14 MATERIAL ASSETS

Material Assets as defined in the 'Advice Guidelines on the Information to be contained in Environmental Impact Assessment Reports DRAFT' (EPA, 2017) as 'built services and infrastructure'. This includes roads and traffic, electricity, telecommunications, gas, water supply infrastructure and sewerage (built infrastructure)..

This chapter of the EIAR addresses the likely significant effects of the proposed wind farm development (the 'Proposed Development') on transportation infrastructure (Section 14.1 Traffic and Transport) and on Telecommunications and Aviation (Section 14.2), which are economic assets of human origin.

14.1 Traffic and Transport

14.1.1 Introduction

14.1.1.1 Background and Objectives

The purpose of this section is to assess the effects on traffic and transport of the additional traffic movements that will be generated by the Proposed Development. The assessment assesses potential effects during both the construction and operational phases of the Proposed Development. A full description of the proposed project, including construction phasing details, is provided in Chapter 4 of this EIAR.

For developments of this nature, the construction phase is the critical period with respect to the traffic effects experienced on the surrounding road network in terms of both 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 plant. The requirements of the additional traffic and abnormal loads generated during the construction stage were assessed on both the external highway network and at the proposed junctions that will provide access to the site. Locations where remedial measures are required to accommodate the abnormal loads are identified.

The magnitude of the increase in traffic volumes experienced on the surrounding network is identified during the various construction stages of the Proposed Development. A preliminary traffic management plan is also provided in Sections 14.1.7 and 14.1.10.6 aimed at minimising the traffic impact on the local highway network. Refer also to the Construction and Environmental Management Plan (CEMP), Appendix 4.4 of this EIAR, for the Outline Traffic Management Plan.

14.1.1.2 Statement of Authority

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

particular expertise in the assessment of development related traffic and transport modelling, including over 20 wind farm developments, and is an accomplished analyst who has experience of a wide variety of modelling packages and methods.

14.1.1.3 Guidance and Legislation

This section of the EIAR has been completed in accordance with the guidance set out in Chapter 1. The assessment uses standard terminology to describe the likely significant effects associated with the Proposed Development. Further information on the classification of effects used in this assessment is presented in Section 1.8.2 of this EIAR.

14.1.1.4 Scoping & Consultation

The scope of this section of the EIAR has been informed through the scoping and consultation of Transport Infrastructure Ireland and Transport NI. The key scoping response points received from both of these statutory consultees are summarised in Table 2.3 and Table 2.5 in the Chapter 2 of this EIAR.

The key response points from both Transport Infrastructure Ireland and Transport NI are dealt with in this section of the EIAR.

14.1.1.5 Methodology and Section Structure

The report adopts the guidance for such assessments set out by Transport Infrastructure Ireland, or TII, (formerly the National Roads Authority or the NRA) in the document *'Guidelines for Traffic and Transport Assessments, 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 an assessment of 2016 traffic flows and traffic forecasts during an assumed construction year of 2019 (Sections 14.1.2 - Receiving Environment and 14.1.3 – Existing Traffic Volumes),
- A description of the nature of the Proposed Development and the traffic volumes that it will generate during the different construction stages and when it is operational (Section 14.1.4 – Proposed Development and Traffic Generation),
- A description of the abnormally large loads and vehicles that will require access to the site (Section 14.1.5 – Construction Traffic Design Vehicles),
- A review of the effects of development generated traffic on links and junctions during construction and when the facility is operational (Section 14.1.6 –Traffic effects during construction and during operation),
- A geometric assessment of the route and its capacity to accommodate the abnormal loads associated with the development (Section 14.1.7 – Route Assessment),
- An assessment of the provision for sustainable modes of travel (in this case primarily with respect to the transport of construction staff) (Section 14.1.8 – Provision for Sustainable Modes of Travel),
- The description of potential significant effects is provided in Section 14.1.9.

14.1.2 Receiving Environment

14.1.2.1 Site Location

The site of the Proposed Development is located in southeast County Donegal, and is shown in the context of the national and local highway networks in Figure 14.1. The site is located approximately eight kilometres south of Ballybofey, with the western boundary approximately 15 kilometres northeast of Donegal Town. The townlands in which the Proposed Development site is located, including the grid connection route and ancillary works, are listed in Table 1.1 in Chapter 1 of this EIAR.

14.1.2.2 Proposed Abnormal Load Delivery Route

The proposed point of arrival for the wind farm plant has been identified as the port in Killybegs with the delivery route following the N56 secondary road to Donegal, followed by the N15 National Primary road to the proposed site access. The access to the site turns right off the N15 at a point approximately 15 kilometres northeast of Donegal Town and accesses the site via an existing track that provides access to a quarry. It is proposed that this track will be upgraded and will provide access for all materials and plant for up to 19 wind turbines.

The assessment of the abnormal load delivery route, which is discussed in Section 14.1.6, covers the locations on the external and internal networks as shown in Figures 14.5a and 14.5b, while the route assessment is set out in Section 14.6 and shown in associated Figures 14.6 to 14.42.

14.1.2.3 Proposed Construction Traffic Haul Route

The proposed route to the site of the Proposed Development, for general HGV construction traffic, is as per the route proposed for the turbine plant traffic.

14.1.3 Existing Traffic Volumes

It should be noted that traffic volumes are discussed in passenger car units, or 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 loaders required to transport the wind turbine equipment was assigned a value of 10.

14.1.3.1 Background Traffic Flows

A continuous traffic counter is maintained by Transport Infrastructure Ireland (TII) on the N15 between Donegal and Ballybofey, adjacent to the site of the Proposed Development, at Lough Mourne, with the Average Annual Daily Traffic volume (AADT) on the N15 recorded to be 6,904 vehicles, as shown in Table 14.1.

Table 14.1 Average annual daily traffic flow (AADT), 2016 (2-way pcus)

Link	AADT
N15 between Ballybofey and Donegal	6,904

14.1.3.2 Future Background Traffic Volumes

Revised guidelines for forecasting annual growth in traffic volumes were produced by TII in October 2016, as set out by region in the Project Appraisal Guidelines (Unit 5.3 – Travel Demand Projections). The annual growth rates for light vehicles for the Borders Region, including County Donegal, and factors for the years relevant to this study, are shown in Tables 14.2 and 14.3, with traffic volumes forecast to increase during the period from 2016 to 2019 (the assumed construction year) by 3.6%, assuming a medium growth scenario. Year 2016 and 2019 AADT flows on the study area network are compared in Table 14.4.

Table 14.2 TII Traffic Growth Indices by growth scenario and year (Borders Region, including County Donegal)

Year	Lights – Annual Factor			Lights – Cumulative Index		
	Low	Medium	High	Low	Medium	High
2016	1.0088	1.012	1.0131	100.9	101.2	101.3
2017	1.0088	1.012	1.0131	101.8	102.4	102.6
2018	1.0088	1.012	1.0131	102.7	103.6	104.0
2019	1.0088	1.012	1.0131	103.6	104.9	105.3

Source: TII Project Appraisal Guidelines – Unit 5.3

Table 14.3 TII traffic growth rates by growth scenario

Period	New Factors		
	Low	Medium	High
2016 – 2019	1.027	1.036	1.040

Table 14.4 Average annual daily flows by year (2-way PCUs)

Link	2016	2019
N15 between Ballybofey and Donegal	6,904	7,146

TII traffic count data recorded on the N15 was also used to estimate the existing percentage of HGVs on the study area network. The observed percentage of HGVs was 5.8% with volumes on the study network shown in Table 14.5.

Table 14.5 AADT, percentage HGVs and HGV flow, 2019

Link	AADT	% HGV's	HGV flows	Cars / LGV's
N15 between Ballybofey and Donegal	7,146	5.8%	414	6,731

14.1.4 Proposed Development and Traffic Generation

14.1.4.1 Development Trip Generation – During Construction

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

- Stage 1 - Site preparation, groundworks, and grid connection cable laying, and,
- Stage 2 - Turbine construction.

With respect to the traffic impact assessment, assumptions based on typical wind farm construction projects regarding the length of the construction phases and work periods etc. must be made to inform the assessment. These assumptions allow for a worst case scenario assessment but should not be inferred as prescriptive limitations to the construction phase. There are numerous variables which can affect a construction project programme, including weather. The construction phase of the Proposed Development will be carried out in accordance with the CEMP, included as Appendix 4.4 of this EIAR, which will be agreed where required with the Local Authority.

14.1.4.1.1 Stage 1 - Site Preparation ground works and cable laying

The construction phase of the Proposed Development is expected to last approximately 18 months. For assessment purposes 382 working days have been assumed for the site preparation and ground works stage with the total numbers of deliveries made to the site during that period shown in Table 14.6.

During this construction phase there will be two distinct types of days with respect to trip generation. A total of 19 days will be used to pour the 19 concrete wind turbine foundations. Foundations will likely be poured one per day, with circa 60 concrete loads required for each turbine delivered to the site over a 12-hour period, resulting in 5 HGV trips to and from the site per hour. On all of the 382 working days for this stage (including the days that concrete will be delivered to the site), other general materials will be delivered to the site.

During all of Stage 1 it is estimated that 2,033 two-way trips will be made to the site by trucks and large articulated HGVs, as set out in Table 14.6, with the daily effect on the local road network shown in Tables 14.7 and 14.8.

For the purpose of this assessment it is assumed that the underground cabling route, assessed as part of this EIAR, the majority of which will run adjacent to the N15 between the site and the substation at Clogher, will also be laid. While the earth and stones that will be excavated from the trench will be transported to the borrow pits within the Proposed Development site (406 truckloads), it is estimated that 217 truckloads of road make up material will be excavated and will be delivered to a licensed disposal facility remote from the site.

The figures show that on the 19 days that concrete will be delivered to the site an additional 288 two-way pcus will be added to the network (comprising 60 two-way HGV trips with 2.4 PCUs per movement), as shown in Table 14.7. Similarly, on all 382 days when other materials will be delivered to the site, traffic volumes on the local network will increase by an average of 11.2 PCUs, as set out in Table 14.8.

Table 14.6 Stage 1 - Site preparation and groundworks - total movements

Material	Total no. Truck Loads	Truck type
Concrete	1,140	Trucks
Steel	38	Large artic
Removal of tar (cable laying on N15)	217	Trucks
Sand / binding/stone	15	Truck
Ducting	8	Large artic
Cabling	11	Large artic
Tree felling	810	Large artic
Coms / ducting	11	Large artic
Total	**2,250**	

Table 14.7 Stage 1 – Concrete foundation pouring - total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2- way PCUs/day
Concrete	1,140	Truck	2.4	2,736	144.0	288.0
* Estimation based on 19 concrete pouring days						

Table 14.8 Stage 1 – Site preparation and groundworks - total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2- way PCUs/day
Steel	38	Large artic	2.4	91	0.2	0.5
Removal of tar (cable laying on N15)	217	Truck	2.4	520	1.4	2.7
Sand/bind/stone	15	Truck	2.4	36	0.1	0.2
Ducting	8	Large artic	2.4	18	0.0	0.1
Cabling	11	Large artic	2.4	27	0.1	0.1
Tree felling	810	Large artic	2.4	1944	5.1	10.2
Coms ducting	11	Large artic	2.4	27	0.1	0.1
Total	**893**	**-**		**2,144**	**7.0**	**14.0**
* Estimation based on ground work period of 382 working days (18 months)						

14.1.4.1.2 Stage 2 - Turbine Construction

During the turbine construction stage, including delivery and assembly, there will be deliveries to the site made by very large vehicles, referred to in this section as *extended artics*, transporting the component parts of the turbines (nacelles, blades and towers) and there will be deliveries made by normal large HGVs, transporting cables, tools and smaller component parts. The types of load and associated numbers of trips made to the site during the turbine construction period are shown in Table 14.9, which

summarises that a total of 171 trips will be made to and from the site by extended artics, with a further 57 trips made by conventional large articulated HGVs.

Table 14.9 Stage 2 - Wind turbine plant - total movements

Material	Units	Quantity per Unit	Total Quantity	Quantity per Truck	Total Truck Loads	Truck type
Nacelle	19	1	19	1	19	Extended Artic
Blades	19	3	57	1	57	Extended Artic
Towers	19	5	95	1	95	Extended Artic
Sub total					**171**	
Cables/ controllers	19	1	19	1	19	Large Artic
Blade hub	19	1	19	1	19	Large Artic
Tools and generator	19	1	19	1	19	Large Artic
Sub total					**57**	
Total					**228**	

For the purposes of this assessment an assumed delivery period is provided. This delivery period may be subject to change. It is assumed that the turbine delivery element will progress at the rate of approximately 5 extended artic trips made by convoy to the site on approximately 2 days per week, resulting in this stage taking approximately 34 days spread over an assumed 17 week period (generally delivered at night time). On a further two days per week, lasting for approximately 10 weeks, the remaining equipment required during this phase will be delivered to the site. The additional traffic movements for these two types of days are summarised in Tables 14.10 and 14.11. In Table 14.10 a PCU equivalent value of 10 was allocated to each extended artic movement, resulting in an additional 100 PCUs on the study network on these 2 days per week, while an additional 14.4 PCUs are forecast to be on the network on two other days per week, as shown in Table 14.11, during the turbine construction phase.

Table 14.10 Stage 2 - Wind turbine plant, extended artics - total movements and volumes per delivery day

Material	Units	Truck Type	PCU Value	Total PCUs	2-way PCUs/ day
Nacelle	1	Extended Artic	10	10.0	20.0
Blades	3	Extended Artic	10	30.0	60.0
Towers	5	Extended Artic	10	50.0	100.0
Total per turbine	**9**	Extended Artic **-**		**90.0**	**180.0**
Total per delivery day	**5***	Extended Artic	**10**	**50**	**100.0**

* Estimation based on 5 abnormal loads being delivered per day on 2 days per week (total 171 loads will take 34 days over a period of 17 weeks)

Table 14.11 Stage 2 - Wind turbine plant, normal artic HGVs - total movements and volumes per delivery day

Material		Quantity per Unit	PCU Value		PCU Movements/ day**	2-way PCUs / day
Cables / controllers		1	2.4		2.4	4.8
Blade hub		1	2.4		2.4	4.8
Tools and generator		1	2.4		2.4	4.8
Total		**-**	**-**		**7.2**	**14.4**

* Estimation based on equipment for 2 turbines being moved per week spread over 2 days

14.1.4.1.3 Construction Employee Traffic

It is estimated that approximately 70 staff members will be employed on the site at any one time during the site preparation and groundworks stage of construction, reducing to a maximum of 45 staff at any one time during the turbine construction stage. If a worst case 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 70 pcu movements (each trip is two way) will be added to the network during the groundworks stage of the development, reducing to 45 pcu trips during the turbine construction stage.

14.1.4.2 Development Trip Generation – During Operation

It is estimated that the wind farm will be unmanned once operational and will be remotely monitored. The only traffic associated with the operational phase of the wind farm will be from the wind farm developers and maintenance personnel who will visit individual turbines.

It is estimated that the traffic volumes that will be generated by the development once it is operational will be minimal, with a likely 2 staff employed on site. The impact on the network of these trips during the operational stage is discussed in Section 14.1.6.

14.1.5 Construction Traffic Vehicles

14.1.5.1 Construction Traffic Vehicle Types

The delivery of turbine components including blades, tower sections and nacelles is a specialist operation owing to the oversized loads involved. The blades are the longest turbine component and in the case of the Proposed Development, 61.66m blades have been considered for the purposes of this assessment.

The actual turbine to be installed on the site will be the subject of a competitive tender process, and could include turbines not amongst those originally considered as part of this assessment because they are not yet available on the market. Regardless of the make or model of the turbine eventually selected for installation on site, a detailed delivery assessment and program will be carried out by the turbine delivery company and a similar methodology will be adopted as set out here to ensure the findings of this assessment remain valid for whatever model of turbine is selected. Any references to the turbine dimensions in the text below must be considered in the context of the above, and should not be construed as meaning it predetermines the dimensions of any wind turbine that could be used on the site.
The key dimensions are as follows:

Transport of Blades – Articulated HGV with blade

Total length	67.6 m
Length of blade	61.7 m
Inner radius	25.0 m

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

Total length (with load)	46.7 m
Length of load	29 m
Inner radius	25.0 m

The critical vehicles in terms of size and turning geometry requirements, and used in the detailed route assessment discussed in Section 14.1.7 are the blade transporter and the tower transporter vehicles, with the geometry of each shown in Figures 14.2 and 14.3 respectively.

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 and will be significantly smaller than the design test vehicles.

14.1.6 Traffic Effects During Construction and During Operation

14.1.6.1 Traffic Effects During Construction and During Operation

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 direction. While this will be the case for the large turbine component parts, which will all be delivered from Killybegs in the southwest, the other deliveries in reality could be split evenly between both directions on the N15. The following assessment of the impacts on the N15 is therefore based on the worst case scenario, where all traffic generated by the development travels to/from the site from the same direction.

Effect on Link Flows – During Construction

Background traffic volumes and development generated traffic volumes are shown for the three typical construction day scenarios discussed in Section 14.1.4 in Tables 14.12 to 14.15 and are summarised in Tables 14.16 to 14.19. The actual figures presented in the tables will be subject to change, however they are considered a robust estimation of likely effects.

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

During Stage 1 – Concrete Pouring

For 19 days when the concrete foundations are poured simultaneously to general site preparation and groundworks being undertaken on the site, an additional 369 PCUs will travel on the N15 adjacent to the development site. On these days the percentage increase in traffic volumes experienced on the N15 will be 5.2%.

During Stage 1 - Site Preparation and Groundworks

For 363 days, an additional 81 PCUs will travel on the local highway network resulting in a 1.2% increase in traffic volumes on the N15 adjacent to the site.

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

The additional 145 PCUs (made up of cars and large extended artics) will appear on the study network for 34 days. On the days this impact occurs, volumes will increase by 2.0% on the N15 approaching the site.

The most significant traffic impact may be experienced during these days primarily due to the slow speeds, size and geometric requirements of these vehicles. The provision of traffic management measures, included in Sections 14.1.6 and 14.1.10.6 and included in the CEMP, will be required to minimise the impact of development traffic on the study network on these days.

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

For 19 days on the delivery route 60 additional PCUs (made up of cars and normal articulated HGV movements to the site and back) will travel on the study network. On these days the percentage increase on the N15 is estimated to be 0.8%.

Table 14.12 Effects of development traffic during concrete pouring

Link	Background PCUs			Development PCUs			Total PCUs(Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
N17 between Ballybofey and Donegal	6,731	414	7,146	70	302	372	6,801	716	7,518

Table 14.13 Effects of development traffic during site preparation and groundworks

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
N17 between Ballybofey and Donegal	6,731	414	7,146	70	14	84	6,801	428	7,230

Table 14.14 Effects of development traffic during turbine construction - extended artics

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
N17 between Ballybofey and Donegal	6,731	414	7,146	45	100	145	6,776	514	7,291

Table 14.15 Effect of development traffic during turbine construction – other deliveries

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
N17 between Ballybofey and Donegal	6,731	414	7,146	45	15	60	6,776	429	7,206

Table 14.16 Summary effect of development traffic during concrete pouring and site preparation and ground works

Link	Background	Development	Total	% increase	Estimated No. of days
N17 between Ballybofey and Donegal	7,146	372	7,518	5.2%	19

Table 14.17 Summary effect of development traffic during site preparation and groundworks

Link	Background	Development	Total	% increase	Estimated No. of days
N17 between Ballybofey and Donegal	7,146	88	7,230	1.2%	363

Table 14.18 Summary effect of development traffic during turbine construction – extended artics

Link	Background	Development	Total	% increase	Estimated No. of days
N17 between Ballybofey and Donegal	7,146	145	7,291	2.0%	34

Table 14.19 Summary effect of development traffic during turbine construction – other deliveries

Link	Background	Development	Total	% increase	Estimated No. of days
N17 between Ballybofey and Donegal	7,146	60	7,206	0.8%	19

An assessment of the impact on link capacity on the N15 was undertaken for the various construction stages as set out in Tables 14.20 to 14.22 with the capacity for the N15 adjacent to the site shown in Table 14.20, which is estimated to be 11,600 vehicles per day based on road widths and capacities set out in the Transport Infrastructure Ireland Standards document DN-GEO-03031 Road Link Design, Table 6/1. Background, or do nothing traffic flows, are compared to flows forecast for the various construction delivery stages in Table 14.21 with the percentage capacity reached for each stage shown in Table 14.21. Based on this assessment the N15 is forecast to operate within capacity for all stages of the Proposed Development reaching a

maximum of 65% of capacity when the concrete foundations are poured during the construction stage.

Table 14.20 Carriageway width, link type and link capacity

Link	Width (m)	Link type	Link capacity
N17 between Ballybofey and Donegal	7.3	Type S2 single	11,600

Table 14.21 Link capacity and summary of link flows by construction delivery stage

Link	Link capacity	Construction delivery stage				
		Background traffic	Concrete pour	Other site works	Turbine plant	Turbine equipment
N17 between Ballybofey and Donegal	11,600	7,146	7,518	7,230	7,291	7,206

Table 14.22 Link capacity and % of link capacity by construction delivery stage

Link	Link capacity	Construction delivery stage				
		Background traffic	Concrete pour	Other site works	Turbine plant	Turbine equipment
N17 between Ballybofey and Donegal	11,600	62%	65%	62%	63%	62%

Effect on Link Flows – During Operation

Once the Proposed Development is operational it is estimated that there will be 2 staff members employed on site with a similar number of vehicle trips. It is considered that the traffic impact during this phase will be negligible.

Effect on Junctions – During Construction

The capacity of the junction most affected (the existing quarry access on the N15) was assessed 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.

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

Scenarios Modelled

While other junctions and links on the network will experience an increase in traffic volumes passing through them, as discussed previously and as set out in Tables 14.16 to 14.19 above, the worst-case effect will be experienced during peak hours at the junction between the N15 the existing quarry access, when, during peak construction periods, approximately 70 workers (35 cars) will pass through it. It is noted that deliveries of materials to the site will take place during the day after the workers have arrived on site, and before they leave at the end of the day, and will therefore not occur at the same time.

N15 / Quarry Access Capacity Test Results

The PM peak hour traffic flows for the year 2019 without and with construction workers passing through this junction are shown in Figure 14.4, with the capacity results shown in Table 14.23. The results show that additional car trips passing through the junction will have a minor effect, increasing the maximum ratio of flow to capacity (RFC) at the junction from 5.0% to 13.2% for the exit from the quarry access onto the N15, which is well within the acceptable limit of 85%.

Table 14.23 Junction capacity test results, N15 / Quarry access junction, PM peak, without and with construction staff, year 2019

Year	Location	Without construction traffic			With construction traffic		
		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
2019	Exit from Quarry	5.0%	0.05	0.14	13.2%	0.15	0.16
	Right turn off N15 L1927	2.5%	0.03	0.08	2.5%	0.03	0.08

Effect on Junctions – During Operation

As discussed in Section 14.1.6 it is forecast that once operational, the Proposed Development is expected to generate 2 trips per day for maintenance purposes. It is also likely that small numbers of amenity traffic will be attracted to the site, as occurs at present. It is therefore concluded that the Proposed Development will have a negligible effect on the local network once constructed.

Effect on Network of Grid Connection

The additional traffic that will be generated on the N15 due to the excavation of materials as part of laying the grin connection is included in Section 14.1.6 while a detailed assessment of the potential effects on general traffic on the N15 and the local road providing access to the site is set out in Appendix 14.2.

The Proposed Development will be connected to the national grid via existing 110kV Clogher Substation, located approximately 6.2 kilometres south west of the Proposed Development site as shown in Appendix 4.1a of this EIAR. The grid connection cable between the site and the substation will be installed in a trench to the side of the carriageway of the N15 National Primary road.

The connection will be installed by 2 teams, with each team laying approximately 150 metres of cable per day, equating to a total of 300 metres per day. On these days traffic will be controlled with a local "stop – go" system to ensure that all roads remain open at all times.

There are a total of 25 no. watercourse crossings along the public road sections of the grid connection route assessed as part of this EIAR.. There are 3 no. river/stream crossings, the locations of which are shown in Appendix 4.1a, with the remaining crossings being classified as culverts.

As the cable will be set in the hard shoulder of the N15, the 2-way flow of general traffic will be maintained at all times during the 4 month construction period for the cable. On the 1.5 kms of local road between the N15 and the Clogher Substation, minor delays will be experienced by local traffic for up to 11 days.

14.1.7 Traffic Management of Large Deliveries

The greatest effect on the road network will likely be experienced on the approximately 34 days during which the 5 very large loads comprising the tower sections, the blades and the nacelles are delivered to the site.

Traffic management measures are included in Section 14.1.10.6 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 (hedge rows 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 roads authorities, An Garda Síochána Traffic Corp and special permits are generally required.

In some cases, temporary accommodation works are required along the turbine delivery route (TDR) such as hedge or tree cutting, temporary relocation of powerlines/poles, lampposts, signage and local road widening. Any updates to the road will be carried out in advance of turbine deliveries and following consultation and agreement with Donegal County Council.

It is not anticipated that any sections of the local road network will be closed, although there may be delays to local traffic at various locations if the deliveries are made during daylight hours. During these periods it may be appropriate to operate local diversions for through traffic.

At a minimum, all of the deliveries comprising abnormally large loads will be made outside the normal peak traffic periods to avoid disruption to work and school related traffic.

14.1.8 Route Assessment

The turbine component delivery route assessment is confined to locations identified from base mapping and site visits with locations identified for assessment shown on Figure 14.5a for the external road network (from Killybegs to the N15, and on Figure

14.5b for the local internal road network (from the quarry access on the N15 to the site access. For these locations road and junction alignments based on OSI mapping or site survey data were supplied by the project team. A preliminary swept path analysis was then undertaken using Autotrack in order to establish the locations where the wind farm transporter vehicles will be accommodated, and the locations where some form of remedial measure may be required.

External Route Killybegs to N15

Figures 14.6 to 14.23

Location 1 – Bend on N56 east of Straleeney

The swept path analysis undertaken for this location, as shown in Figures 14.6 and 14.7. indicates that the existing geometry will accommodate the proposed turbine vehicles.

Location 2 – Bend on N56 north of Castlereagh

The swept path analysis undertaken for this location, as shown in Figures 14.8 and 14.9, indicates that the existing geometry will accommodate the proposed turbine vehicles.

Location 3 – Bend on N56 through Bruckless

As indicated in Figures 14.10 and 14.11 the assessment indicates that the existing bend through Bruckless will accommodate the proposed turbine vehicles.

Location 4 – Bend on N56 east of Bruckless

This location has undergone recent improvement works and the swept path analysis shown in Figures 14.12 and 14.13 indicates that the revised alignment will accommodate the proposed turbine vehicles.

Location 5 – Bend on N56 between Bruckless and Beaugreen

The preliminary assessment shown in Figures 14.14 and 14.15 indicates that the blade may require to overhang the carriageway edge on the western side of the N56, and that some minor accommodation works within the curtilage of the public road corridor may be required. A more detailed assessment and 'dry run' will be undertaken by the selected turbine manufacturer prior to the delivery stage.

Locations 6 and 7 – Bends on N56 west and east sides of Dunkineely

As indicated in Figures 14.16 to and 14.19 the assessment indicates that the existing bends on the west and east sides of Dunkineely will accommodate the proposed turbine vehicles.

Locations 8 and 9 – N56 / R925 roundabout & N15 Drumlonagher Roundabout

The preliminary swept path analysis undertaken for the 2 roundabouts either side of Donegal, as set out in Figures 14.20 to 14.23, show that some very minor, temporary over runs may be required at both locations in order to accommodate the proposed turbine vehicles.

Internal Route via quarry road to site access

Figures 14.24 to 14.39

Location B1 – N15 / quarry road junction

This location will require significant remedial work in order to accommodate the turbine plant vehicles with the proposed junction layout shown and vertical cross-sections shown in Figures 14.24 and 14.25 respectively. The autotrack assessment shown in 14.26 and 14.27 shows that the proposed junction and over-run area will accommodate the proposed turbine vehicles.

The horizontal visibility splays along the N15 for the 100 kph speed limit, are 220 metres taken from a setback of 3 metres, as required by the TII guideline Geometric Design of Junctions (DN-GEO-03060), as shown in Figure 14.24. While the full splay is available to the northeast, remedial works will be required, including the alteration of an existing wall, in order that the full splay is available to the southwest.

The vertical cross section shown in Figure 14.25 shows that to the north east the vertical alignment taken from a subject height of 1.05 meters to the same object height is clear up to the required distance of 220m, in accordance with revised objects heights specified by Transport Infrastructure Ireland (TII) in Rural Road Link Design DN-GEO-03031. To the south west the horizontal curvature in the existing carriageway results in the minimum object height of 1.05 metres being visible up to a distance of 180 metres, with an object height of 1.5m being visible at a point 220 metres away. This is considered acceptable and within limits of acceptable relaxations of standards as set out by the TII in Section 4.4 of DN-GEO-03031.

Plate 6 Location B1 - Junction between N15 and quarry road

Plate 7 Location B1 - Junction between N15 and quarry road – visibility looking west

Plate 8 Location B1 - Junction between N15 and quarry road – wall located to the west of junction which will be avoided

Plate 9 Location B1 - Junction between N15 and quarry road – visibility looking east

Between B1 and B2 – S-bend and incline on Quarry Road

This location will require remedial work in order to accommodate the turbine plant vehicles, both in the horizontal plane (as shown in Plate 10) and in the vertical plane.

Plate 10 Location between B1 and B2 – Sharp S-ben and steep incline on quarry road east of N15

Location B2 – sharp right turn on Quarry Road

This location will require remedial work in order to accommodate the turbine plant vehicles as shown in Figures 14.28 and 14.29 for the blade and turbine transporter vehicles respectively.

Plate 11 Location B2 – Sharp right turn on quarry road east of N15

Plate 12 Location B2 – Sharp right turn (through gate) on quarry road

Locations B3 – to B7 on quarry road junction

As shown in Figures 14.30 to 14.39, remedial measures will be required at all further locations on the internal access route (Locations B3 to B7) to accommodate the wind turbine plant vehicles.

It is noted that, while the route between locations B2 and B3 is relatively flat, there are significant sheer drops immediately to the west of the route on this section of the proposed access route. Works will be required in order to negotiate this section of the route, up to and including the bend at location B3, which will require filling in order that the wind turbine vehicles may negotiate the existing sharp bend, as shown in Figures 14.30 and 14.31.

Plate 13 Between locations B2 and B3 – Existing track

Plate 14 Approaching B3 – Sharp right turn

Plate 15 Approaching B3 – Sharp right turn – significant drop to the west of the existing track

Plate 16 Looking south of location B3

Access junctions on the L6554

Location B8 – Delivery exit onto the L6554

The proposed junction onto the L6554, together with the visibility splay that will be kept clear of all obstruction at all times during which times the exit is in use are shown in Figure 14.40. As it is proposed that some of the empty HGV's will exit the site via this

location during the construction stage, a 10.5 metre radius is provided on the western corner. An autotrack showing a typical HGV will be accommodated making this manoeuvre is shown in Figure 14.41.

Location B9 – Recreational access onto the L6554

It is proposed that members of the public visiting the site for recreational purposes, during the operational phase, will access the site via this junction located on the L6554. The junction layout and visibility splay that will be kept clear of all obstacles during the construction and operational phases of the Proposed Development are shown in Figure 14.42.

14.1.9 Provision for Sustainable Modes of Travel

14.1.9.1 Walking and Cycling

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

14.1.9.2 Public Transport

There are no public transport services that currently pass the site although mini-buses may be considered for transporting staff to and from the site in order to minimise traffic generation and parking demand on site.

14.1.10 Likely and Significant Effects and Associated Mitigation Measures

14.1.10.1 "Do Nothing" Scenario

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

14.1.10.2 Construction Phase

During the 19 days when the concrete foundations are poured at the same time as general site preparation and groundworks are progressing, the effect on the surrounding road network will be negative, resulting in an increase in traffic levels of 5.2% on the N15 adjacent to the site access. The effect will be temporary, lasting for 19 days, and will be moderate.

During the remaining 363 days for the site preparation and ground works, including the grid connection cabling works, when deliveries to the site will take place, the effect on the surrounding road network will be negative, resulting in an increase in traffic levels of 1.2% on the N15 adjacent to the site. The effect will be temporary, lasting for 363 days, and will be slight.

During the 19 days of the turbine construction stage when general materials are delivered to the site, the delivery of construction materials will result in a negative impact on the surrounding road network, increasing traffic levels of 0.8% on the N15. The effect will be temporary, and will be imperceptible.

During the 34 days when the various component parts of the wind turbine plant are delivered to the site using extended articulated HGVs, the effect of the additional traffic on these days will be moderate due to the size of vehicles involved, resulting in increased traffic volumes of 2.0% on the N15, but will be temporary. The effect may be

reduced to slight if the delivery of oversized loads is undertaken at night, as is frequently the case for abnormally large loads.

It was determined that the N15 will operate within operational capacity for all days within the construction period.

14.1.10.3 Operational Phase

During the operational phase the effect on the surrounding local highway network will be negative and long term, but will be imperceptible given that there will be only 2 staff members on site, resulting in typically 2 visits to the site on any one day made by a car or light goods vehicle. There will also be low volumes of amenity traffic generated by the site.

14.1.10.4 Decommissioning Phase

The design life of the wind farm is 30 years after which time a decision will be made to determine whether or not the turbines will be replaced by new turbines or if decommissioning will occur. If the site is decommissioned, cranes will disassemble each turbine tower and all equipment.

All infrastructure including turbine components will be separated and removed off-site for re-use, recycling and waste disposal.

It is proposed that turbine foundations and hardstanding areas will be left in place and covered with soil/topsoil. It is proposed to leave the access roads in situ at the decommissioning stage. It is considered that leaving the turbine foundations, access tracks and hardstanding areas in situ will cause less environmental damage than removing and recycling them. However, if removal is deemed to be required all infrastructure will be removed with mitigation measures similar to those during construction being employed. The amenity facilities within the wnd farm site will be out of use during the decommissioning phase and therefore will not generate additional traffic.

14.1.10.5 Cumulative Effects

A detailed assessment of all developments at varying stages in the planning process (from pre-planning to operational), is set out in Section 2.2 of this EIAR, with an assessment of the potential cumulative traffic effects with the proposed subject Wind Farm assessed on the following criteria;

- Project status (proposed to operational)
- Degree of overlap with the cabling route from the Drumnahough substation, proposed under Pl. Ref 17/505/43 & ABP Ref. PL05E.248796, on the highway network (low to high)
- Traffic volumes (low to high)

It is noted that traffic generated by the existing quarry adjacent to the site is included in background traffic volumes on the N15.

The development or activities that were considered to have potential cumulative impacts with the proposed wind farm development in terms of traffic impacts are set out below and summarised in Table 14.24.

1 Clogher Substation – This existing substation is located approximately 6.2 kilometres south west of the proposed access (existing quarry access) off the N15 to the subject site. While there may be a number of maintenance trips to and from the

substation while the proposed wind farm and associated grid connection is being constructed, the number of maintenance trips will be low. It is therefore considered that the cumulative traffic effects between the existing Clogher substation and the proposed Meenbog Wind Farm development will be imperceptible.

2 Peat Extraction / Rock Extraction - Peat extraction and rock extraction from the quarry located adjacent to the site occurs at present and will continue in the future with or without the proposed wind farm in place. As traffic movements relating to peat or rock extraction activity were included in background traffic levels, there will be no additional cumulative traffic effects between it and the proposed Meenbog Wind Farm.

3 Forestry / Tree Felling – Similar to peat extraction, forestry and tree felling activity takes place at present and will continue in the future with or without the proposed wind farm. It is noted that traffic movements relating to this activity contributed to background traffic levels, but there may be cumulative traffic effects between forestry operations locally and the proposed Meenbog Wind Farm. It is likely that Coilte will postpone scheduled tree felling during the construction stage. During the operational phase, which is when most of the forestry operations will be occurring i.e. over the 30 year life of the project, the effects will be imperceptible as the proposed wind farm generates very low traffic numbers for the majority of its lifetime.

If it is assumed that tree felling takes place in coups of 20 hectares at a time, generating approximately 200 HGV movements over 10 working days (or 20 HGV movements daily) the cumulative impact on these days is forecast to be slight even if it occurs during the construction phase of the Proposed Development.

It should be noted that additional tree felling required for the proposed wind farm development site works is included in the direct impacts assessed previously in this section.

Table 14.24 Summary of projects considered in cumulative assessment and potential for cumulative traffic effects with proposed Meenbog Wind Farm

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential cumulative traffic effects
1 Clogher Substation	Operational	High	Low	Imperceptible
2 Peat/Rock Extraction	Operating	Not relevant	Not relevant	None (Included in background traffic levels)
3 Forestry / Tree Felling	Operating	High	Low	Slight

14.1.10.6 Mitigation Measures

This section summarises the mitigation measures to minimise the effects of the proposed Meenbog Wind Farm development during both the construction and operational stages.

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 14.1.2.2; and,
- The majority of gravel and stone material being obtained from a borrow bit located within the site boundary.

Mitigation Measures During the Construction Stage
The successful completion of this project will require significant coordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction stage of the project in order to minimise the effects of the additional traffic generated by the Proposed Development. The range of measures will include the following which are also set out in the CEMP Section 4.11, Outline Traffic Management Plan;

A detailed Traffic Management Plan (TMP), incorporating all the mitigation measures set out in the Outline TMP submitted as part of the CEMP, included in Appendix 4.4 of this EIAR, will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the roads authority and An Garda Síochána prior to construction works commencing on site. The detailed TMP will include the following:

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

Delivery Programme – a programme of deliveries will be submitted to Donegal County Council in advance of deliveries of turbine components to site.

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

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

Liaison with the relevant local authority - Liaison with the relevant local authority 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 14.1.8.

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

Travel plan for construction workers – While the assessment above has assumed the worst 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.

Temporary traffic signs – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including the access junction on the N15. All measures will be in accordance with the *"Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works"* (DoT now DoTT&S) and "Guidance for the Control and Management of Traffic at Roadworks" (DoTT&S). A member of construction staff (flagman) will be present at key junctions during peak delivery times.

Delivery times of large turbine components - The management plan will include the option to deliver the 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 wheel washing facilities on site and 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.

Road Opening Licence – Roads works associated with the grid connection cabling will be undertaken in line with the requirements of a road opening licence as agreed with Donegal County Council.

Trench Reinstatement - Trenches on public roads, once backfilled, will be temporarily reinstated to the satisfaction of the roads authority. Following temporary reinstatement of trenches sections of public roads along which the cable route travels will receive a surface overlay subject to agreement with the roads authority.

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

Mitigation Measures During Decommissioning Stage
In the event that the Wind Farm is decommissioned after the 30 years of operation, a decommissioning plan, including material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning of the wind farm.

14.1.10.7 Residual Impacts

Construction Stage
During the 18 month construction stage of the Meenbog Wind Farm development, it is forecast that the additional traffic that will appear on the delivery routes indicated in Figures 14.5a and 14.5.b will have a slight to moderate and temporary impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Road works required to lay the grid connection cable will generally be installed in a trench at the side or in the corridor of the road, which will result in local, short term delays to traffic. It is unlikely that any road closures will be required. While traffic delays will be incurred resulting in a slight, temporary impact on local traffic, and potentially on local businesses, it is noted that only a short section of the cable route, and the trips that pass through it, will be affected each day.

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

Decommissioning Stage
As stated above, in the event that the Wind Farm is decommissioned a decommissioning plan will be prepared and implemented in order to minimise the residual impacts during this stage.

14.2 Telecommunications and Aviation

14.2.1 Introduction

This section of the EIAR addresses the potential impact of the Proposed Development with regards to telecommunications and aviation. Section 14.3.2 below provides details regarding the way in which wind turbines can potentially interfere with telecommunications or aviation signals. Section 14.2.3 presents details regarding the way in which such impacts will be avoided.

14.2.1.1 Methodology and Guidance

This section of the EIAR has been prepared in line with the guidance set out by:

- *'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements'* (EPA, 2003)
- *'Guidelines on the Information to be contained in Environmental Impact Statements'* (EPA, 2002)
- *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports DRAFT'* (EPA, 2017)

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 above 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 this EIAR.

The assessment of likely significant effects on material assets uses the standard methodology and classification of effects as presented in Section 1.8.2 of this EIAR. The full project description, including proposed turbine locations and elevations, is provided in Chapter 4.

14.2.1.2 Statement of Authority

This section of the EIAR has been prepared by Lorraine Meehan (B.Sc. Env.), Environmental Scientist with McCarthy Keville O'Sullivan Ltd. Lorraine has over 9 years' experience in the preparation of EIARs, including the assessment of likely significant effects on material assets. She has coordinated the scoping and consultation exercise with telecommunications operators and aviation authorities for numerous wind energy developments, and prepared the relevant sections of the EIARs.

14.2.2 Background

14.2.2.1 Broadcast Communications

Wind turbines, like all large structures, have the potential to interfere with television or radio signals by acting as a physical barrier to microwave links. The most significant effect at a domestic level, relates to a possible flicker effect caused by the moving rotor, particularly on television signals. The most significant potential effect occurs where the wind farm is directly in line with the transmitter radio path.

14.2.2.2 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.

14.2.2.3 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. These effects are generally easily dealt with by detailed micro-siting of turbines in order to avoid alignment with signal paths or by the use of divertor relay links out of line with the wind farm.

14.2.3 Preventing Electromagnetic Interference

14.2.3.1 National Guidelines

The 'Wind Energy Development Guidelines for Planning Authorities' (Department of the Environment, Heritage and Local Government, 2006) 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; full details are provided in Section 2.6. of this EIAR.

14.2.3.2 Scoping and Consultation

As part of the scoping and consultation exercise, MKO contacted the relevant national and regional broadcasters, fixed and mobile telephone operators, aviation authorities and other relevant parties. Consultation was also carried out with ComReg in order identify any other additional licensed operators in the vicinity of the site to be contacted, who may not have been on the list of main operators. The telecommunications and aviation consultees are presented below in Table 14.25.

Table 14.25 Telecommunications and Aviation Scoping Responses

Consultee	Response	Potential Interference Flagged?
Airspeed	Email received 25th Oct. 2016	No
Broadcasting Authority of Ireland	Email received 5th Dec. 2016	No
BT Communications Ireland	Email received 21st Oct. 2016	No
ComReg (Commission for Communications Regulation)	Email received 20th Oct. 2016	No
Department of Defence	Email received 1st Jan. 2017, 18th Jan. 2017 and 3rd March 2017	No impact due to natural topography
Eir	Email received 26th Oct. 2016	Highlighted local link, but this was found to be outside the Proposed Development site – No other potential interference
EMR Solutions	Email received 11th Nov. 2016	No
Imagine Comunications	Email received 9th Dec. 2016	No
Irish Aviation Authority	No response received as of 31st October 2017	-
Mayo County Council Telecoms Section	Email received 25th Oct. 2016	Provided microwave link details in area – These links were found to be outside the area where turbines are proposed.
Mayo County Council Telecoms Section	Email received 25th Oct. 2016	Highlighted local link, but this was found to be outside the Proposed Development site – No other potential interference
Meteor Mobile Communications (now Eir)	Email received 13th Dec. 2016	One link was highlighted. Clearance buffer was agreed. No other issue.
RTE Transmission Network (2rn)	Email received 21st Oct. 2016	Highlighted local links, but these were found to be outside the Proposed Development site – No other potential interference
Tetra Ireland Communications (emergency services)	Email received 9th Dec. 2016	No

Consultee	Response	Potential Interference Flagged?
Three Ireland (now includes O2 Ireland)	Email received 21st Oct. 2016, Contact by phone 12th Jan. 2017	Highlighted local link, but this was found to be outside the Proposed Development site – No other potential interference
Towercom	No response received as of 31st October 2017	
TV3	No response received as of 31st October 2017	
UPC Communications Ireland	No response received as of 31st October 2017	
Viatel	Email received 21st Oct. 2016	No
Vodafone Ireland	Email received 30th Dec. 2016 and 4th Jan. 2017	Highlighted local link, but this was found to be outside the Proposed Development site – No other potential interference

The scoping responses from the telecommunications and aviation consultees are summarised below. Copies of scoping responses are provided in Appendix 2-1.

14.2.3.2.1 Broadcasters

RTE Television Network Radio Telefís Éireann Transmission Network Ltd, now 2RN responded by email on the 21st October 2016. Having reviewed the location of the Proposed Development, a link running from Truskmore, Co. Sligo to Holywell Hill, Co. Donegal via Barnesmore Gap was identified. However, this microwave link path had sufficient clearance for the northwest boundary of the wind farm site. Therefore, no interference was anticipated.

14.2.3.2.2 Telephone and Broadband Operators

The response from An Garda Síochána, on the 20th December 2016, confirmed that the Proposed Development would not present any problems to their communication provider, Tetra Ireland.

Airspeed Communications Ltd. responded on the 25th of October 2016 with coordinates for end points of local links, thus confirming that the Proposed Development would pose no problems for their network.

EMR Solutions responded by email on the 11th November 2016 with coordinates for end points of local links, thus confirming that the Proposed Development would pose no problems for their network.

Viatel Ireland confirmed by email, on the 21st October, 2016, that the proposed windfarm would have no impact on their network.

Mayo County Council responded by email, on the 25th October, 2016, with coordinates for end points of local links, thus confirming that the Proposed Development would pose no problems for their network.

BT Communications Ireland (Three Ireland Ltd.) responded by email, on the 21st October, 2016 with information on local network links. Following further consultation it was confirmed that no links would be impacted.

Eir responded by email on the 26th October, 2016, with coordinates for end points of local links, thus confirming that the Proposed Development would pose no problems for their network.

Meteor (now Eir) responded by email on the 13th December 2016 confirming the presence of one link in the area. The coordinates of these links were forwarded for mapping purposes and taken into account in the design layout of the Proposed Development.

Vodaphone responded by email on the 30th December, 2016, and the 4th January 2017 with coordinates for end points of a link near the Proposed Development, but confirming that the Proposed Development would pose no problems for their network.

14.2.3.2.3 Aviation

The Department of Defence scoping response stated that having consulted with the Irish Air Corps, they would request that the Proposed Development meet with their standard lighting requirements for wind farms. These are:

1. *Single turbines or turbines delineating corners of a wind farm should be illuminated by high intensity obstacle lights.*
2. *Obstruction lighting elsewhere in a wind farm will be of a pattern that will allow the hazard be identified and avoided by aircraft in flight.*
3. *Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment. Obstruction lighting fitted to obstacles must emit light at the near Infra-Red (IR) range of the electromagnetic spectrum specifically at or near 850nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light.*

In relation to clearance from the N15 route, they also stated that the Proposed Development would be elevated and shielded by the natural geographical feature of Barnesmore Gap, and so would not have a significant impact on Air Corps operations.

No scoping response was received from the Irish Aviation Authority during the initial consultation exercise or following circulation of the proposed turbine coordinates in December 2016.

14.2.3.2.4 Other Consultees

TETRA Ireland Communications (Emergency Services radio network) stated that the Proposed Development poses no network or coverage concerns.

The Broadcasting Authority of Ireland (BAI) response stated that there are no issues from wind farms on existing FM networks, and that the Proposed Development is not located close to any existing or planned FM transmission sites.

14.2.3.3 Potential Telecommunication Impacts and Associated Mitigation Measures

14.2.3.3.1 '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.

14.2.3.4 Construction Phase

The potential for electromagnetic interference from wind farms occurs only during the operational phase of the development. There are no electromagnetic interference impacts associated with the construction phase of the Proposed Development, and hence no mitigation required.

14.2.3.5 Operational Phase

14.2.3.5.1 Telecommunications

Pre-Mitigation Impact

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 aviation authorities. The existence of point-to-point wireless radio links through the site was highlighted by Meteor and BT Communications Ireland Ltd. (Three Ireland Ltd.) in their scoping response.

Further consultation was then undertaken with these operators, who confirmed that the location of turbines would not interfere with national and regional broadcasters, fixed line and mobile telephone operators and aviation authorities.

Mitigation Measures

In the event of further scoping responses being received from the EIA consultees, the comments of the consultees and any proposed mitigation measures will be considered in the construction and operation of the Proposed Development, subject to a grant of planning permission.

In the event of interference occurring to telecommunications, the Department of the Environment, Heritage and Local Government Wind Farm Planning Guidelines (2006) state that these effects are generally easily dealt with by the use of divertor relay links out of line with the wind farm.

Residual Impact

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

Significance of Effects

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

14.2.4 Cumulative Impact Assessment

Section 2.7 of this EIAR describes the methodology used in compiling the list of projects considered in the assessment of cumulative effects, and provides a description of each project, including current status. Although there are two wind farms within 5 kilometres of the Proposed Development (existing Lough Golagh Wind Farm and permitted Straness Wind Farm), there will be no cumulative impacts relating to the

Proposed Development and surrounding projects in relation to Telecommunications or Aviation.

During the development of any large project that holds the potential to effect telecoms or Aviation, the Developer is responsible for engaging with all relevant Telecoms Operators and the relevant the 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 mitigatory measures are in place. Therefore, as each project is designed and built to avoid impacts arising, a cumulative impact cannot arise.

14.2.5 Summary

A comprehensive scoping and consultation exercise was carried out with the main telecommunications operators and aviation bodies, plus other regional operators identified by ComReg as operating within ten kilometres of the Proposed Development site. Only one operator, Meteor, flagged a potential interference issue. This impact was mitigated by design, by ensuring the proposed turbine locations were beyond the potential interference zone.

The obstacle warning light scheme required for tall structures by the Irish Air Corps and the Irish Aviation Authority will be agreed ahead of turbine construction, as is standard for permitted wind farms.

The Proposed Development will have no significant effects on telecommunications or aviation.