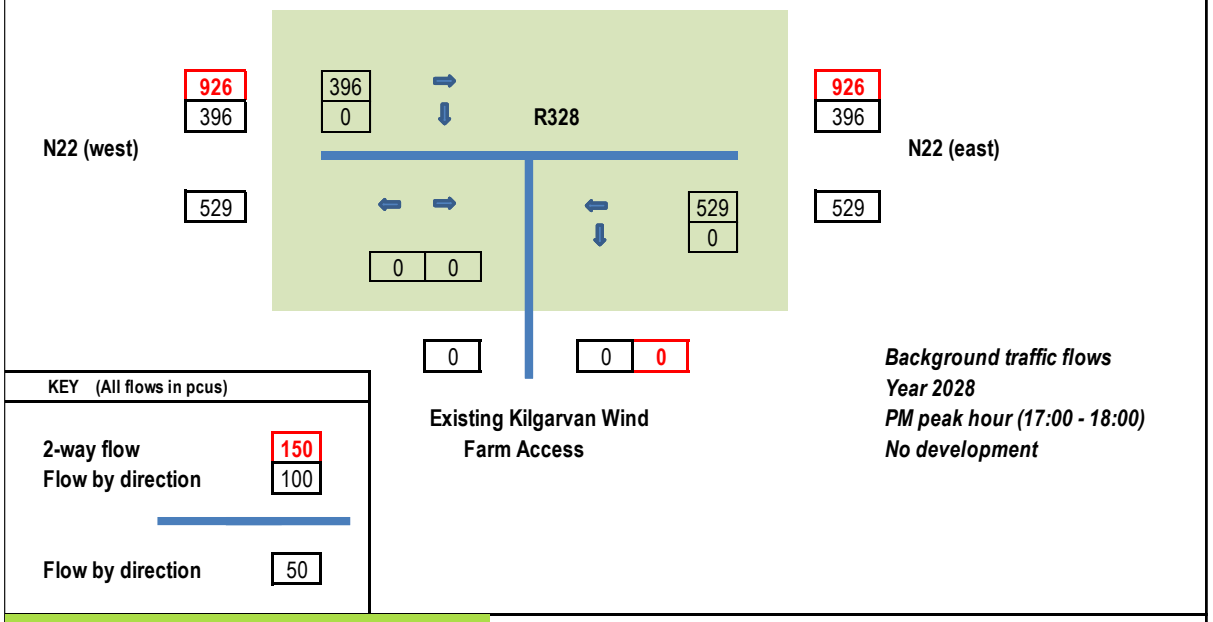


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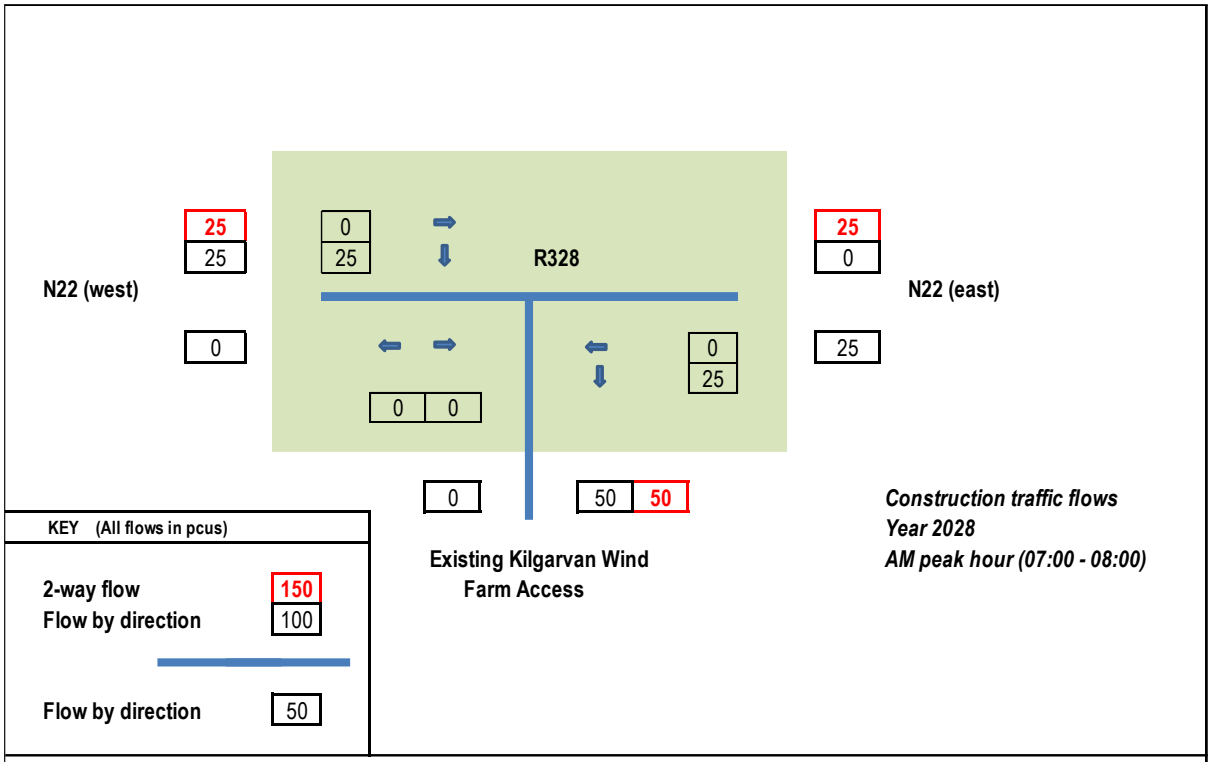
Figure 15-5b Background traffic flows, N22 / site access junction
AM and PM peak hours, year 2028, pcus



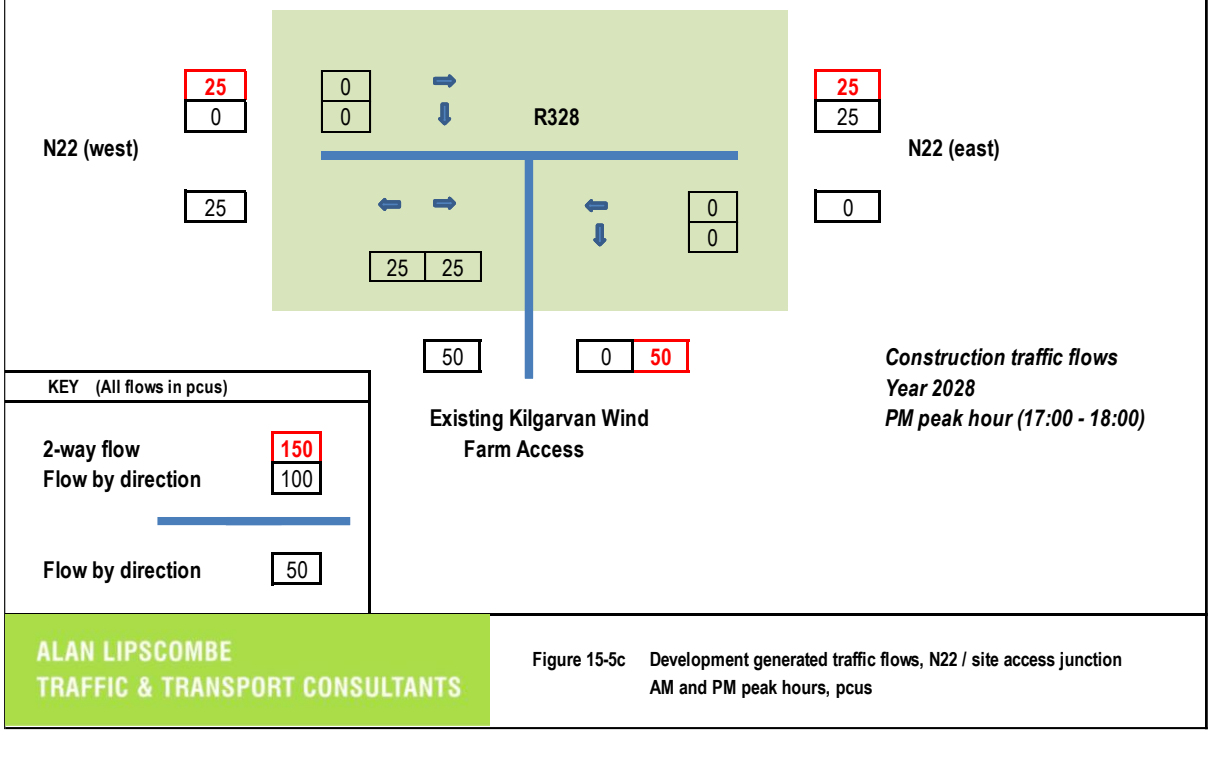


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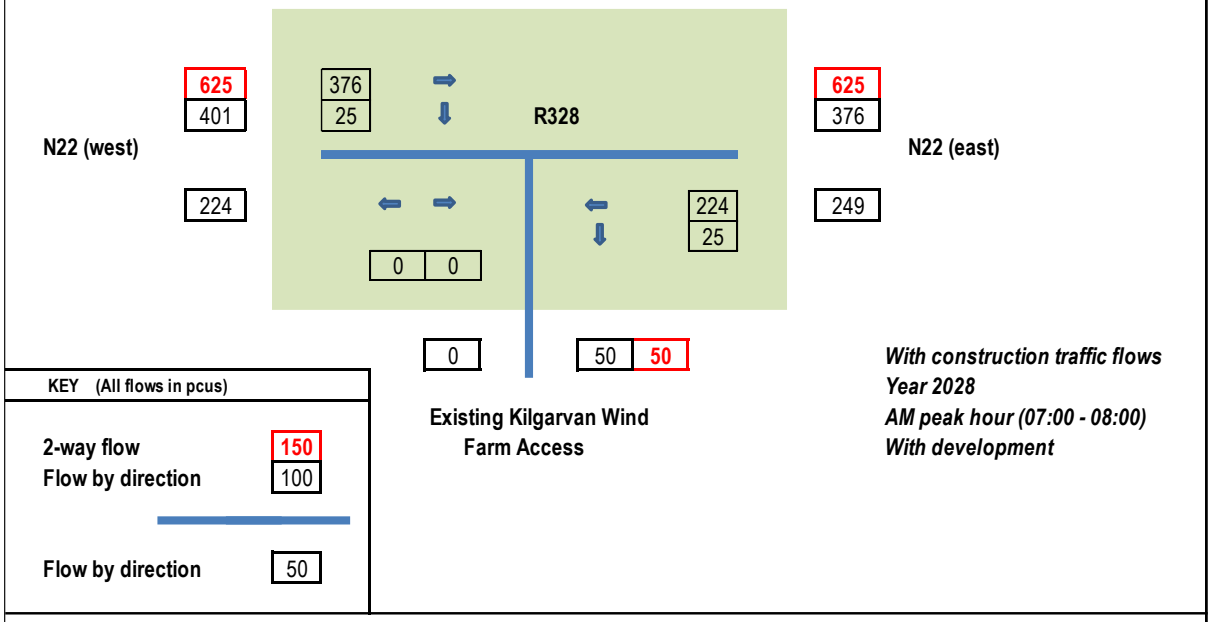
Figure 15-5c Development generated traffic flows, N22 / site access junction AM and PM peak hours, pcus



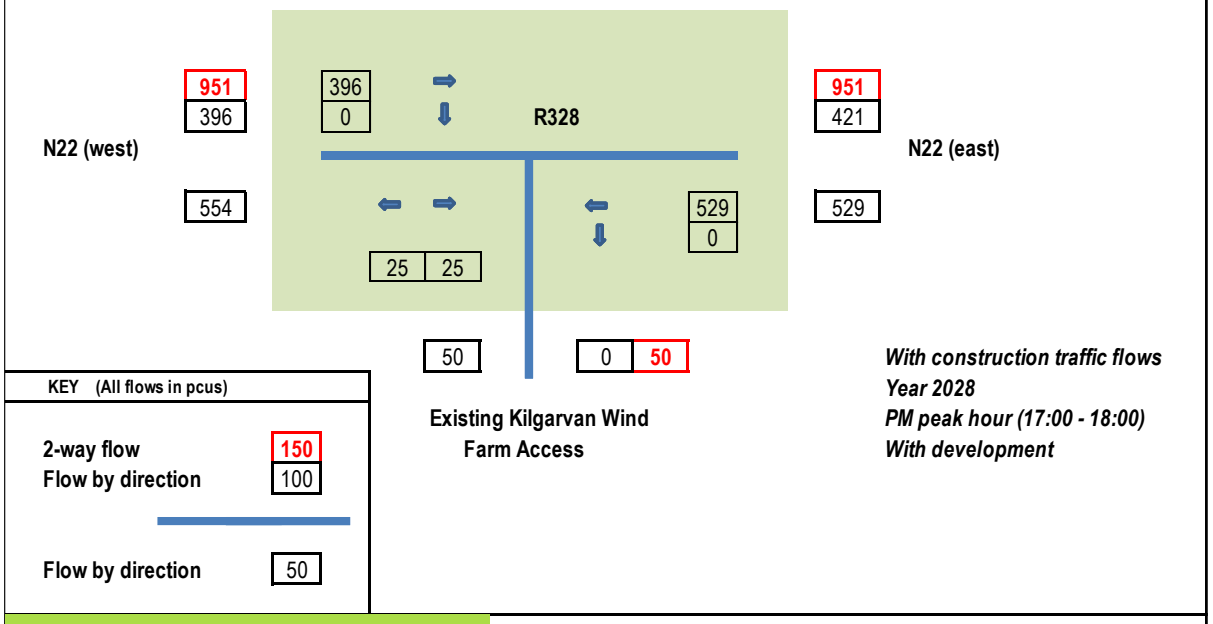


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Figure 15-5d With construction traffic flows, N22 / site access junction
AM and PM peak hours, year 2028, pcus

In Section 15.1.2.2 it is set out that there are two options being considered for the delivery of the 81.5m blades to site. The first and preferred method will utilise blade adaptors which raise the blade to 60° in order to shorten the wheel base of the delivery vehicles. As set out subsequently in Section 15.1.8, this is a requirement in order to negotiate the Existing Kilgarvan Wind Farm access junction off the N22. The second option is to use a standard method of transportation to a location on the old N22 approximately 4 kms to the east of the Existing Kilgarvan Wind Farm access junction, and then transfer the blades onto an adapter for the final part of the journey. It is noted that the additional traffic volumes that will be generated on the network will be the same for both options, although for the second option each trip will require to be split over 2 nights.

The below two plates represent examples of these movements. Plate 15-1 shows a blade artic trailer, where it drives past the junction and reverses into the old section of the N22 to transfer the blades to a blade adapter trailer. Plate 15-2 shows a blade adapter exiting the old section of the N22 to travel west and deliver to the Proposed Development site. Both movements are achievable at this location.

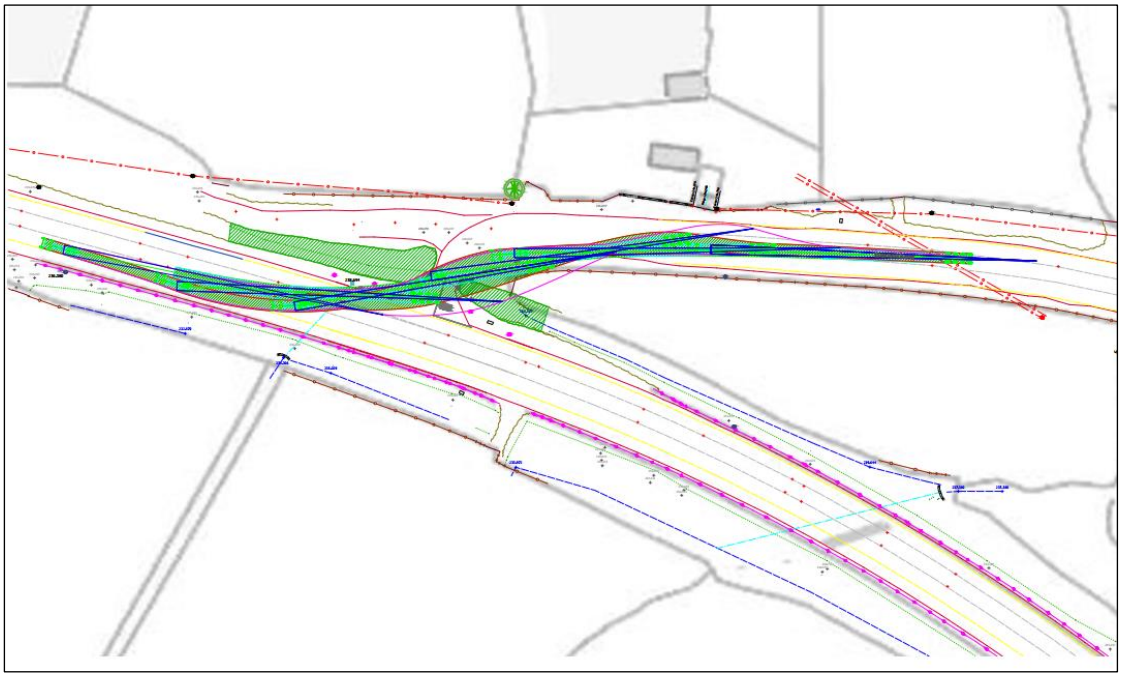

Plate 15-1 N22 Reverse - Blade Artic Trailer

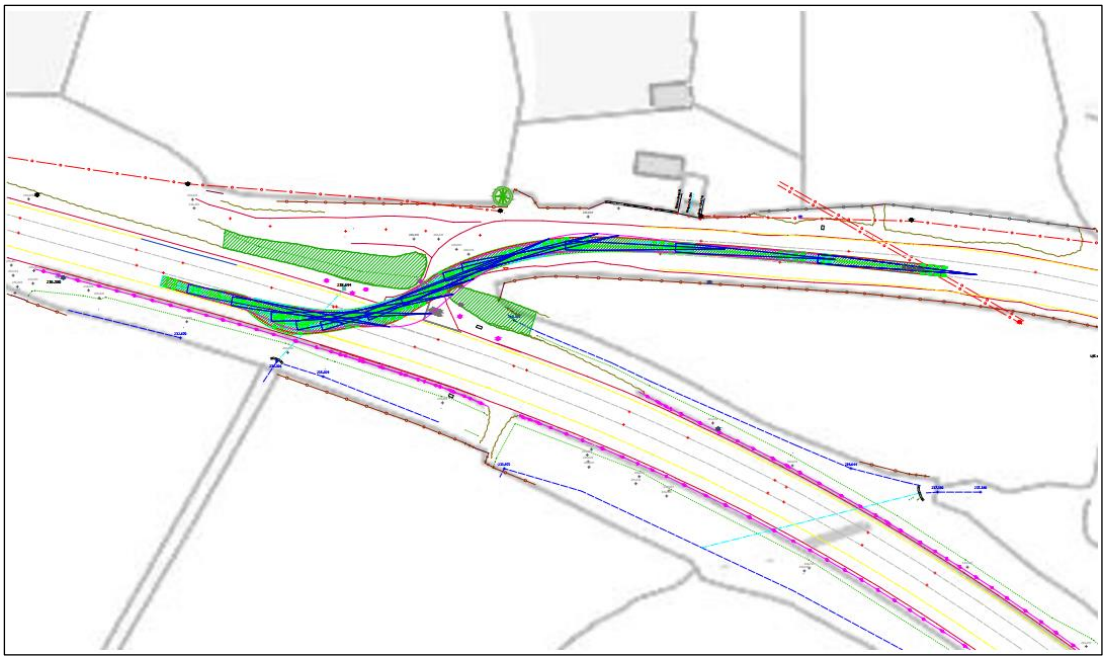

Plate 15-2 Exit on N22 - Blade Artic Trailer 60 degree adapter

Traffic impacts - Phase 1 – Civils – Concrete foundation pours

For 11 days when the concrete foundations are poured an additional 612 PCUs will travel to/from the Proposed Development site.

During the delivery of the concrete, it is forecast that the increase in traffic volumes will range from a minimum of +3.7% on the N22 between Lissarda and Macroom (Link 2), to +4.6% on the N28 just west of Ringaskiddy (Link 1), to a maximum of +6.1% on the N22 Macroom Bypass (Link 3). In the event that concrete deliveries travel to the site from the direction of Killarney, it is forecast that traffic volumes on the N22 will increase by +5.7%. It is noted that these are the busiest delivery days forecast for the Proposed Development.

Traffic impacts - Phase 1 – Civils – General construction

For 124 days when general construction materials are delivered to the site an additional 124 PCUs will travel to/from the Proposed Development site.

During the delivery of the concrete, it is forecast that the increase in traffic volumes will range from a minimum of +0.8% on the N22 between Lissarda and Macroom (Link 2), to +0.9% on the N28 just west of Ringaskiddy (Link 1), to a maximum of +1.3% on the N22 Macroom Bypass (Link 3). If materials travel from the west it is forecast that traffic volumes on the N22 will increase by +1.2%.

Traffic impacts - Phase 2 – Civils – General construction and removal of existing turbines

For the 75 days when general construction materials are delivered to the site at the same time that the existing 28 wind turbines are removed from the site it is forecast that an additional 140 PCUs will travel to/from the Proposed Development site.

During this period, it is forecast that the increase in traffic volumes will range from a minimum of +0.8% on the N22 between Lissarda and Macroom (Link 3), to +1.0% on the N28 just west of Ringaskiddy (Link 1), to a maximum of +1.4% on the N22 Macroom Bypass (Link 3). In the event that materials travel to and from the west it is forecast that traffic volumes on the N22 will increase by +1.3%.

Traffic impacts - Phase 2 – Civils – General construction

For the remaining 80 days of the Phase 2 civils construction period, it is forecast that an additional 122 PCUs will travel to/from the Proposed Development site.

During this period, it is forecast that the increase in traffic volumes will range from a minimum of +0.7% on the N22 between Lissarda and Macroom (Link 2), to +0.9% on the N28 just west of Ringaskiddy (Link 1), to a maximum of +1.2% on the N22 Macroom Bypass (Link 3). Should the materials travel to and from the site from the west it is forecast that traffic volumes on the N22 will increase by +1.1%.

Traffic impacts - Phase 2 – Civils – Turbine delivery – abnormally sized loads

On the 29 days / nights that the abnormal loads carrying the large turbine components travel to the Proposed Development, an additional 140 PCUs will travel to/from the site.

During this period it is forecast that the increase in traffic volumes will range from a minimum of +0.8% on the N22 between Lissarda and Macroom (Link 2), to +1.0% on the N28 just west of Ringaskiddy (Link 1), to a maximum of +1.4% on the N22 Macroom Bypass (Link 3).

Traffic impacts - Phase 2 – Civils – Turbine delivery – standard HGVs

On the 11 days that the standard HGVs carrying the smaller turbine components travel to the Proposed Development, an additional 99 PCUs will travel to/from the site.

During this period it is forecast that the increase in traffic volumes will range from a minimum of +0.6% on the N22 between Lissarda and Macroom (Link 2), to +0.7% on the N28 just west of Ringaskiddy (Link 1), to a maximum of +1.0% on the N22 Macroom Bypass (Link 3).

Table 15-19 Daily traffic volumes - Phase 1 Civils – concrete foundation pours – background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N28 Ringaskiddy	10,975	2,447	13,422	100	512	612	11,075	2,959	14,034
2 – N22 Lissarda to Macroom	14,889	1,723	16,612	100	512	612	14,989	2,235	17,224
3 – N22 Macroom Bypass	8,675	1,353	10,028	100	512	612	8,775	1,865	10,640
4 – N22 Killarney to Islandmore	9,633	1,140	10,773	100	512	612	9,733	1,652	11,385

Table 15-20 Daily Traffic volumes – Phase 1 Civils – general construction – background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N28 Ringaskiddy	10,975	2,447	13,422	100	27	127	11,075	2,474	13,549
2 – N22 Lissarda to Macroom	14,889	1,723	16,612	100	27	127	14,989	1,750	16,739
3 – N22 Macroom Bypass	8,675	1,353	10,028	100	27	127	8,775	1,380	10,155
4 – N22 Killarney to Islandmore	9,633	1,140	10,773	100	27	127	9,733	1,167	10,900

Table 15-21 Daily traffic volumes – Phase 2 Civils – general construction – background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N28 Ringaskiddy	10,975	2,447	13,422	100	22	122	11,075	2,469	13,544
2 – N22 Lissarda to Macroom	14,889	1,723	16,612	100	22	122	14,989	1,745	16,734
3 – N22 Macroom Bypass	8,675	1,353	10,028	100	22	122	8,775	1,375	10,150
4 – N22 Killarney to Islandmore	9,633	1,140	10,773	100	22	122	9,733	1,162	10,895

Table 15-22 Daily traffic volumes – Phase 2 Turbine delivery – abnormally sized loads – background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N28 Ringaskiddy	10,975	2,447	13,422	80	60	140	11,055	2,507	13,562

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
2 – N22 Lissarda to Macroom	14,889	1,723	16,612	80	60	140	14,969	1,783	16,752
3 – N22 Macroom Bypass	8,675	1,353	10,028	80	60	140	8,755	1,413	10,168
4 – N22 Killarney to Islandmore	9,633	1,140	10,773	80	60	140	9,713	1,200	10,913

Table 15-23 Daily traffic volumes – Phase 2 Turbine delivery – standard HGVs – background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N28 Ringaskiddy	10,975	2,447	13,422	80	19	99	11,055	2,466	13,521
2 – N22 Lissarda to Macroom	14,889	1,723	16,612	80	19	99	14,969	1,742	16,711
3 – N22 Macroom Bypass	8,675	1,353	10,028	80	19	99	8,755	1,372	10,127
4 – N22 Killarney to Islandmore	9,633	1,140	10,773	80	19	99	9,713	1,159	10,872

Table 15-24 Daily traffic volumes – Phase 2 Removal of existing turbines – standard HGVs – background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N28 Ringaskiddy	10,975	2,447	13,422	80	18	98	11,055	2,465	13,520
2 – N22 Lissarda to Macroom	14,889	1,723	16,612	80	18	98	14,969	1,741	16,710
3 – N22 Macroom Bypass	8,675	1,353	10,028	80	18	98	8,755	1,371	10,126

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
4 – N22 Killarney to Islandmore	9,633	1,140	10,773	80	18	98	9,713	1,158	10,871

Table 15-25 Phase 1 – Civils – Concrete foundation pours - background traffic, development traffic, % increase

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – N28 Ringaskiddy	13,422	612	14,034	4.6%	11
2 – N22 Lissarda to Macroom	16,612	612	17,224	3.7%	11
3 – N22 Macroom Bypass	10,028	612	10,640	6.1%	11
4 – N22 Killarney to Islandmore	10,773	612	11,385	5.7%	11

Table 15-26 Phase 1 – Civils – General construction - background traffic, development traffic, % increase

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – N28 Ringaskiddy	13,422	127	13,549	0.9%	124
2 – N22 Lissarda to Macroom	16,612	127	16,739	0.8%	124
3 – N22 Macroom Bypass	10,028	127	10,155	1.3%	124
4 – N22 Killarney to Islandmore	10,773	127	10,900	1.2%	124

Table 15-27 Phase 2 – Civils – General construction and removal of existing turbines - background traffic, development traffic, % increase

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – N28 Ringaskiddy	13,422	140	13,562	1.0%	75
2 – N22 Lissarda to Macroom	16,612	140	16,752	0.8%	75
3 – N22 Macroom Bypass	10,028	140	10,168	1.4%	75

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
4 – N22 Killarney to Islandmore	10,773	140	10,913	1.3%	75

Table 15-28 Phase 2 – Civils – General construction - background traffic, development traffic, % increase

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – N28 Ringaskiddy	13,422	122	13,544	0.9%	80
2 – N22 Lissarda to Macroom	16,612	122	16,734	0.7%	80
3 – N22 Macroom Bypass	10,028	122	10,150	1.2%	80
4 – N22 Killarney to Islandmore	10,773	122	10,895	1.1%	80

Table 15-29 Phase 2 – Turbine delivery - abnormally sized loads - background traffic, development traffic, % increase

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – N28 Ringaskiddy	13,422	140	13,562	1.0%	29
2 – N22 Lissarda to Macroom	16,612	140	16,752	0.8%	29
3 – N22 Macroom Bypass	10,028	140	10,168	1.4%	29
4 – N22 Killarney to Islandmore	10,773	140	10,913	1.3%	29

Table 15-30 Phase 2 – Turbine delivery – standard HGVs - background traffic, development traffic, % increase

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – N28 Ringaskiddy	13,422	99	13,521	0.7%	11
2 – N22 Lissarda to Macroom	16,612	99	16,711	0.6%	11
3 – N22 Macroom Bypass	10,028	99	10,127	1.0%	11
4 – N22 Killarney to Islandmore	10,773	99	10,872	0.9%	11

15.1.6.2 Link Capacity Assessment

An assessment of the impact on link capacity on the delivery routes was undertaken for the various construction phases as set out in Tables 15-31 to 15-33. Capacities are based on road types and widths as set out in the TII Standards document DN-GEO-03031 Road Link Design, Table 6/1. The capacity of the links on the route options, as shown in Table 15-31, vary from 20,000 vehicles per day on the N22 Macroom Bypass (Link 3), down to 8,600 vehicles per day on the N28 just to the west of Ringaskiddy Port (Link 1).

It is noted that the link capacities adopted from the TII guidelines correspond to a Level of Service D, which the guidelines describe as being the level where:

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

It should be noted below that all materials are assumed to be delivered from either the east from the direction of Ringaskiddy, and in the case of concrete and general construction materials from the west from the direction of Killarney. For the case where materials are delivered from the east, the assessment is based on the case that all deliveries are made from Ringaskiddy, in order to present a robust assessment. In the event that general materials, including concrete, are delivered from suppliers closer to the to the Proposed Development site than Ringaskiddy, then the impacts presented below will occur over a reduced part of the network.

Background flows are compared to flows forecast for the various construction delivery stages, in Table 15-31, with the percentage capacity reached for each stage shown in Table 15-32. Based on this assessment, it is forecast that the N22 Macroom Bypass (Link 3 - 50%), and the N22 approaching from the west in the direction of Killarney (Link 4 - 93%) are forecast to operate within link capacity by the construction year 2028 without the additional traffic forecast to be generated by the Proposed Development. For these links it is forecast that both will remain within link capacity, increasing to a maximum during the 11 days when the concrete foundations will be poured to 53% on the N22 Macroom Bypass (Link 3) and 98% on the N22 approaching the site from the west (Link 4).

With respect to the N28 at Ringaskiddy (Link 1) and the N22 between Lissarda and Macroom (Link 2), it is forecast that both will operate over capacity by the construction year 2028 without the additional traffic forecast to be generated by the Proposed Development. As set out previously in Section 15.1.3.1, it is important to consider the relative increase due to the Proposed Development. It is forecast that the N28 at Ringaskiddy (Link 1) is forecast to operate at 156% of capacity by the year 2028 with background traffic only, increasing to a maximum of 163% for the 11 days during which the concrete foundations are poured. For all other construction days, the link is forecast to operate at a maximum of 158% capacity, or 2% points above background levels. Similar levels of increases are forecast for the N22 between Lissarda and Macroom (Link 2), with background traffic volume reaching 143%, increasing to 148% during the 11 day concrete pours, and then reducing to maximum of 144%, or 1% points above background levels during remainder of construction period.

Table 15-31 Delivery route carriageway widths, link type and link capacity (at Level of Service D)

Link	Link type	Link capacity (Level of Service D)
1 – N28 Ringaskiddy	Type 2 single	8,600
2 – N22 Lissarda to Macroom	Type 1 single	11,600

3 – N22 Macroom Bypass	Type 2 dual	20,000
4 – N22 Killarney to Islandmore	Type 1 single	11,600

Table 15-32 Delivery route link capacity and summary of link flows by construction delivery stage

Link	Link capacity (Level of Service D)		Phase 1		Phase 2			
		Background traffic	Concrete pour	Civil	Civil	Turbine abnormal loads	Turbine standard vehicles	Civil + decomm
1 – N28 Ringaskiddy	8,600	13,422	14,034	13,549	13,544	13,562	13,521	13,562
2 – N22 Lissarda to Macroom	11,600	16,612	17,224	16,739	16,734	16,752	16,711	16,752
3 – N22 Macroom Bypass	20,000	10,028	10,640	10,155	10,150	10,168	10,127	10,168
4 – N22 Killarney to Islandmore	11,600	10,773	11,385	10,900	10,895	10,913	10,872	10,913

Table 15-33 Delivery route link capacity and % of link capacity by construction delivery stage

Link	Link capacity (Level of Service D)		Phase 1		Phase 2			
		Background traffic	Concrete pour	Civil	Civil	Turbine abnormal loads	Turbine standard vehicles	Civil + decomm
1 – N28 Ringaskiddy	8,600	156%	163%	158%	157%	158%	157%	158%
2 – N22 Lissarda to Macroom	11,600	143%	148%	144%	144%	144%	144%	144%
3 – N22 Macroom Bypass	20,000	50%	53%	51%	51%	51%	51%	51%

Link	Link capacity (Level of Service D)		Phase 1		Phase 2			
4 – N22 Killarney to Islandmore	11,600	93%	98%	94%	94%	94%	94%	94%

15.1.6.3 Effect on Link Flows – During Operation

Once the Proposed Development is operational it is estimated that there will be 1-2 staff members employed on site with a similar number of vehicle trips. As stated previously it is likely that the Proposed Development will attract some recreational trips, although it is expected that visitor numbers will be low. It is considered that the traffic impact during this phase will be imperceptible.

15.1.6.4 Effect on Junctions – During Construction

The junction most affected on the delivery route will be the existing site access junction on the N22. While the increase in traffic volumes on the N22 does not approach the +10% threshold set by TII which requires a detailed junction capacity test, the test was undertaken as a precautionary measure.

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

- Queue – This is the average queue forecast for each movement and is useful to ensure that queues will not interfere with adjacent junctions.
- Degree of Saturation or Ratio of Flow to Capacity (% Sat or RFC) – As suggested, this offers a measure of the amount of available capacity being utilised for each movement. Ideally each movement should operate at a level of no greater than 85% of capacity, in accordance with TII requirements.
- Delay – Output in minutes, this gives an indication of the forecast average delay during the time period modelled for each movement.

15.1.6.4.1 *Scenarios Modelled*

The greatest effect in terms of traffic will be experienced during peak hours when, during peak construction periods, approximately 100 construction staff (50 cars) will access the site through it. It is assumed that deliveries of materials to the Proposed Development site will take place during the day after the workers have arrived, and before they leave at the end of the day and will therefore not occur at the same time.

15.1.6.4.2 *N22 / Kilgarvan Wind Farm Access Junction Capacity Test Results*

The AM and PM peak hour traffic flows for the base year 2023 and the proposed construction year of 2028 are shown in Figures 15-4a and 15-4b respectively. The additional traffic movements that are forecast to be generated by construction workers are shown in Figure 15-4c, with proposed construction year 2028 traffic flows including the additional construction traffic shown in Figure 15-4d. The results of

the junction capacity tests are set out in Table 15-34 and show that the construction traffic accessing the Proposed Development access junction during the AM peak hour will be accommodated at the junction, with the ratio of flow to capacity (RFC) forecast to be 7.1%. Similarly for construction traffic exiting the Proposed Development site during the PM peak hour, it is also forecast that these trips will be accommodated, with an RFC of 14.5%.

The assessment shows that the junction is forecast to operate well within the acceptable limit of 85% as specified by TII in the Traffic and Transport Assessment Guidelines.

Table 15-34 Junction capacity test results, N22 / Kilgarvan Wind Farm Access junction, AM and PM peak hours, with construction traffic, by time period, year 2028

Arm	AM peak hour			PM peak hour		
	RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
From Proposed Development access	0.0%	0.00	0.00	14.5%	0.17	0.18
Right turn into Proposed Development	7.1%	0.12	0.08	0.0%	0.00	0.00

Effect on Junctions – During Operation

As discussed in Section 15.1.4.3 it is forecast that once operational, the Proposed Development is expected to generate 1 to 2 trips per day for maintenance purposes. It is therefore concluded that the Proposed Development will have an imperceptible effect on the local network once constructed.

15.1.7 Traffic Management of Large Deliveries

Traffic management measures are included in Section 15.1.11.5.1 and include the following:

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

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

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

Refer also to the Construction and Environmental Management Plan (CEMP), Appendix 4-3 of this EIAR, for the Traffic Management Plan.

15.1.8 Abnormal Load Route Assessment

A route assessment was undertaken covering the proposed turbine delivery route, with the route assessment locations shown in Figure 15-2a.

Ringaskiddy Port is the proposed point of arrival for the large turbine components for the Proposed Development. The port is a well-established point of arrival for wind turbine components of similar scale into the State on a regular basis, as is the road network between the port and the national road network.

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

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

Location 1 – N28 Pfizer roundabout, Ringaskiddy

The swept path analysis undertaken for this blade being transported using the standard method in the horizontal position and using an adaptor lifting the blade to 60º are shown in Figures 15-6a and 15-6b, while the assessment shown for the tower transporter shown in Figure 15-7. The figures show that all 3 vehicles will be accommodated at this roundabout by using the existing over-run area through the centre island.

Location 2 – N28 / R611 roundabout

The swept path analysis undertaken for this blade being transported using the standard method in the horizontal position is shown in Figure 15-8a. The figure shows that a minor over-run of the splitter island

on the eastern arm of the roundabout will be required. The swept paths for the blade using the adaptor, and the tower extended artic, shown in Figures 15-8b and 15-9 respectively, show that both of these vehicles will be accommodated at this location.

Location 3 – N22 Macroom Bypass / R584 roundabout

The swept path analysis undertaken for this location is shown in Figures 15-10a, 15-10b and 15-11. The figures show that all 3 test vehicles will be accommodated at this roundabout.

Locations 4 – N22 / Kilgarvan Wind Farm access junction

Figure 15-12a illustrates that the transportation of the 81.5m blade using the standard method of delivery is not an option for consideration based on the geometry of the Existing Kilgarvan Wind Farm access junction. On the approach to the Existing Kilgarvan Wind Farm access junction, the blades will be attached to a blade adapter and lifted to 60º. The swept path assessment for this vehicle is shown at the existing site access in Figure 15-12b, which shows that this vehicle will be accommodated at this location. Similarly, Figure 15-13, illustrates that the tower extended artic will also be accommodated at the existing access junction.

It is noted that there are no new access junctions proposed on the N22 at part of the Proposed Repowering of the Existing Kilgarvan Wind Farm.

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-6a Location 1 - N28 Pfizer roundabout, Ringaskiddy, extended blade artic

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

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Base mapping provided by MKO

Figure 15-6b Location 1 - N28 Pfizer roundabout, Ringaskiddy, blade adapter

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

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Figure 15-7 Location 1 - N28 Pfizer roundabout, Ringaskiddy, extended tower artic

PROJECT: Repowering of the Existing Kilgarvan Wind Farm		
CLIENT: Orsted		SCALE: 1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY: AL

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Figure 15-8a Location 2 - N28 / R611 roundabout, extended blade artic

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

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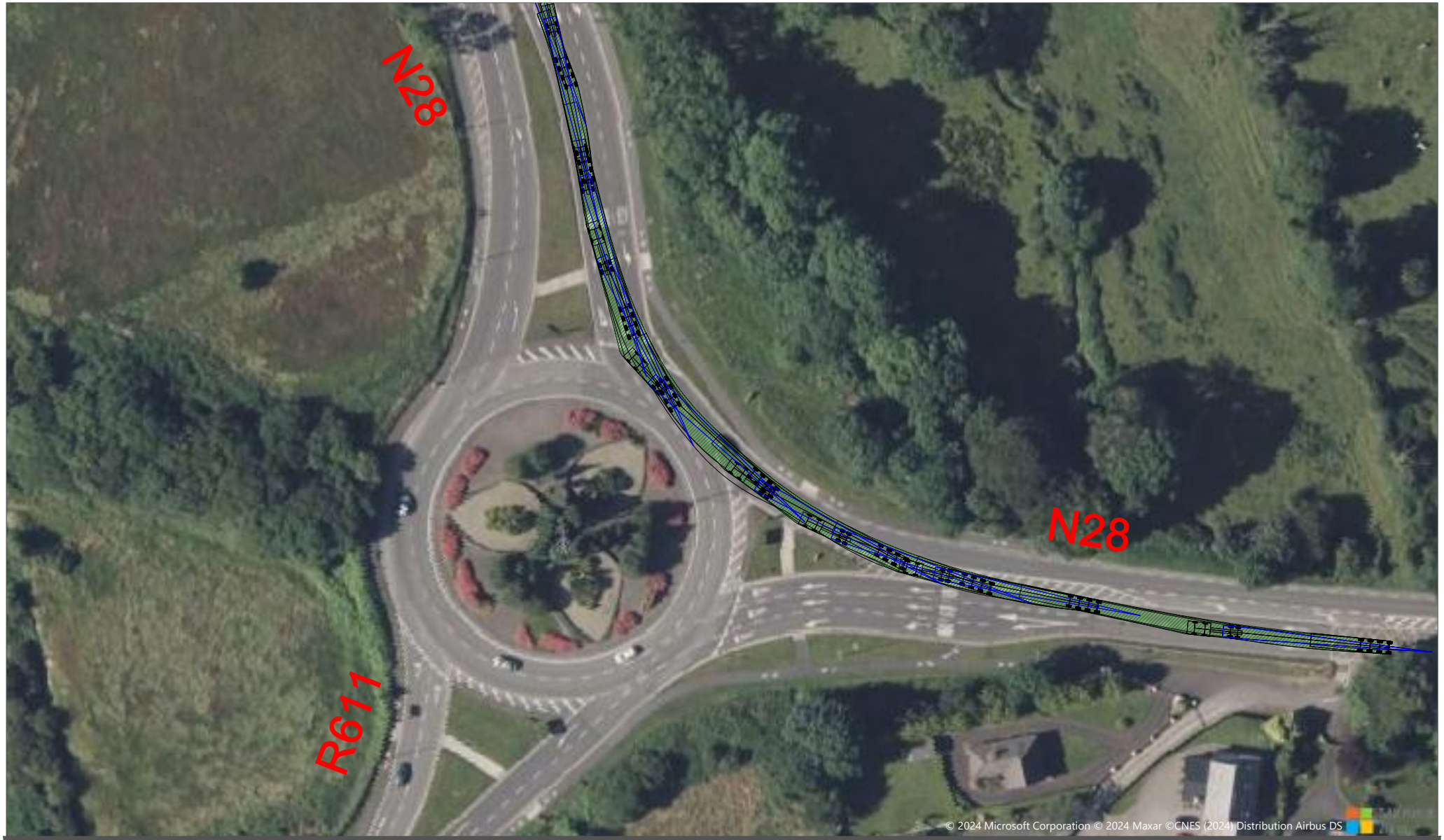

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Base mapping provided by MKO

Figure 15-8b Location 2 - N28 / R611 roundabout, blade adapter

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

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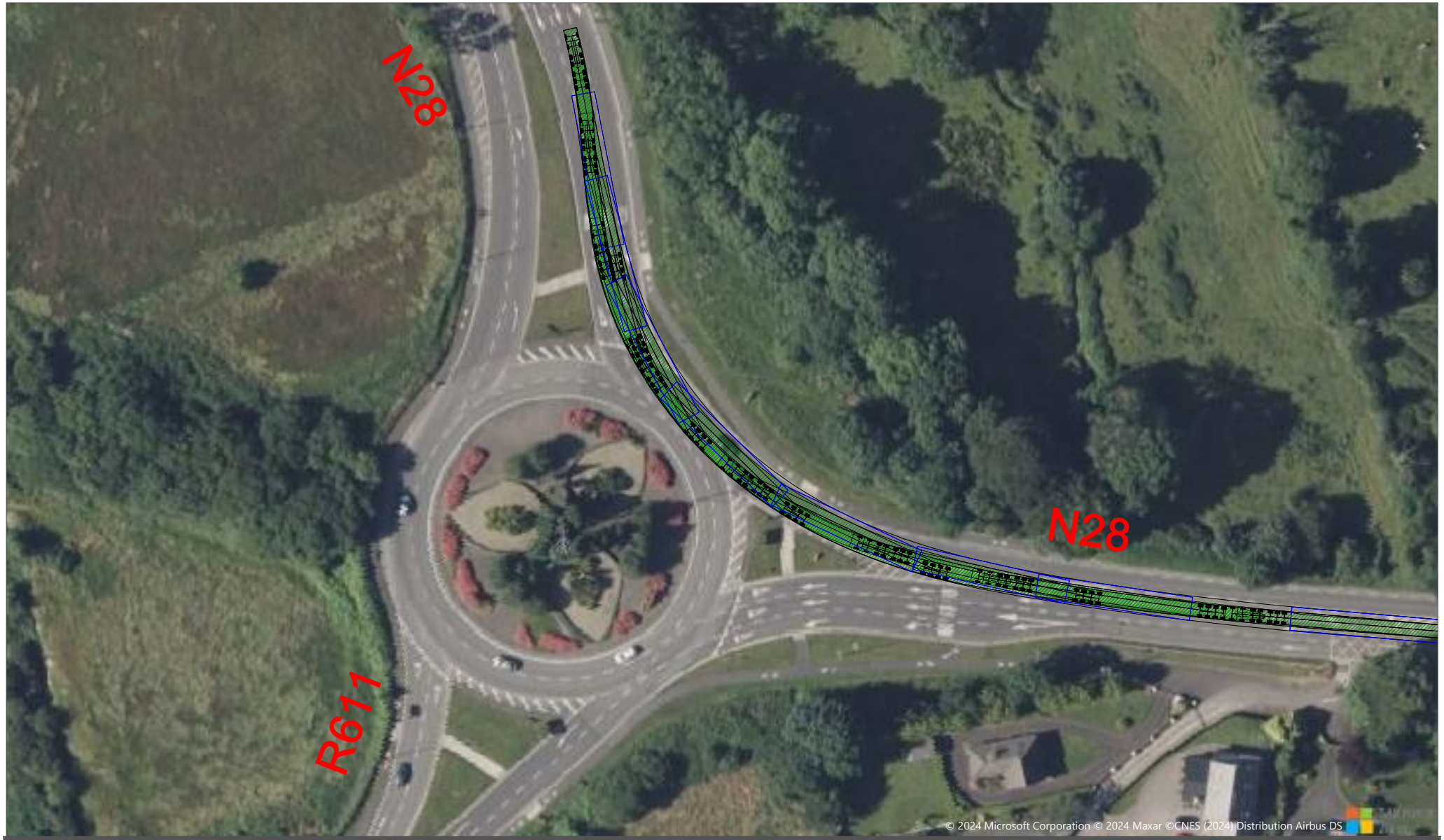

NOTES:

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Base mapping provided by MKO

Figure 15-9 Location 2 - N28 / R611 roundabout, extended tower artic

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

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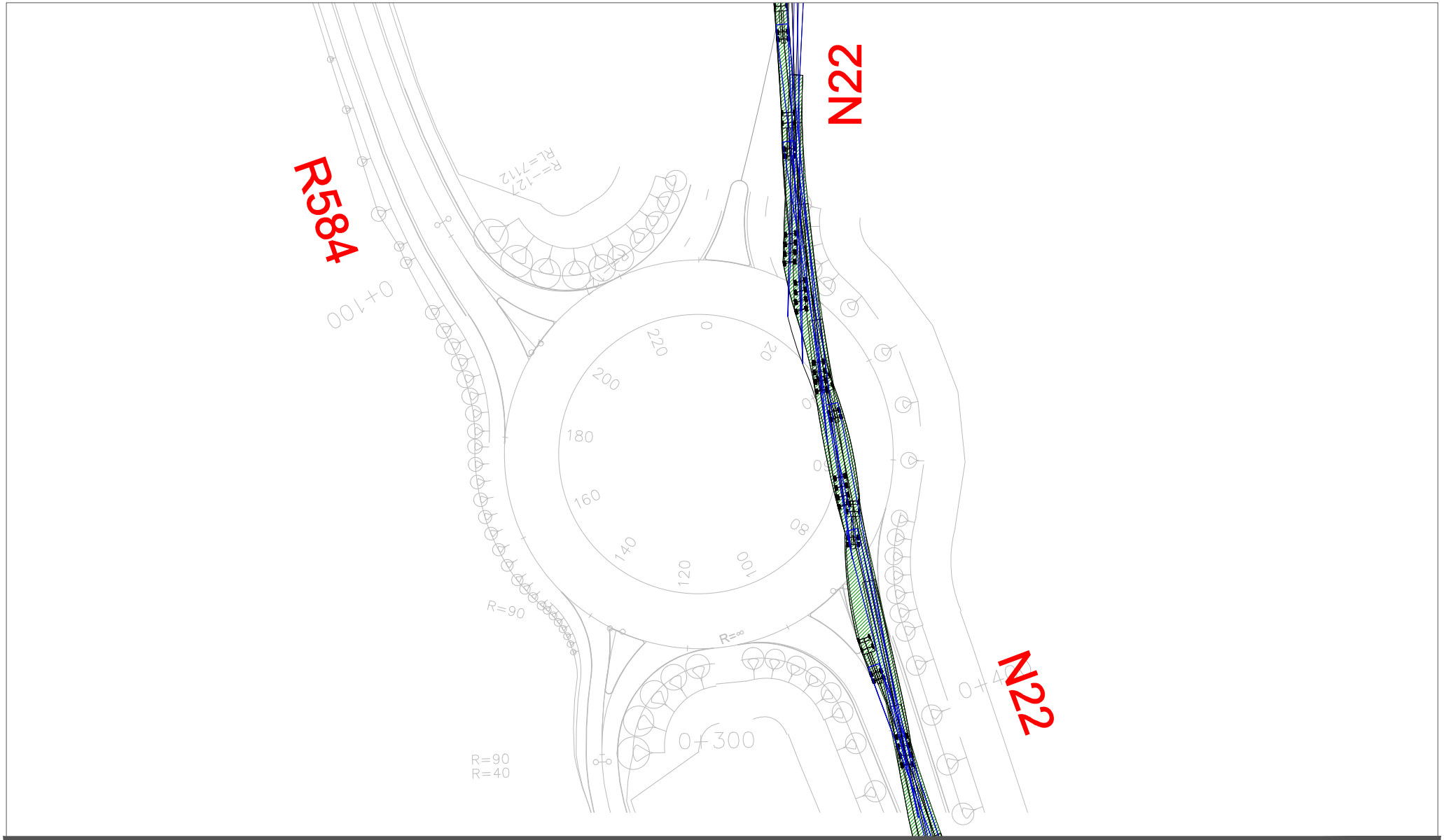

NOTES:

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Base mapping provided by MKO

Figure 15-10a Location 3 - N22 Macroom Bypass / R584 roundabout, blade extended artic

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

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Figure 15-10b Location 3 - N22 Macroom Bypass / R584 roundabout, blade adapter

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

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Figure 15-11 Location 3 - N22 Macroom Bypass / R584 roundabout, tower extended artic

PROJECT: Repowering of the Existing Kilgarvan Wind Farm		
CLIENT: Orsted		SCALE: 1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY: AL

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Figure 15-12 Location 4 - N22 / site access junction, blade adapter

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

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Figure 15-13 Location 4 - N22 / site access junction, tower extended artic

PROJECT:	Repowering of the Existing Kilgarvan Wind Farm		
CLIENT:	Orsted	SCALE:	1:1000
PROJECT NO: 9990	DATE: 29.04.24	DRAWN BY:	AL

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15.1.9 Road Safety

The situations that require a Road Safety Audit are set out in Section 2.1 of the TII guidelines ***Road Safety Audit Guidelines (GE-STY-01024).*** In relation to development proposals the guidelines state that a Road Safety Audit is required when "A scheme results in a change to the road or roadside layout that is initiated and /or executed for commercial or private development". As no changes to the Existing Kilgarvan Wind Farm access junction are proposed it is concluded that a Road Safety Audit is not required.

15.1.10 Provision for Sustainable Modes of Travel

15.1.10.1 Walking and Cycling

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

15.1.10.2 Public Transport

Public bus routes 40 (Bus Eireann Tralee to Rosslare, 6 services per day) and 257 (Killarney to Macroom, 5 services per day) travel on the N22 past the Existing Kilgarvan Wind Farm site entrance. It is noted that there are no bus stops or pedestrian facilities on this section of the N22, which has a 100 km/h speed limit. Based on this, public transport is not considered a viable or safe option for construction staff to travel to the site. The provision of minibuses will be considered for transporting staff to and from the site in order to minimise traffic generation and parking demand.

15.1.11 Likely and Significant Effects and Associated Mitigation Measures

15.1.11.1 'Do-Nothing' Scenario

I If the Proposed Development were not to proceed, the existing uses for the site of small-scale agricultural farming practices, would continue, and the operational Kilgarvan Wind Farm would continue to operate until the turbines are to be decommissioned in accordance with the conditions of their respective planning permissions. The opportunity to continue to harness the wind energy resource of County Kerry would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

If the Proposed Development were not to proceed, there will be no construction related traffic generated required to construct the 11 new turbines. The traffic impacts set out in Section 15.1.6 above relating to the removal of the existing 28 turbines will apply once the Existing Kilgarvan Wind Farm turbines reach their end of life.

15.1.11.2 Construction Phase: Traffic and Transport

15.1.11.2.1 *Proposed Development*

During the 11 days when the concrete foundations are poured, the effect on the surrounding road network will be negative. It is forecast that the increase in traffic volumes will range from +3.7% on the N22 between Lissarda and Macroom (Link 3), to +4.6% on the N28 just west of Ringaskiddy (Link 1), to a maximum of +6.1% on the N22 Macroom Bypass (Link 3). In the event that concrete deliveries travel to the site from the direction of Killarney (Link 4), it is forecast that traffic volumes on the N22 will

increase by +5.7%. It is on these 11 days that it is forecast that the Proposed Development will have the greatest impact on the surrounding road network, when the effects will be negative, temporary and slight on the delivery route.

For the remaining 24 months of the proposed construction period for the Proposed Development, the increase in link flows on the delivery route compared to background traffic flows without the Proposed Development are forecast to vary as follows;

- Link 1 – N28 Ringaskiddy, between +0.7% to 1.0%,
- Link 2 – N22 Lissarda to Macroom, between 0.6% to 0.8%,
- Link 3 – N22 Macroom Bypass, between +1.0% to +1.4%, and
- Link 4 – N22 Killarney to Islandmore, between 0.9% to 1.3%.

During this main part of the construction phase, based on the forecast increase in traffic volumes set out above it is forecast that the impact on the delivery routes will be negative, temporary and imperceptible.

15.1.11.3 Operational Phase: Traffic and Transport

The impacts on the surrounding local highway network will be negligible given that there will be approximately 1 to 2 trips made to the Proposed Development by car or light goods vehicle on any given day. The effects of the maintenance traffic on the surrounding highway network will therefore be imperceptible.

15.1.11.4 Decommissioning Phase: Traffic and Transport

15.1.11.4.1 *Proposed Development*

The 11 wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 35 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the site may be decommissioned fully.

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

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

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

15.1.11.5 Mitigation Measures

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

15.1.11.5.1 Mitigation by Design

Mitigation by design measures include the following:

- Selection of the most appropriate delivery route to transport the wind turbine components, requiring the minimum remedial works to accommodate the vehicles as set out in Section 15.1.8.
- Selection and use of an established access junction for turbine delivery to the site, reducing requirement for junction works.

15.1.11.5.2 *Mitigation Measures During the Construction Stage*

The successful completion of the Proposed Development will require significant coordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction stage in order to minimise the effects of the additional traffic generated by the Proposed Development.

A detailed Traffic Management Plan (TMP) will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the road's authority and An Garda Síochána prior to construction works commencing. The detailed TMP will include the following:

- **Traffic Management Coordinator –** a competent Traffic Management Co-ordinator will be appointed for the duration of the construction of the Proposed Development and this person will be the main point of contact for all matters relating to traffic management.
- **Delivery Programme –** a programme of deliveries will be submitted to Cork County Council and other relevant authorities in advance of deliveries of turbine components to the Proposed Development site.
- **Information to locals** – Locals in the area will be informed of any upcoming traffic related matters e.g. delivery of turbine components at night, via letter drops and/or posters in public places. Information will include the contact details of the Contract Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided.
- **A Pre and Post Construction Condition Survey –** A pre-condition survey of roads associated with the Proposed Development will be carried out prior to construction commencement to record the condition of the road. A post construction survey will be carried out after works are completed. Where required the timing of these surveys will be agreed with the local authority.
- **Liaison with the relevant local authorities** - Liaison with the relevant local authorities including the roads sections of local authorities that the delivery routes traverse, and An Garda Siochana, during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required.
- **Implementation of temporary alterations to road network at critical junctions** – At locations where required highlighted in Section 15.1.8.
- **Identification of delivery routes** – These routes will be agreed and adhered to by all contractors.
- **Travel plan for construction workers to Site–** While the assessment above has assumed a robust case that construction workers will drive to the site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of a routes to / from the site and identification of an area for parking.
- **Delivery times of large turbine components** - The management plan will include the delivery of large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage.

- **Additional measures** - Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including sweeping / cleaning of local roads as required.
- **Re-instatement works** - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.

15.1.11.5.3 *Mitigation Measures During Operational Stage*

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

15.1.11.5.4 *Mitigation Measures During Decommissioning Stage*

In the event that the Proposed Development is decommissioned after the 35 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Chapter 4 and Appendix 4-5 Decommissioning Plan. This plan will include a material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning.

15.1.11.6 Residual Effects

15.1.11.6.1 *Construction Stage*

During the 18–24-month construction stage of the Proposed Development, it is forecast that the additional traffic that will appear on the public road network serving the Proposed Development site will have a slight to moderate and temporary negative effect on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed Traffic Management Plan included as Section 15.1.11.5.2 above.

15.1.11.6.2 *Operational Stage*

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

15.1.11.6.3 *Decommissioning Stage*

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

For this scenario the existing on-site substation and Grid Connection will remain in-situ and continue to operate as part of the national electricity grid network.

15.1.11.7 Cumulative Effects

A detailed assessment of all developments at varying stages in the development process (from pre-planning to operational), is set out in Section 2.7 of Chapter 2 with all developments included listed in Appendix 2-4. The potential for cumulative traffic effects with the Proposed Development are assessed based on the following criteria;

- Project status (pre-planning to operational)
- Degree of overlap with the Proposed Development delivery highway network (low to high)
- Traffic volumes (low to high).

15.1.11.7.1 Other Wind Farms

From a review of all existing and approved wind farms set out in Appendix 2-4 it has been determined that the potential for cumulative impacts will only occur with other wind farms that are proposed or permitted and have yet to be constructed, as the traffic generation for existing operational wind farms is very low. There are several other applications in the pre-application stage that have not been considered as their applications have not been submitted to the relevant authorities and no traffic related information is available. In addition, any single/domestic turbines have not been considered in the cumulative assessment as the scale of construction traffic associated with these would be considered insignificant and therefore would not have a cumulative impact when associated with the Proposed Development.

As set out in Table 15-35 there is 1 permitted wind farms which is considered to have a high potential risk of traffic related cumulative impacts with the Proposed Development (Knocknamork Wind Farm, County Cork). There is also 1 proposed wind farm (Inchamore Wind Farm, County Kerry and County Cork (one application in appeal to An Bord Pleanála)) that is also determined to have a high risk of cumulative traffic related impacts with the Proposed Development. In the event that the construction of the Proposed Development coincides with the construction phase of any of these wind farms the traffic related cumulative impacts would be negative, short-term and slight to moderate, based on the potential overlap of TDRs and associated traffic generation. It is therefore proposed that the construction phase of the Proposed Development will be scheduled, where possible, to avoid the construction phases of these proposed and permitted wind farm developments. This will ensure that the potential for cumulative effects is minimised.

Table 15-35 Summary of other wind farms considered in cumulative assessment and potential for cumulative traffic effects with Proposed Development

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
1 – Inchamore Wind Farm, County Kerry and Cork (5 turbines)	Proposed	High	Medium	High
2 – Knocknamork Wind Farm, County Cork (7 turbines)	Permitted	High	Medium	High
3 – Gortyrahilly Wind Farm, County Cork (14 turbines)	Proposed	Low	Medium	Low
4 – Cummeenabuddoge Wind Farm, County Cork (2 turbines)	Proposed	Low	Medium	Low
5 – Curraglass Wind Farm, County Cork (7 turbines)	Proposed	Low	Medium	Low
6 – Gneeves 2 Wind Farm, County Cork (3 turbines)	Proposed	Low	Medium	Low
7 – Carrigrierk Wind Farm Extension, County Cork (3 Turbines)	Permitted	Low	Medium	Low

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
8 – Gortloughra Wind Farm, County Cork (9 Turbines)	Proposed	Low	Medium	Low
9 – Ballinagree Wind Farm, County Cork (20 Turbines)	Proposed	Low	Medium	Low
10 – Dromleena Wind Farm, County Cork (11 Turbines)	Permitted	Low	Medium	Low

Other development applications in the planning system

A planning search was undertaken by MKO of the EIA planning register for all development planning applications within 25km of the Proposed Development site, as set out in Appendix 2-4. For the purpose of traffic related impacts, the search was reduced to a radius of 5 kms from the Proposed Development site. Of the developments included in the list it was considered that the 2 developments listed in Table 15-36 should be considered based on the location and scale of these developments. It is considered that the potential risk of cumulative impacts between the Proposed Development and these 2 developments is low with the resulting cumulative impacts being negative, short term and slight.

Table 15-36 Summary of other development applications considered in cumulative assessment and potential for cumulative traffic effects with Proposed Development

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
1 – Coillte Rossacroo Forestry , Derrybanane , Flesk County Kerry. KCC Planning Reference 23/60262. Cignal Infrastructure Limited for permission to install a 42m lattice type telecommunications support structure, carrying antenna and dishes together with associated ground equipment cabinets, fencing and associated site works at Coillte.	Permission Granted, Conditional	High	Low	Low

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
2 – Lumnagh Beg, Coolea, Macroom, County Cork. CCC Planning Reference 24/4036 Permission for retention and completion of dwelling house and associated site works granted under Pl.Reg.No. 05/6346 and extended under Pl.Reg.No. 10/8271 with alterations to the front, rear and side elevations and installation of a new septic tank.	Retention Granted	Medium	Low	Low

As determined above, the effects during the construction, operation or decommissioning phases of the Proposed Development will be not significant. Therefore, no significant cumulative effects are foreseen.

15.1.12 Conclusion

An assessment of the traffic effects on the local highway network was undertaken for the Proposed Development. The assessment considers the likely impacts resulting from the additional traffic movements that will be generated by the Proposed Development during the construction, operational and decommissioning phases on the transport delivery route to the site.

The Proposed Development is located in County Kerry and is situated in the existing Kilgarvan Wind Farm site. The construction and operational phases of the Proposed Development will utilise the existing site access junction which is located on the south side of the N22 at a point approximately 26 kms west of Macroom in County Cork, and 22 kms southeast of Killarney in County Kerry.

An assessment of the geometry of the delivery route was also undertaken in order to ensure that the abnormally sized vehicles required to deliver the turbine plant to the site are accommodated.

The Proposed Development will take 18-24 months to construct during which 28 existing wind turbines will be removed from the site, and 11 new turbines and associated materials will be transported to the site and constructed.

The delivery route to the site for the abnormally sized loads transporting the large turbine components commences at the Port of Ringaskiddy, approximately 80.8kms to the east of the Existing Kilgarvan Wind Farm access junction. From the Port of Ringaskiddy the route travel west and then north on the N28 to the N40 Cork Southern Ring Road. The route then heads west on the N40 Cork Southern Ring Road to join the N22 to the south of Ballincollig. The route continues west on the N22 through Ovens, Farran, Farnanes, Lissarda to the eastern side of Macroom where it joins the recently opened N22 Macroom to Ballyvourney Road that bypasses Macroom to the north and links back into the former N22 to the west of Ballyvourney. From this point the route continues on the N22 to the Existing Kilgarvan Wind Farm site access junction.

The types of vehicles that will be required to negotiate the local network will be up to 87.5 metres long and will carry a blade 81.5 metres in length.

An assessment of the geometric requirements of the delivery vehicles was undertaken on the delivery route. Locations where it was established that the existing road geometry will not accommodate all of the vehicles associated with the Proposed Development are highlighted, with the extent of remedial works identified. In addition to the assessment presented, it is recommended that a dry run is undertaken by the transport company to check vertical and horizontal clearance on the transport route prior to construction.

During the 11 days when the concrete foundations are poured, the effect on the surrounding road network will be negative. It is forecast that the increase in traffic volumes will range from +3.7% on the N22 between Lissarda and Macroom, to +4.6% on the N28 just west of Ringaskiddy, to a maximum of +6.1% on the N22 Macroom Bypass. In the event that concrete deliveries travel to the site from the direction of Killarney it is forecast that traffic volumes on the N22 will increase by +5.7%. It is on these 11 days that it is forecast that the Proposed Development will have the greatest impact on the surrounding road network, when the effects will be negative, temporary and slight on the delivery route.

For the remaining 24 months of the proposed construction period for the Proposed Development, the increase in link flows on the delivery route compared to background traffic flows without the Proposed Development are forecast to vary as follows;

- Link 1 – N28 Ringaskiddy, between +0.7% to 1.0%,
- Link 2 – N22 Lissarda to Macroom, between 0.6% to 0.8%,
- Link 3 – N22 Macroom Bypass, between +1.0% to +1.4%, and
- Link 4 – N22 Killarney to Islandmore, between 0.9% to 1.3%.

During this main part of the construction phase, based on the forecast increase in traffic volumes set out above it is forecast that the impact on the delivery routes will be negative, temporary and imperceptible.

Once the Proposed Development is operational the traffic impact created by maintenance staff will be imperceptible.

The residual effect for the decommissioning phase will be less than for the construction stage as set out above and will be slight to imperceptible.

15.2 Telecommunications and Aviation

15.2.1 Introduction

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

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

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

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

15.2.1.1 Statement of Authority

This section of the EIAR has been prepared by Niamh McHugh and reviewed by Órla Murphy, both of MKO. Niamh is an Environmental Scientist who has been working with MKO since June 2021. Niamh holds a BSc (Env) in Environmental Science from the National University of Ireland, Galway. Niamh has been involved in the preparation of a number of EIARs for wind farm applications. Órla Murphy is a Senior Environmental Scientist with MKO with over 8 years of experience in private consultancy. Órla holds BSc (Hons) in Geography from Queens University Belfast & a MSc in Environmental Protection and Management from the University of Edinburgh. Prior to taking up her position with McCarthy Keville O'Sullivan in January 2018, Órla worked as an Environmental Project Assistant with ITPEnergised in Scotland. Órla's key strengths and areas of expertise are in Environmental Protection and Management, EIA, Project Management, Renewable Energy and Peatland Management, where she has carried out research projects and site work relating to restoration and management of peatland sites in both Scotland and Northern Ireland. On joining MKO Órla has been involved on a range of renewable energy infrastructure projects. In her role as a project manager, Órla works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Within MKO, Órla plays a role in the management of and sharing of knowledge with junior members of staff and works as part of a large multi-disciplinary team to produce EIA Reports.

15.2.2 Methodology and Guidance

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

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

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

15.2.3 Background

15.2.3.1 Broadcast Communications

Wind turbines, like all large structures, have the potential to interfere with broadcast signals, by acting as a physical barrier or causing a degree of scattering to microwave links. The most significant effect at a domestic level relates to a possible flicker effect caused by the moving rotor, affecting, for example, radio signals. The most significant potential effect occurs where the renewable energy development is directly in line with the transmitter radio path.

15.2.3.2 Domestic Receivers

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

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

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

15.2.3.3 Other Signal Types

Wind turbines have the potential to affect other signal types used for communication and navigational systems, for example tower-to-tower microwave communication links, and airborne and ground radar systems. Interference with radar systems occurs when wind turbines are located close to an airport or directly in line with the instrument landing approach. The nearest such operational airport to the Proposed Development site is Kerry Airport, which is located approximately 28 km to the northwest of the Proposed Development. Liaison with representatives from Kerry Airport confirmed that no issues were anticipated due to the construction and operation of the Proposed Development. Table 15-37 below details the response received from Kerry Airport in relation to the Proposed Development. No scoping response was received from the Irish Aviation Authority in relation to the Proposed Development.

15.2.4 Preventing Electromagnetic Interference

15.2.4.1 National Guidelines

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

Developers are advised to contact individual local and national broadcasters and mobile phone operators to inform them of proposals to develop wind farms. This consultation has been carried out by MKO as part of the assessment of the Proposed Development as summarised below in Table 15-37. Full details are provided in Section 2.6 in Chapter 2 of this EIAR.

15.2.4.2 Scoping and Consultation

As part of the EIAR scoping and consultation exercise, MKO contacted the relevant national and regional broadcasters, fixed and mobile telephone operators, aviation authorities and other relevant consultees. Consultation was also carried out with ComReg in order to identify any other additional licenced operators in the vicinity of the Proposed Development to be contacted, who may not have been on the list of main operators.

There were 2 no. rounds of scoping emails sent out to the relevant providers; the first round of emails were issued on 21st February 2022, and a subsequent round of emails were sent out on the 28th March 2022 to providers who had not yet responded to the original email.

The response received from the telecommunications and aviation consultees are summarised below in Table 15-37.

Table 15-37 Telecommunications and Aviation Scoping Responses

Consultee	Response	Potential for Interference Following Consultation Exercise
2rn (RTÉ Transmission Network)	17th February 2022	2 no. links were identified by 2rn in the general vicinity of the Proposed Development. Further investigation was required.
Ajisko Ltd	28th March 2022	No
Broadcasting Authority of Ireland	16th February 2022	No
BT Communications Ireland	29th March 2022	No
ComReg	18th February 2022	N/A
Eir	25th February 2022	8 no. links were identified by Eir in the general vicinity of the Proposed Development. Further investigation was required.
Eircom Ltd	No response received to date	N/A
Enet	17th February 2022	2 no. links were identified by Enet in the general vicinity of the Proposed Development. Further investigation was required.
ESB Telecoms	21st March 2022	3 no. links were identified by ESB in the general vicinity of the Proposed Development. Further investigation was required.
Imagine Networks Services Ltd.	16th February 2022	No
Ivertec Ltd.	28th March 2022	No
Irish Aviation Authority (IAA)	No response received to date	N/A
Kerry Airport	14th November 2022	No impact expected
Meteor Mobile Communications Ltd.	21st February 2022	N/A
Ripple Communications Ltd	No response received to date	N/A
Tetra Ireland Communications Ltd.	28th February 2022	Tetra provided a coordinate for a piece of equipment located in

Consultee	Response	Potential for Interference Following Consultation Exercise
		close proximity to the Proposed Development. Further investigation was required.
Three Ireland (Hutchison) Ltd.	17th October 2022	2 no. links were identified by Three in the general proximity of the site. Further investigation was required.
Towercom	No response received to date	N/A
Viatel Ireland Ltd.	No response received to date	N/A
Virgin Media Ltd.	28th March 2022	No
Vodafone Ireland Ltd.	29th March 2022	6 no. links were identified in the general proximity of the site. Further investigation was required

The scoping responses from the telecommunications and aviation consultees are described below. Relevant copies of scoping responses are provided in Appendix 2-3.

15.2.4.2.1 *Broadcasters*

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

RTÉ Transmission Network (2rn) replied on the 17th February 2022 and identified 2 no. off-air links within the vicinity of the Proposed Development site. Once these links were mapped and their respective requested 2nd Fresnel Zone setback distances were applied, it was found that the proposed turbines were not located within the relevant setback distances for either link. This was confirmed with 2rn, and it was requested that the Applicant sign a standard Protocol Document with 2rn which covers the scenario of a turbine causing unexpected interference to a distribution link once it is constructed. The Protocol document ensures that if an interference is experienced, the Applicant will have the responsibility of rectifying the issue. The Protocol document was signed by the Applicant and returned to 2rn, and is included as Appendix 15–2.

Virgin Media responded to the scoping request issued by MKO on the 28th March to confirm that they had no links in the area, and so there was no potential for impact on their network.

15.2.4.2.2 *Other Consultees*

Of the scoping responses received from telephone, broadband and other telecommunications operators, those who highlighted a potential interference risk are addressed below.

Eir

Eir identified 8 no. links within the vicinity of the Proposed Development site. Once these links were mapped, and their respective requested setback distance of 100m was applied, it was found that only 2 links encroached on the site and that the requested setback distances encompassed 19 no. of the existing Kilgarvan Wind Farm turbines, and 9 no. of the proposed turbines. The question was asked of Eir if there had been any issues experienced on the transmission links to date due to the presence of the existing turbines. Upon further communication with Eir, MKO were informed that one of the links which the proposed turbines would be encroaching on was due to be decommissioned, and that we did not need to consider this in our assessments. It was also confirmed that the existing links had not been seeing any disturbance due to the existing Kilgarvan Wind Farm turbines.

Further communication was had with Eir, and further analysis was conducted by MKO on the heights of the masts and links relative to the proposed turbines. Eir agreed to reduce the original setback distance to 64.5m buffer. With this revised buffer, only one turbine remained within the setback distance, which was subsequently microsited to maintain the requested setback distance.

Enet

Enet identified 2 no. links in the general vicinity of the Proposed Development site. Once the links were mapped, and their respective requested setback distances of 50-70m were applied, it was found that the proposed turbines did not encroach on the requested setback distances, and so no further action or mitigation was required.

Tetra

Tetra identified a singular mast in the general vicinity of the Proposed Development site. Once the mast was mapped and its requested setback distance of 500m was applied, it was found that there was an existing turbine located within 315m of this mast, and that the closest proposed turbines would be located further away from the mast than the existing turbine. The question was then asked of Tetra if the buffer could be reduced on this basis, given the fact that the mast was currently not experiencing any issues. Tetra agreed that if the proposed turbine was going to be located further away from the mast than the existing turbine, that they would not have an issue with this, and so no further action or mitigation was required.

Three Ireland

Three Ireland identified 2 no. links in the general vicinity of the Proposed Development site. Once the links were mapped and their requested setback distance was added, it was found that the turbines were not located in close proximity to theses links, and so no further action or mitigation was required.

ESB and Vodafone

The final turbine layout overlaps with links and setback distance identified by both ESB and Vodafone. Investigations were subsequently completed on the information provided to MKO by the respective telecoms providers by A.I. Bridges, to assess the potential impact to the identified links by the proposed turbines. The conclusions of these reports are detailed below.

ESB

ESB identified 1 no. radio link, and 2 no. point to multipoint links within the general vicinity of the Proposed Development site. Once the links were mapped, and their respective requested clearance distances of the 2nd Fresnel zone plus 150m were applied, it was found that 2 no. of the links had one of their end points located on the existing onsite Coomagearlahy 110kV substation which was constructed as part of the original Kilgarvan Wind Farm. It was also noted that 11 no. of the existing Kilgarvan Wind Farm turbines were encroaching on the ESB links and their requested setback distance. It was also found that there were a number of proposed turbines located within the setback distance of the existing links.

The question was asked of ESB whether they had experienced any interference on their links due to the positioning of the exiting turbines. No response was received from ESB. Several reminder emails were issued over the weeks following the initial communication, but no further response was received. The decision was then made to employ the expertise of A.I. Bridges to assess the impact and propose some mitigation measures. A.I. Bridges compiled a report in which they identified that 1 no. proposed turbine had the potential to cause interference to the existing ESB link. The report proposed the provision of a relay mast adjacent to the turbine which has the potential to impact the ESB link. The applicant has committed to constructing this relay mast in order to ensure that no impact is felt on the ESB transmission network. The A.I. Bridges report was also forwarded to the ESB for their comment, and no response was received. The A.I. Bridges report is included within this chapter as Appendix 15-3.

Vodafone

Vodafone identified 6 no. links in the general vicinity of the Proposed Development site. Once the links and their associated requested buffers were applied, it was found that there was some encroachment of proposed turbines into the requested setback buffer zones. Further communication was had with Vodafone regarding these buffers, and the question was asked of Vodafone if there was a possibility of reducing any of the buffer zones. The response from Vodafone clarified that they were requesting an additional 30m buffer on top of the buffer that they had originally requested. Further communication was had with Vodafone and the heights of the relevant masts were requested so a more detailed assessment could be carried out. Based on the further assessments, it was found that there were a number of existing Kilgarvan Wind Farm turbines, as well as some of the proposed turbines encroaching on the buffer zone. The question was asked of Vodafone whether there had been any impact experienced on the links to date due to the existing Kilgarvan Wind Farm, and on that basis if there was any scope to reduce the setback distances. Vodafone confirmed that they did not want to change the buffers that they had supplied to us.

The decision was then made to employ the expertise of A.I. Bridges to assess the potential impact and propose some mitigation measures if needs be. A.I. Bridges conducted further assessments on the proposed turbine locations and the links supplied by Vodafone. It was found that there was 1 no. proposed turbine which had the potential to impact on the Vodafone link. 2 no. mitigation measure solutions were called out by A.I. Bridges as potential solutions to avoid this issue.

1. Relay radio link via an existing Vodafone Mast Site
2. Construction of a relay mast located within the Proposed Development site boundary.

The Applicant has committed to employing one of these techniques before the construction of the proposed turbines. This report has been forwarded on to Vodafone for comment and no response has been received to date. The A.I. Bridges report is included within this chapter as Appendix 15-3.

15.2.4.2.3 Aviation

As noted in Table 15-37 a scoping response was received from the following aviation consultees:

- Kerry Airport
- Department of Defence

No scoping response was received from the Irish Aviation Authority.

Pertinent information has been summarised below relating to the two responses noted above, however the scoping response should be referenced for further detail.

Kerry Airport

In November 2022, a scoping response was received from a representative within Kerry Airport. The representative in question made a phonecall to MKO in which he requested the following information:

- Co-ordinates for 3 no. points along the site boundary representative of the entire site boundary;
- Details on when the existing turbines would be decommissioned during the construction phase, and
- Details of the proposed turbine tip height.

Once this information was received by Kerry Airport, they were satisfied that no impacts would occur on their services, and no mitigation would be needed.

Department of Defence

A scoping response was received from the Department of Defence on behalf of the Air Corps based in Casement Aerodrome in Dublin. It was requested that certain lighting requirements be met by the proposed turbines once they were constructed. The specific requirements were contained within the scoping response, which can be seen in Appendix 2-3 of Chapter 2 of this EIAR.

15.2.5 Likely Significant Effects and Associated Mitigation Measures

15.2.5.1 'Do-Nothing' Scenario

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

15.2.5.2 Construction Phase

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

15.2.5.3 Operational Phase

15.2.5.3.1 *Telecommunications*

Pre-Mitigation Effect

Consultation regarding the potential for electromagnetic interference from the Proposed Development was carried out with the relevant national and regional broadcasters, fixed line and mobile telephone

operators and other operators, which showed that some turbines were located within the desired setback distances of identified links, in particular ESB and Vodafone as detailed in Section 15.2.4.2.2 above.

Mitigation Measures

MKO employed the expertise of A.I Bridges, who compiled specialist reports to identify any remaining issues and propose appropriate mitigation measures. The report received from A.I. Bridges is attached to this chapter as Appendix 15-3 and lists mitigation measures to be implemented such as the construction of relay masts and relaying links to existing mast sites.

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

Residual Effect

With implementation of the above mitigation, the Proposed Development will have no residual impact on the telecommunications signals of any operator.

Significance of Effects

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

15.2.5.3.2 *Aviation*

Pre-Mitigation Effect

The Department of Defence provided some specifications for obstacle lighting which it requested be implemented onsite once the proposed turbines were constructed.

No scoping response was received from the Irish Aviation Authority in relation to this project. However, taking lead from scoping responses which have been received on other similar projects, specific requirements can be made by the IAA in relation to lighting used at the Proposed Development.

Mitigation Measures

The specification for obstacle lighting requested by the Department of Defence will be implemented in full once the proposed turbines have been constructed.

Although none was received in this case, scoping responses from the IAA generally set out lighting requirements as set out above. These requirements will still be complied with for the Proposed Development and any further details will be agreed in advance of construction with the IAA, i.e. crane erection. The coordinates and elevations for the as-built turbines will be supplied to the IAA, as is standard practice for wind farm developments.

Residual Effects

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

Significance of Effects

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

15.2.5.4 Decommissioning Phase

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

15.2.5.5 Cumulative Effect

Chapter 2, Section 2.7 of this EIAR describes the methodology used in compiling the list of permitted or proposed projects and plans in the area (wind energy or otherwise) considered in the assessment of cumulative effects, and provides a description of each project, including current status. There are a number of existing wind farms in the surrounding area, the closest wind farm development Midas Wind Farm) being located directly to the south-southeast of the Proposed Development. There will be no cumulative effects relating to the Proposed Development and surrounding projects in relation to telecommunications providing the mitigation measures as outlined above are implemented and adhered to.

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

15.3 Other Material Assets

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

In order to assess the potential for significant effects on built services and waste management in the vicinity of the Proposed Development, scoping requests were made to EirGrid, Irish Water and numerous sections of both Cork and Kerry County Councils, including Environment and Roads. Refer to Section 2.6 of Chapter 2 of this EIAR for details in relation to the EIA scoping exercise.

No response was received from the Commission for Regulation of Utilities, Water and Energy; Eirgrid, or Irish Water in relation to this Proposed Development. Responses were received from the Roads Department in Cork County Council.

15.3.1 Existing Built Services and Utilities

The Proposed Development does not require the construction of a grid route, as it will be making use of the 110kV overhead line which connects the existing onsite Coomagearlahy 110kV substation to the existing Clonkeen substation. There will be no disturbance to any other electrical infrastructure due to the construction of the Proposed Development.

There are no other overhead cables on the Proposed Development site other than the above-mentioned existing grid connection. Therefore, there are no impacts on overhead electricity lines as a result of the Proposed Development.

There are no other known existing services (i.e. water supply, sewage, telecommunications) present on the Proposed Development Site.

There will be no upgrades to the existing grid connection, so there will be no impact on existing built services and utilities as a result of the Proposed Development.

15.3.2 Waste Management

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

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

During the removal of the existing turbines, the Applicant has committed that none of the turbine materials will be sent to landfill. Instead, the blades will be segmented and removed from the site following the methodology as outlined in Chapter 4 Section 4.3.1.1 of this EIAR. The tower sections will also be removed from site following the methodology as outlined in Chapter 4.

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

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

Further details on waste management are presented in the CEMP which is included as Appendix 4-3.

15.3.3 Likely Significant Effects and Associated Mitigation Measures

15.3.3.1 'Do-Nothing' Scenario

If the Proposed Development were not to proceed, the opportunity to continue to generate renewable energy and electrical supply to the national grid would be lost. 13 no. of the existing turbines will be decommissioned in 2029, as per their planning permission, and the remaining 15 no. turbines will eventually fall into disrepair and require decommissioning.

15.3.3.2 Construction Phase

The construction phase of the Proposed Development is unlikely to have an impact on above ground or underground built services or waste management. The existing turbines will be removed as per the methodology as set out in Chapter 4 Section 4.3.1.1 of this EIAR. Relevant mitigation measures have been set out which will ensure that no adverse impact is felt on built services or waste management

during the construction phase of the Proposed Development. The mitigation measures include the following:

- Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works.
- Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified.
- Excavation permits will be completed, and all plant operators and general operatives will be inducted and informed as to the location of any services.
- The contractor must comply with and standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks.
- In the event that any unmapped overhead lines are encountered along the turbine delivery route, these will be avoided with appropriate precautions and procedures

Residual Impacts

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

Significance of Effects

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

15.3.3.3 Operational Phase

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

15.3.4 Cumulative Impact Assessment

The potential cumulative impact of the Proposed Development and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Development will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans in the area, in the vicinity of the Proposed Development site, as set out in Section 2.7 in Chapter 2 of this EIAR.

As the Proposed Repowering of the Existing Kilgarvan Wind Farm does not include for a new grid connection cabling route to an existing substation, there is no potential for cumulative effects with other proposed or permitted developments on built services. The potential for cumulative effects with any nearby energy developments are not significant from the perspective of waste management.

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