14. MATERIAL ASSETS

Material Assets are defined in the '*Advice Notes for Preparing Environmental Impact Statements'* (EPA, Draft 2015) as "*resources that are valued and that are intrinsic to specific places" and 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 roads infrastructure.*" They may be either of human or natural origin. The cultural assets of Archaeology and Cultural Heritage are addressed in Chapter 12 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: Hydrology and Hydrogeology, and Chapter 10: Air and Climate. Tourism and amenity resources, which are also considered material assets, are addressed in Chapter 5: Population and Human Health. Waste management which is also considered under the heading of material assets by the above EPA documents, is summarised in Section 4.3.11.7 of Chapter 4 of the EIAR and considered in Section 14.3 below. Traffic volumes generated by the removal of waste from the site of the Proposed Development to fully authorised waste facilities, are considered in Section 14.1 below.

This chapter of the EIAR addresses the likely significant effects of the Proposed Development on transportation infrastructure (Section 14.1 Traffic and Transport) and on Other Material Assets (Section 14.2), which are economic assets of human origin. This chapter of the EIAR has been prepared in accordance with the requirements of the EIA legislation and guidance outlined in Section 1.7 of Chapter 1 of this EIAR.

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 roads and traffic 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 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 delivery of wind turbine components. The requirements of the additional traffic and abnormal sized loads generated during the construction stage were assessed on both the external road network and at the junction of the local road (L59296) that will provide access to the site.

It should be noted that abnormal weight loads are not a feature of the turbine delivery vehicles, they are abnormal in size only. All construction and delivery vehicles for the Proposed Development will be subject to the standard axle weight requirements set out under Road Traffic (Construction and Use of Vehicles) Regulations 2003 (S.I. No. 5 of 2003), as amended, and therefore the loadings from construction traffic will not exceed the relevant standards. Notwithstanding the need to use some specialist vehicles to facilitate turbine delivery, it should be noted that the number of load-bearing axles for any specialist vehicles carrying large loads are designed to ensure that the load on any one axle does not exceed acceptable load bearing statutory limits. Therefore, the structural integrity of the national and regional road network used during the construction of the Proposed Development is adequate to provide for these accepted loads.

The magnitude of the increase in traffic volumes experienced on the surrounding network is identified during the various construction stages of the proposed development. Traffic management measures are

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 Appendix 14-2 for the Traffic Management Plan (TMP).

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, including many consented wind farm developments including the following; Ardderoo, Derrinlough, Knocknamork, Meenbog, Shehy More, Cloncreen, Ballyhorgan, Cahermurphy, Lettergull, Barnadivane, Cleanrath and Knocknalough.

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

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

14.1.1.3 Guidance and Legislation

This section has been completed in accordance with the guidance set out in Chapter 1 of this EIAR. The assessment uses standard terminology (refer to Table 1-2 of Chapter 1 of the EIAR) 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 of this EIAR. See also Section 14.1.1.4 below for additional guidance that has been adhered to.

14.1.1.4 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as outlined in Sections 2.6 and 2.7 of Chapter 2 of the EIAR and summarised below.

Transport Infrastructure Ireland

Transport Infrastructure Ireland (TII) responded to Scoping on the 30th March 2021 in which it provided a list of recommendations to be followed when preparing the EIAR. All relevant TII guidelines and policies have been taken into account in the preparation of this assessment, including the following;

- PE-PDV-02045, Transport Assessment Guidelines, Transport Infrastructure Ireland, May 2014

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

Automatic Traffic Count (ATC) data was also referenced for the year 2019 (pre Covid 19) from sites maintained by TII and downloaded from their website along the Turbine Delivery Route (TDR), which are discussed further in Section 14.1.1.1.

Mayo County Council

Mayo County Council responded to the scoping request on 16th June 2021. The Roads Department commented on the following issues:

- An assessment of the structural capacity of the local road network adjacent to the proposed wind farm will be required, which should include Falling Weight Deflectometer (FWD) and visual assessments,
- Structural road pavement improvements identified from the FWD and visual assessments will be required in advance of any construction, and following completion, if required,
- The proposal to construct the grid connections along the local road network and N59 is not acceptable as it has the potential to undermine the structural capacity of the roads concerned. A private wayleave should be secured.
- Details of any significant additional strengthening and widening of the public road along the haul route should be provided, with works undertaken in advance of any construction works commencing.
- Any pavement damage caused by construction traffic / activities must be repaired to the satisfaction of Mayo County Council.

14.1.1.5 Methodology and Section Structure

The traffic and transport assessment takes cognisance of guidance for such assessments set out by Transport Infrastructure Ireland (TII) (listed in Section 14.1.1.4 above). . The geometric requirements of the turbine delivery vehicles were assessed using Autocad and Autotrack, with this element undertaken by Collett & Sons Ltd.

The Traffic and Transport Section of this chapter 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 observed traffic flows from 2019 and 2021, and traffic forecasts for an assumed construction year of 2028 (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 likely generate during the different construction stages and when it is operational and during decommissioning (Section: 14.1.4 – Proposed Development and Traffic Generation).
- A description of the abnormally sized loads and vehicles that will require access to the site (Section 14.1.5 – Construction Traffic Design Vehicles).
- A review of the likely increases in traffic volumes due to development generated traffic on links and junctions (Section 14.1.6 – Expected Traffic during Construction, during Operation and during Decommissioning.
- Identification of traffic management for large deliveries during construction and decommissioning (Section 14.1.7 – Traffic Management for Large Deliveries).

- A geometric assessment of the turbine delivery route and its capacity to accommodate the abnormal-sized loads associated with the Proposed Development (Section 14.1.8 – Abnormal Load Route Assessment).
- An assessment of the provision for sustainable modes of travel (in this case primarily with respect to the transport of construction staff) (Section 14.1.9 – Provision for Sustainable Modes of Travel).
- An assessment of the effects of the Proposed Development on roads and traffic (Section 14.1.10 – Likely and Significant Effects and Associated Mitigation Measures, including Traffic Management Plan).

14.1.2 Receiving Environment

14.1.2.1 Site Location

The Proposed Development, known as Sheskin South Wind Farm, is located in north Co. Mayo, in the townlands listed in Table 1-1 of Chapter 1: Introduction.

The Proposed Development site is located approximately 6km east of Bangor Erris and 20km west of Crossmolina. The Proposed Development site entrance is located on the L52926 approximately 3 km north of the junction with the N59 National Secondary Road. The site location is shown on Figure 1-1 of the EIAR.

14.1.2.2 Proposed Abnormal Size Load Delivery Route (Turbine Delivery Route)

A detailed assessment of the transport route for the abnormally large vehicles (TDR) was carried out. The TDR commences from the proposed port of entry in Galway City, with the route shown in Figure 14-1 and discussed in detail in Section 14.1.8.

The route assessment includes 21 no. locations, on the TDR, that were subject to geometric assessment, as shown on Figures 14-2a, 14-2b, 14-2c and 14-2d, and are as follows.

- Location 1 - The assessment locations include the left turn from Monivea Road onto Connolly Avenue
- Location 2 - The right turn from Connolly Avenue onto the Tuam Road (R336) in Galway City.
- Location 3 - The right turn from the Tuam Road (R336) onto the N6 in Galway City.
- Location 4 - The left turn on the N6 through the Coolagh Roundabout in in Galway City.
- Locations 5 and 6 - The Kilmore and Mountpotter Roundabouts on the Tuam Bypass respectively.
- Locations 7 and 8 - The route then heads north for approximately 60 km on the N17 through the villages of Milltown, Ballindine, Knock and Killkeely before accessing the N17 / N5 Bracklagh Roundabout (Location 7) and the N17 / N5 westbound slip road (Location 8) located to the south of Charlestown.
- Location 9 - The route then heads west on the N5 for approximately 30 km before turning right onto the N58 at Ballyvary.
- Locations 10, 11 and 12 through Foxford - The TDR then heads north for approximately 12 km on the N58 to the town of Foxford, where the route negotiates the urban network via the N58 / N26 junctions and the River Moy Bridge crossing.
- Locations 13, 14 and 15 through Ballina - From Foxford the route travels north on the N26 for approximately 17 km to Ballina where the town will be negotiated at the junctions between the R314 Killala Road / Sli Ectra (Location 13), Sli Ectra / L1119 McDermott Street (Location 14) and the Gurteens Roundabout (Location 15).

Map Legend

- EIAR Site Boundary
- Proposed Transport Delivery Route
- Alternative Route for Construction Traffic

N

Ordnance Survey Ireland Licence No. AR 0021820© Ordnance Survey Ireland/Government of Ireland

Drawing Title

Overall Turbine Delivery Route

Project Title

Sheskin South Wind Farm Co. Mayo

Drawn By	Checked By
DOS	EM
Project No.	**Drawing No.**
201119	14-1
Scale	**Date**
1:400,000	2023-02-27

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91VW84
+353 (0) 91735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

348276-070C1.1 (L6)

348276-057C1.1 (L5)

348276-050C1.1 (L2)

348276-055C1.1 (L3)

348276-045C1.1 (L1)

348276-056C1.1 (L4)

Map Legend

- EIAR Site Boundary
- Proposed Transport Delivery Route
- Route Assessment Points

Ordnance Survey Ireland Licence No. AR 0021820© Ordnance Survey Ireland/Government of Ireland

Drawing Title

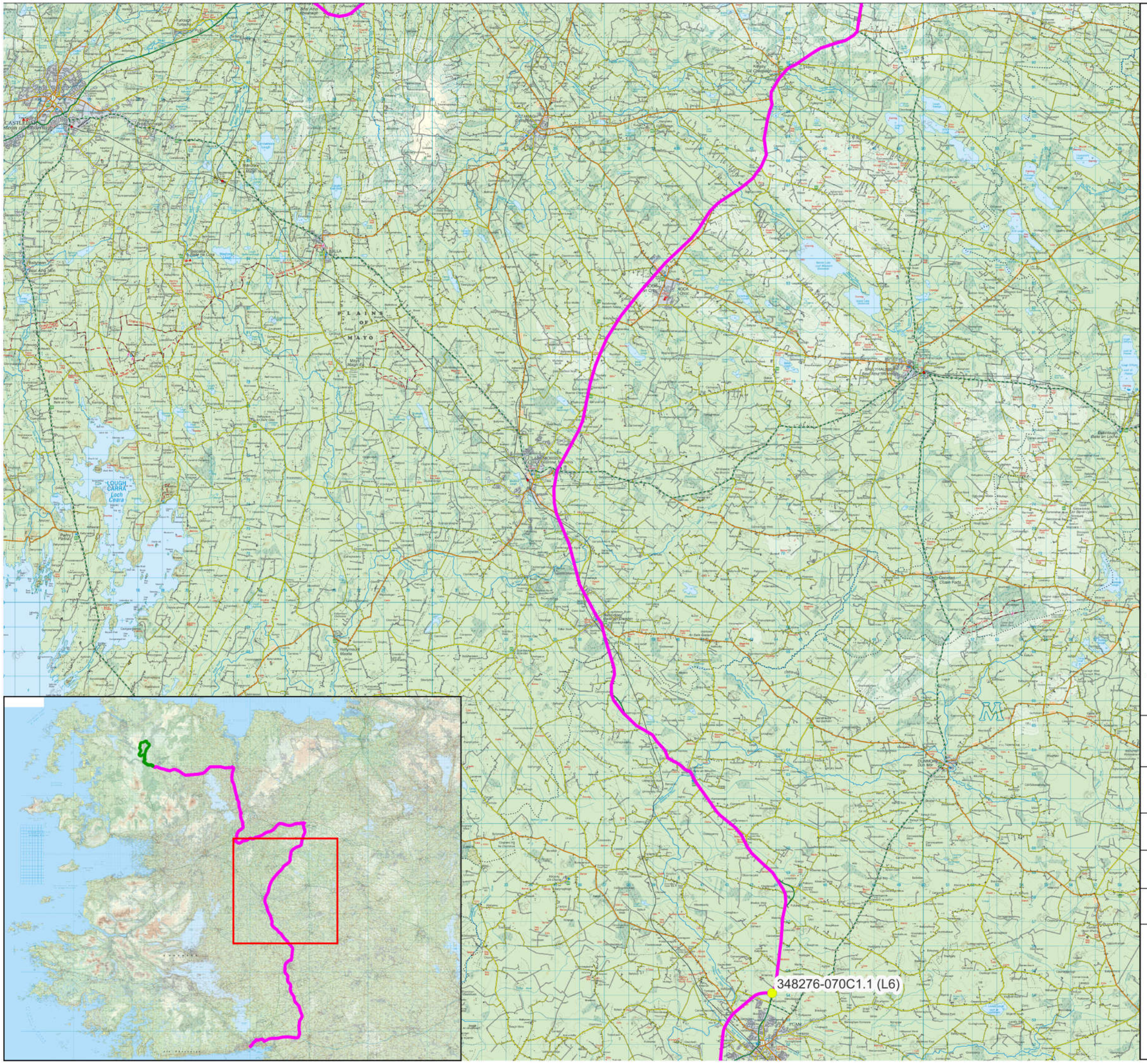
Route Assessment Locations

Project Title

Sheskin South Wind Farm Co. Mayo

Drawn By	Checked By
DOS	EM
Project No.	**Drawing No.**
201119	14-2a
Scale	**Date**
1:150,000	2023-02-27

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- Proposed Transport Delivery Route
- Route Assessment Points

Ordnance Survey Ireland Licence No. AR 0021820© Ordnance Survey Ireland/Government of Ireland

Drawing Title

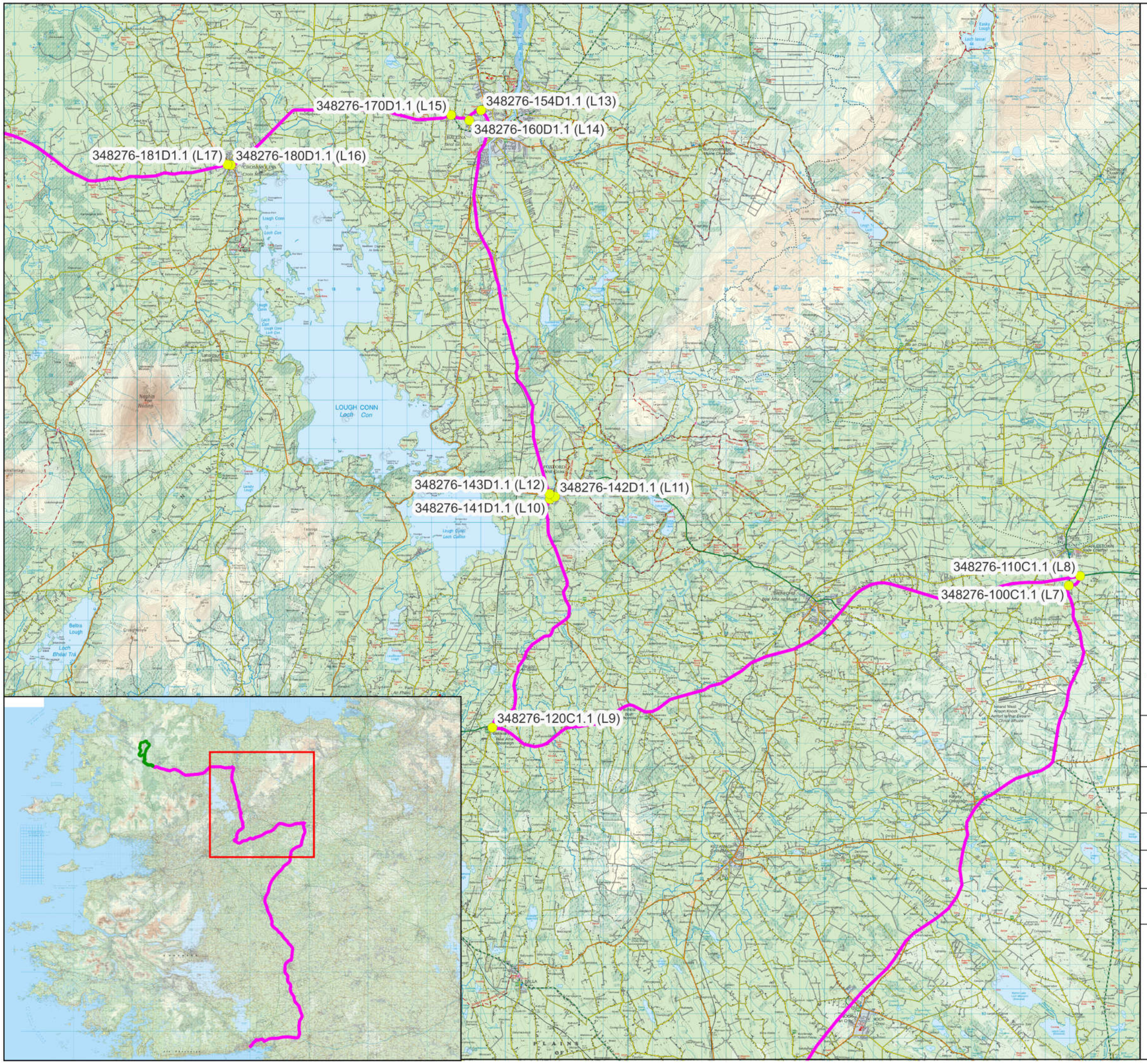
Route Assessment Locations

Project Title

Sheskin South Wind Farm Co. Mayo

Drawn By	Checked By
DOS	EM
Project No.	Drawing No.
201119	14-2b
Scale	Date
1:150,000	2023-02-27

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- Proposed Transport Delivery Route
- Route Assessment Points

Ordnance Survey Ireland Licence No. AR 0021820© Ordnance Survey Ireland/Government of Ireland

Drawing Title

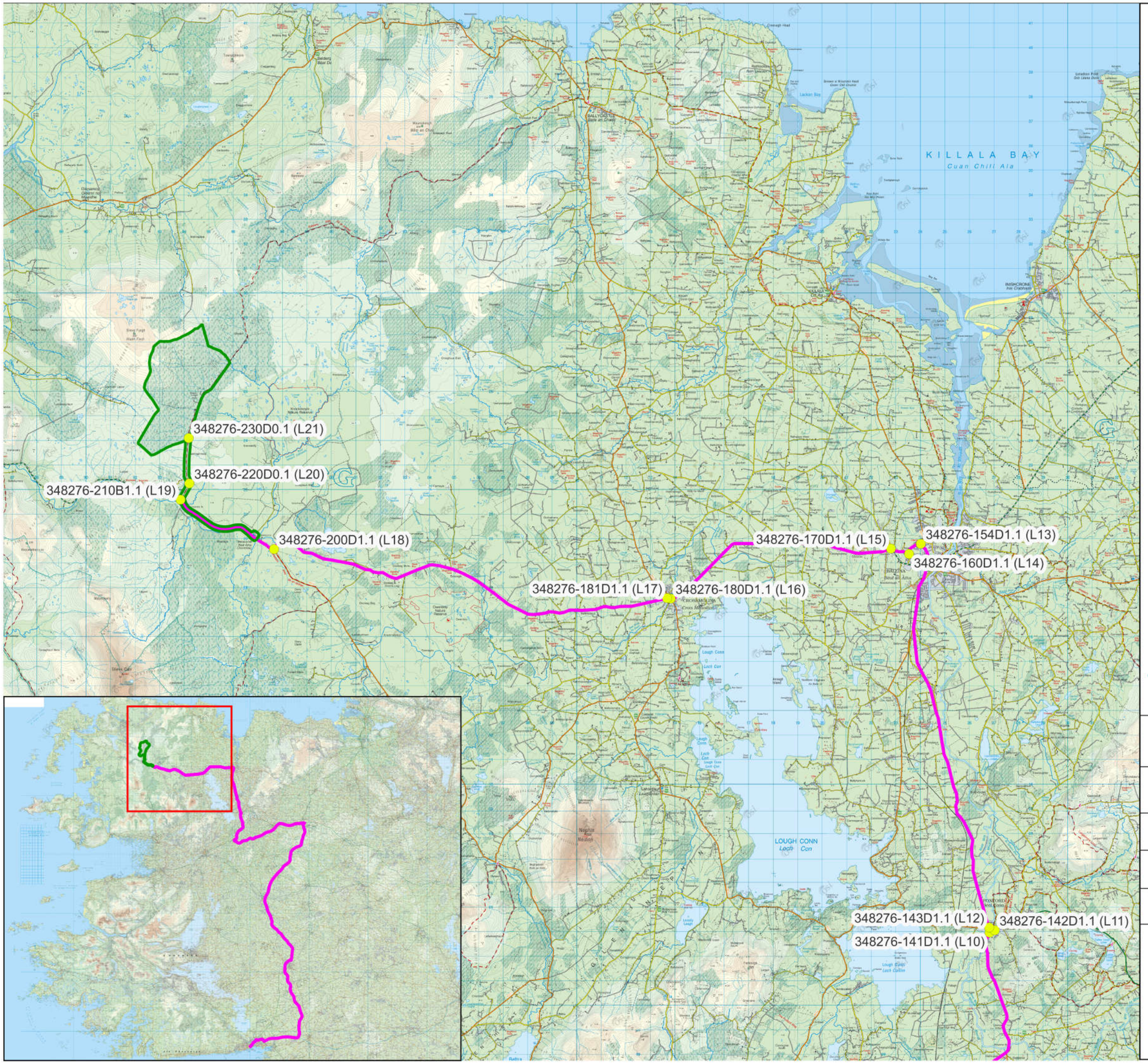
Route Assessment Locations

Project Title

Sheskin South Wind Farm Co. Mayo

Drawn By	Checked By
DOS	EM
Project No.	**Drawing No.**
201119	14-2c
Scale	**Date**
1:150,000	2023-02-27

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- Proposed Transport Delivery Route
- Route Assessment Points

Ordnance Survey Ireland Licence No. AR 0021820© Ordnance Survey Ireland/Government of Ireland

Drawing Title
Route Assessment Locations

Project Title
Sheskin South Wind Farm Co. Mayo

Drawn By	Checked By
DOS	EM
Project No.	**Drawing No.**
201119	14-2d
Scale	**Date**
1:150,000	2023-02-27

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

- Locations 16 and 17 through Crossmolina - From Ballina the TDR heads west on the N59 for approximately 13 km to Crossmolina where the roundabout on the east side of the Deel River (Location 16) and the S-bend on the eastern side of the river (Location 16) will require to be negotiated.
- Location 18 - From Crossmolina the route continues west on the N59 for approximately 19 km to the sharp bend located at Bellacorick. At this location it is proposed to use the existing bypass that has been constructed for the purposes of turbine delivery in the townland of Moneynieren. This bypass was permitted by ABP following a Section146B request by Owenniny Power 2 DAC (ABP Ref. 309043-20).
- Location 19 – The route continues west on the N59 for a further 4km before heading north at an existing priority junction onto L-52926. .
- Locations 20 and 21 – The route passes through a bend on the L-52926 (Location 20) and at a point approximately 3km north of the N59 turns left off the L-52926 onto the new access road that will provide access to the site of the Proposed Development.

All deliveries of abnormally sized loads will be made using Garda Siochana escorts and local transient traffic management measures put in place by the haulage company in the form of escort vehicles .

14.1.2.3 Proposed Construction Traffic Haul Route

The delivery route(s) for general construction traffic including site staff and heavy goods vehicles (HGVs) may vary depending on the location of the suppliers used for concrete and other materials required to construct the Proposed Development. Based on the location of suppliers in the vicinity of the Proposed Development (as described below), it is estimated that concrete and general construction traffic may travel towards the site on the N59 from either the east, from the direction of Ballina, or west from the direction of Bangor Erris, as shown in the delivery routes for general construction traffic in Figure 14.1. For these trips it was assumed that all traffic would travel from each of the direction in order that the greatest impact on the N59 east and west of the L-52926 is assessed.

Concrete

- It is not confirmed at this stage where the concrete required for the turbine foundations during the construction phase will be transported from. For the purposes of the assessment it has been assumed the concrete will be transported from local quarries located to both to the east and west of the proposed Sheskin Wind Farm site. While it is possible that multiple quarries situated closest to the site will be used in order to minimise the traffic effects of the proposed development, in order to test a precautionary scenario it is assumed that all concrete may be delivered from any one direction.

General construction materials, felled timber, other miscellaneous items and waste

- Similarly, it is not confirmed at this stage where general construction materials, felled timber, miscellaneous items and waste will be transported from or to. Again, in order therefore to test a precautionary scenario it was assumed that all general construction traffic may be delivered from the west or the east on the N59, as shown in Figure 14-1.

Other wind turbine component deliveries (components delivered using standard HGVs)

- All other wind turbine components delivered by standard HGVs will arrive at the Port of Galway and will be delivered by via the same TDR as for the abnormally

sized loads as set out in 14.1.2.2 above and will occur at the same time as the abnormal sized loads.

The impacts of additional traffic generated due to the construction of the grid connection are also assessed, including the potential impacts on existing traffic that will require to undertake local detours for short periods.

The assessment presented in this chapter of the EIAR is based on these conservative scenarios.

14.1.2.4 Site Entrances

During the construction phase, the Proposed Development site will be accessed via an existing entrance (Location 21 on Figure 14-2d off an existing forestry access road which runs along the eastern boundary of the site in the townland of Sheskin. The existing forestry access road merges with the L-52926 road approximately 1.5km to the south of the site in the townland of Tawnaghmore. The L-52926 meets the N59 approximately 1km further south.

It is proposed that the L-52926 will also be used as the primary site entrance for HGVs and other abnormal loads during the construction phase of the Proposed Development. Between the N59 and the site entrance it is proposed to upgrade the L-52926 (within the existing public road corridor) to accommodate turbine component deliveries and general construction traffic and to improve safety for local community traffic accessing the road.

Once the proposed Sheskin South Wind Farm is operational, this entrance will remain in place and will be used for forestry operations. The entrance will be used in the event of the delivery of a replacement turbine component or other abnormal load required for the operational maintenance of the wind farm. It will also be used by operational and maintenance staff and by the visiting public in order to access the recreation and amenity facilities. Further information on the proposed amenity elements associated with the Proposed Development is outlined in Chapter 4 of this EIAR.

The substation will be accessed via a new proposed site entrance off the existing forest road running along the eastern boundary of the site.

A second existing site entrance in the townland of Sheskin through the forestry, approximately 900m north of the substation entrance, will also be used during the construction phase for staff cars and LGVs. It is not proposed to upgrade this entrance.

A third existing site entrance in the townland of Sheskin through the forestry , located in the north eastern corner of the site, will also be used during the construction phase for staff cars, LGVs and HGVs.

All site entrances are shown on Figure 4-1b and on the layout drawings included in Appendix 4-1 of this EIAR.

14.1.3 Existing Traffic Volumes

It should be noted that traffic volumes are discussed in terms of vehicles and 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 or light goods vehicles (LGV). 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 PCUs.

14.1.3.1 Background Traffic Flows

Link count locations 1 to 9 included in the assessment are shown in Figure 14-3.

An all-day classified turning count was undertaken by Traffinomics Ltd at the junction between the N59 and the L-52926 approaching the proposed site, which provided link flows for these links (Links 1 and 2). For all other links on the TDR (Links 3 to 9) traffic flow data was obtained from continuous traffic count sites maintained by TII.

The traffic counts at the N59 / L52926 junction was undertaken on Tuesday 27th July, 2021, which was during a period when some Covid-19 related government travel restrictions were impacting on traffic flows. In order to determine the scale of the likely reduction in traffic demand on the day of the survey, daily traffic volumes observed at the TII count site, on the N59, closest to the site were compared for the year 2019, prior to the Covid-19 pandemic, with those recorded in 2021, the year of the survey. An average annual daily traffic volume of 2,175 vehicles was observed in 2019, compared to 1,884 in 2021, indicating a Covid-19 related correction factor for traffic demand on the N59 of +15.4%. The observed Year 2021 traffic flows for the L-52926 and the N59 are shown in Table 14-1, with the Covid-19 adjusted flows shown in the same table.

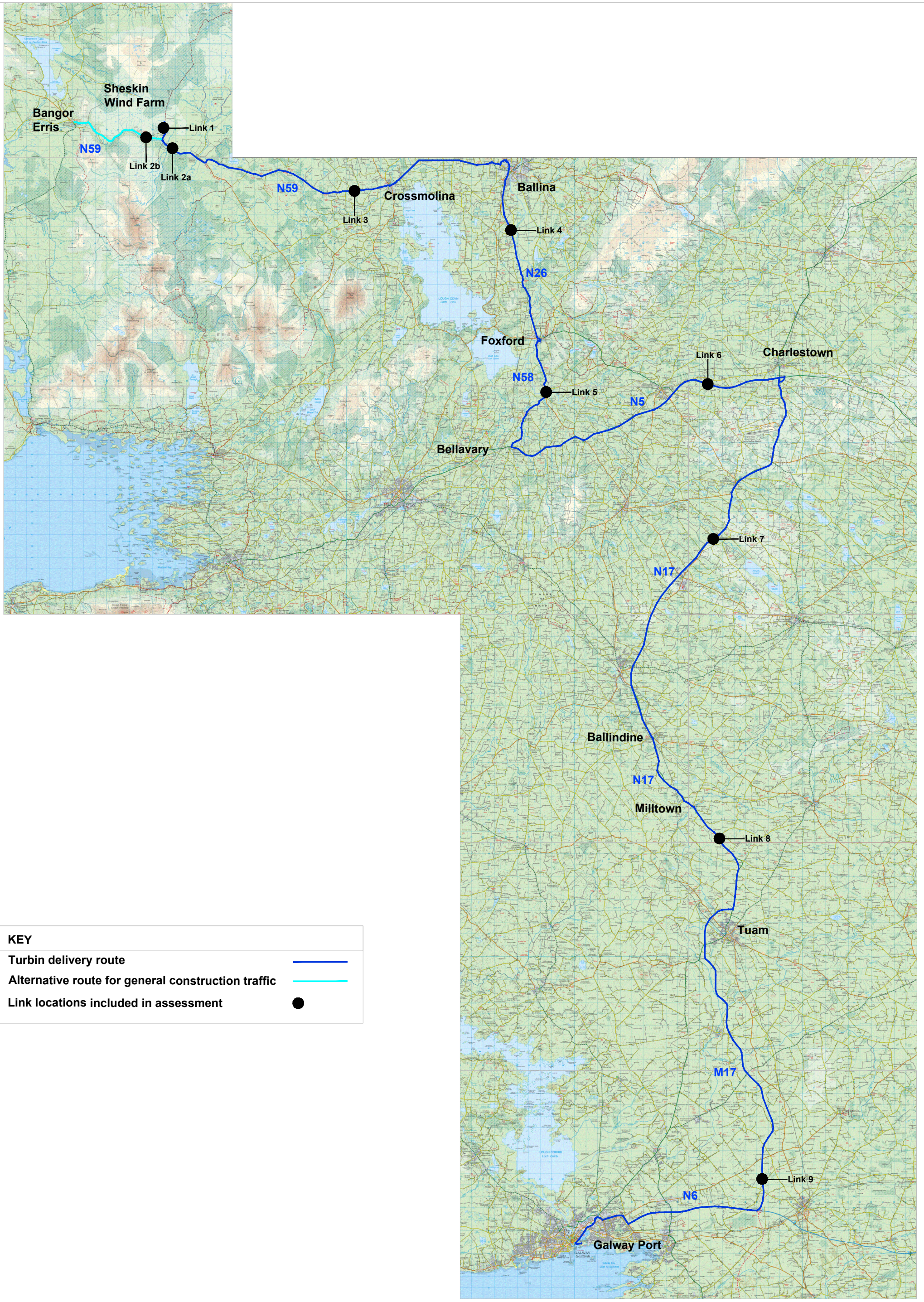
The base data used from the ATC counts was taken from the year 2019, which predates the Covid-19 pandemic, with no correction factor therefore required. The base data for all links 1 to 9 are shown in Table 14-2.

Table 14-1 Observed average all day traffic flows (AADT) by location and year (2-way vehicles)

Link	2021 observed	2021 Covid-19 adjusted
1 L-52926 to site	100	115
2 N59 adjacent to L-52926 at site	2,799	3,192

Table 14-2 Observed average all day traffic flows (AADT) by location and year (2-way vehicles)

Link	2019	2021
1. L-52926 to site	NA	115
2. N59 adjacent to L-52926 at site	NA	3,192
3. N59 between L-52926 and Ballina	2,175	NA
4. N26 between Foxford and Ballina	8,095	NA
5. N58 between Ballylahan and Foxford	6,016	NA
6. N5 between Swinford and Charlestown	5,730	NA
7. N17 between Charlestown and Knock	6,422	NA
8. N17 Tuam and Claremorris	9,893	NA
9. M17 between N63 and M6	11,506	NA



KEY

Turbin delivery route	———
Alternative route for general construction traffic	———
Link locations included in assessment	●

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 14-3 Route assessment location plan

PROJECT:	Sheskin South Wind Farm		
CLIENT:	SSE	SCALE:	NTS
PROJECT NO: 9350	DATE: 27.02.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

14.1.3.2 Future Background Traffic Volumes

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 for National Roads (Unit 5.3)'. The annual growth rates for light vehicles for Co. Mayo, and factors for the years relevant to this study, are shown in Table 14-3 and Table 14-4. Traffic volumes are forecast to increase during the period from 2019 to 2028 (the assumed construction year) by 12.0% and from 2021 to 2028 by 9.2%, assuming a medium growth scenario. All day traffic flows at locations 1 to 9 are compared for the years 2019, 2021 and 2028 in Table 14-5.

It should be noted that while the assumed construction year of 2026 may vary slightly, this will not alter the forecast outcomes and effects presented in this section of the EIAR. This is due to the annual growth rate for background traffic being just 1.27% (as shown in Table 14-3 as 1.0127) and the traffic volumes generated by the Proposed Development will remain unchanged regardless of construction year, as presented subsequently in Section 14.1.4.

Table 14-3 TII Traffic Growth Annual Factors and Indices for County Mayo

Year	Lights – Annual Factor			Lights (Cars and LGVs) – Cumulative factor		
	Low	Medium	High	Low	Medium	High
2019	1.0111	1.0127	1.0161	1.000	1.000	1.000
2020	1.0111	1.0127	1.0161	1.011	1.013	1.016
2021	1.0111	1.0127	1.0161	1.022	1.026	1.032
2022	1.0111	1.0127	1.0161	1.034	1.039	1.049
2023	1.0111	1.0127	1.0161	1.045	1.052	1.066
2024	1.0111	1.0127	1.0161	1.057	1.065	1.083
2025	1.0111	1.0127	1.0161	1.068	1.079	1.101
2026	1.0111	1.0127	1.0161	1.080	1.092	1.118
2027	1.0111	1.0127	1.0161	1.092	1.106	1.136
2028	1.0111	1.0127	1.0161	1.104	1.120	1.155

Source: TII Project Appraisal Guidelines – Unit 5.3, October 2021

Table 14-4 TII traffic growth rates by growth scenario

Period	New Factors		
	Low	Medium	High

2019 – 2028	1.104	1.120	1.155
2021 – 2028	1.080	1.092	1.118

Table 14-5 All day flows by year (2-way vehicles)

Link	2019	2021	2028
1 L-52926 to site	NA	115	126
2 N59 adjacent to L-52926 at site	NA	3,192	3,486
3 N59 between L-52926 and Ballina	2,175	NA	2,436
4 N26 between Foxford and Ballina	8,095	NA	9,066
5 N58 between Ballylahan and Foxford	6,016	NA	6,738
6 N5 between Swinford and Charlestown	5,730	NA	6,418
7 N17 between Charlestown and Knock	6,422	NA	7,193
8 N17 Tuam and Claremorris	9,893	NA	11,080
9 M17 between N63 and M6	11,506	NA	12,887

The classified counts undertaken at the N59 / L-52926 junction together with the TII ATC sites on the delivery route were used to determine the existing percentage of HGVs on the study area network. The observed percentage of HGVs was observed to vary on the turbine delivery route from 4.0% on the L-52926 leading to the site, to 13.8% on the N59 adjacent to the L-52926 junction. Traffic volumes forecast on the study network for the year 2026 are shown by vehicle type in Table 14-6.

Table 14-6 All day flows, percentage HGVs and flows by vehicle type, year 2028

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / LGVs	HGVs	Cars / LGVs	Total
1 L-52926 to site	126	4.0%	5	121	12	121	133
2 N59 adjacent to L-52926 at site	3,486	13.8%	481	3,005	1,154	3,005	4,159
3 N59 between L-52926 and Ballina	2,436	4.6%	112	2,324	269	2,324	2,593

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / LGVs	HGVs	Cars / LGVs	Total
4 N26 between Foxford and Ballina	9,066	4.2%	381	8,686	914	8,686	9,600
5 N58 between Ballylahan and Foxford	6,738	3.5%	236	6,502	566	6,502	7,068
6 N5 between Swinford and Charlestown	6,418	6.3%	404	6,013	970	6,013	6,984
7 N17 between Charlestown and Knock	7,193	5.2%	374	6,819	898	6,819	7,716
8 N17 Tuam and Claremorris	11,080	4.3%	476	10,604	1,143	10,604	11,747
9 M17 between N63 and M6	12,887	5.4%	696	12,191	1,670	12,191	13,861

14.1.4 Proposed Development and Traffic Generation

14.1.4.1 "Do Nothing" Scenario

If the Proposed Development does not proceed, there will be no additional traffic generated or accommodation works carried out on the local road network as a result of the Proposed Development and therefore no direct or indirect effects on roads and traffic will occur.

14.1.4.2 Development Trip Generation – During Construction

The assessment of the effects of traffic generated during the construction of the Proposed Development is considered in two stages.

- Stage 1 – Site preparation and groundworks, construction of turbine foundations, cabling, met mast foundation, substation construction, construction of compounds, upgrade and construction of access roads, tree felling, and,
- Stage 2 – Turbine component delivery and construction.

For the purpose of the traffic impact assessment, projections based on trip generation data collected from other wind farm construction projects regarding the numbers of trips per quantum of material, the number of turbine component parts based on 21 turbines, the length of the construction phase and work periods were made to inform the assessment. These projections allow for a best estimate but should not be inferred as prescriptive limitations to the construction phase. There are numerous variables which can affect a construction phase programme such as weather for example. The construction phase of the Proposed Development will be carried out in accordance with the CEMP, which is submitted as Appendix 4-3 of this EIAR.

The construction phase of the Proposed Development is expected to last approximately 18 to 24 months (1.5 to 2 years). The shortest potential construction phase duration of 18 months was assumed for the purpose of this assessment in order to test a conservative scenario in terms of concentration of construction traffic volumes. The shortest construction period will give rise to higher volumes of construction traffic using the public road network at any one time.

14.1.4.2.1 Stage 1 – Site Preparation and Ground Works

For assessment purposes a standard 255 working days per annum was adopted, equating to 383 working days over an 18 month construction period.

For the site preparation and ground works stage (Stage 1) the total numbers of deliveries made to the site during that period are shown in Table 14-7.

During this construction phase, there will be two distinct types of days with respect to trip generation. A total of 21 days will be used to pour the 21 concrete wind turbine foundations. Foundations will likely be poured one per day, with an estimated 75 concrete loads required for each turbine foundation delivered to the site over a 12-hour period. This will result in just over 6 HGV trips to and from the site per hour. On the remaining 345 working days for this stage, other general materials will be delivered to the site.

During all of Stage 1, it is estimated that 4,026 two-way HGV trips will be made to the site by trucks and large articulated HGVs, as set out in Table 14-7, with the daily effect on the local road network shown in Table 14-8 and 14-9.

The figures in Table 14-8 show that on the 21 days that concrete will be delivered to the site an additional 360 two-way PCUs will be added to the network (comprising 75 two-way HGV trips or 150 movements, with 2.4 PCUs per movement). Similarly, on the 345 days when other materials will be delivered to the site, traffic volumes on the local network are forecast to increase by an average 34 two-way PCUs. as set out in Table 14-9.

Table 14-7 Stage 1 – Site preparation and groundworks – total movements

Material	Total no. Truck Loads	Truck type
Concrete	1,575	Trucks
Concrete blinding and steel	245	Large artic
Plant / fencing / compound set-up	53	Large artic
Forestry felling	1,127	Large artic
Crushed rock and stone	100	Trucks
Ducting / cabling	659	Large artic
Grid cable laying	56	Large artic
Cranes	11	Large artic
Substation components	150	Large artic
Refuelling / maintenance / misc (incl. waste)	49	Large artic

Material	Total no. Truck Loads	Truck type
Total	4,026	

Table 14-8 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	1,575	Truck	2.4	3,780	180.0	360.0
* Estimation based on 21 concrete pouring days						

Table 14-9 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
Concrete blinding and steel	245	Large artic	2.4	588.0	1.7	3.4
Plant / fencing / compound set-up	53	Large artic	2.4	127.7	0.4	0.7
Forestry felling	1,127	Large artic	2.4	2,704.8	7.8	15.7
Crushed rock and stone	100	Trucks	2.4	240.0	0.7	1.4
Internal Site Ducting / cabling	659	Large artic	2.4	1,582.6	4.6	9.2
Grid cable laying	56	Large artic	2.4	134.4	0.4	0.8
Cranes	11	Large artic	2.4	26.4	0.1	0.2
Substation components	150	Large artic	2.4	360.0	1.0	2.1

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2- way PCUs/day
Refuelling / maintenance / waste collection / misc.	49	Large artic	2.4	117.6	0.3	0.7
Total	2,451			5,881	17.0	34.1
* Estimation based on ground work period of 345 working days						

14.1.4.2.2 Stage 2 – Turbine Construction

During the turbine construction stage, including delivery and assembly, some deliveries to the site will be made by abnormally large vehicles, referred to in this section as extended artics, transporting the component parts of the turbines (nacelles, blades and towers). There will also 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 14-10, which summarises that a total of 189 trips will be made to and from the site by extended artics, with a further 84 trips made by conventional large articulated HGVs.

Table 14-10 Stage 2 – Wind turbine plant – total movements

Material	Units	Quantity per Unit	Total Quantity	Quantity per Truck	Total Truck Loads	Truck type
Nacelle	21	1	21	1	21	Extended Artic
Blades	21	3	63	1	63	Extended Artic
Towers	21	5	105	1	105	Extended Artic
Sub total					***189***	
Transformer	21	1	21	1	21	Large Artic
Drive train and blade hub	21	1	21	1	21	Large Artic
Base and other deliveries	21	2	42	1	42	Large Artic
Sub total					***84***	
Total					**273**	

For the purpose of this assessment a delivery period based on previously constructed wind farm sites is provided, although this may be subject to change. It is assumed that the turbine delivery element will progress at the rate of 5 extended artic trips made by convoy to the site on 2 days per week, resulting in this stage taking approximately 38 days/nights spread over a 19-week period. On a further 21 days at 2 days per week, lasting for approximately 11 weeks, the remaining equipment required during this phase will be delivered to the site. The additional traffic movements for these 2 types of days are summarised in Table 14-11 and Table 14-12. In Table 14-11, 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 14-12, during the turbine construction phase.

Table 14-11 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			90.0	180.0
Total per delivery day	5			50.0	100.0
* Based on 5 abnormal sized loads being delivered per day on 2 days per week (total 189 loads will take 38 nights spread over 19 weeks)					

Table 14-12 Stage 2 - Wind turbine plant, normal 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	1	2.4	4.8
Total	3		14.4
* based on equipment for 2 turbines being moved per week spread over 2 days			

14.1.4.2.3 Construction Employee Traffic

It is estimated that a maximum of 80 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 40 staff at any one time during the turbine construction stage. If a worst case is assumed then all staff will travel to /

from the site by car, at an average of 2 persons per car, then a total of 80 PCU movements (each trip is two way). This is added to the network during the groundworks stage of the development, reducing to 40 PCU trips during the turbine construction stage. This has been included in the figures used in this assessment.

14.1.4.3 Development Trip Generation – During Operation

It is assumed that the wind farm will be unmanned once operational and will be remotely monitored. Traffic associated with the operational phase of the wind farm will be from the wind farm operator, Eirgrid personnel visiting the substation, 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. The site will be unmanned but will generate maintenance trips, with approximately two to three maintenance staff trips per week. The impact on the network of these trips during the operational stage is discussed in Section 14.1.10.3.

Once operational the site will also be open to visitors for amenity purposes, with those travelling by car using the carpark provided and accessed via the site access junction. Based on visitors to existing wind farm sites it is forecast that up to 20 car trips per day will be generated by this use.

14.1.4.4 Development Trip Generation – During Decommissioning

Traffic generation during decommissioning will be significantly less than the trip generation estimates presented for the construction phase presented in 14.14.1. This is because much of the materials brought into site during construction will be left in-situ during the decommissioning stage.

14.1.5 Construction Traffic Design Vehicles

The delivery of turbine components including blades, tower sections and nacelles is a specialist operation due to the oversized loads involved. The blades are the longest turbine component and in the case of the Proposed Development blades up to 85m long have been considered for the purpose of this assessment.

The proposed blade length of 85m has been assessed and is the maximum regardless of the make or model of the turbine eventually selected for installation on site. A confirmatory delivery assessment and program will be carried out by the turbine delivery company.

For the purpose of this assessment set out in this EIAR, it is assumed that the blades, which are the largest turbine components, will be transported using a standard extended artic, or super wing carrier, where practical. As this method involves transporting the blade in a horizontal position it represents the worst case in terms of the geometric requirements on the road network. For locations where the geometry is constrained, particular through the urban centres of Foxford and Ballina, and at the junction between the N59 and L-52926, the use of blade lift adaptors that can transport blades at an angle of 60º to both lift the rear of the blade and shorten the wheelbase of the transporter, are assumed.

The critical vehicles in terms of size and turning geometry requirements and used in the detailed route assessment discussed in Section 14.1.8 are the set out below. The geometry of the design vehicles are included as Drawing No.'s 348276-C and 348276 - D include on Appendix 14-1.

The key dimensions of the vehicles tested are as follows:

Transport of Blades – Super Wing Carrier with blade

Total length of vehicle	97.07m

Length of blade 85.0m

Transport of Blades – Blade Lift Adaptor Elevated

Total length of vehicle 52.02 m

Length of blade 85m raised to 60 degrees with effective length of 42.5m

The vehicles used to transport the tower sections and nacelles will be shorter in length compared to the blade transporters.

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 Expected Traffic During Construction, During Operation and During Decommissioning

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

14.1.6.1 Expected Traffic on Link Flows – During Construction

Background traffic volumes, as established previously and set out in Table 14-5, and development generated traffic volumes are shown for the typical construction day scenarios discussed in Section 14.1.4 are set out in Table 14-13 to 14-16, with the traffic effects summarised in Table 14-17 to 14-20. The actual figures presented in the tables, may vary slightly, however they are considered to represent a robust worst case assessment of the likely increases in traffic volumes.

The extent of the road network that the impacts of the various stages of construction traffic is assessed is shown in Figure 14-3. While the impacts of the delivery of the turbine component parts are assessed over the full extent of the route to the port of arrival in Galway City, the delivery of all other materials is assessed as far afield as the N59 to Bangor Erris in the west (Link 2b in Figure 14-3) and the N59 to Ballina in the east (Links 2 and 3). This distinction is made as general construction materials, including concrete, are available from quarries and suppliers within this proximity to the site.

For the purposed of assessing the worst case increases in traffic volumes on links during Stage 1 of construction, it is assumed that all traffic may travel from each of the traffic routes identified in Figure 14-1b.

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

During Stage 1 - Site Preparation and Groundworks

For these 345 days an additional 114 PCUs will travel on the study network.

On these days the percentage increase in traffic volumes experienced on the study network will be between +4.4% on the N59 between the site and Ballina, to +2.7% on the N59 just to the east or west of the L-52926 on the way to the site. On the local L-52926 road approaching the proposed site it is forecast that traffic flows will almost double (+86.0%).

During Stage 1 – Concrete Pouring

For these 21 days an additional 440 PCUs will travel on the study network.

It is assumed that concrete will be delivered from quarries located to the east and west of the proposed site.

If solely delivered from the east the percentage increase in traffic volumes experienced on the study network will be between +17.0% on the N59 between the site and Ballina, to +10.6% on the N59 just to the east of the L-52926 on the way to the site. If solely delivered from the N59 in the west the % increase on the N59 will also be +10.6%. On the local L-52926 road approaching the proposed site where existing traffic volumes are very low (133 vehicles daily) it is forecast that traffic flows will increase by a factor of 4.3 or +332%.

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

As stated previously, all of the deliveries for this stage will originate from the Port of Galway and will approach the site from the south and west, as shown in Figure 14-1.

The additional 140 PCUs (made up of cars and large extended artics) will travel on the study network for 38 days. On the days this impact occurs, volumes will increase by between 1.0% on the M17 between Galway and Tuam, +1.2% on the N17 between Tuam and Claremorris to +2.0% on the N58 between Ballylahan and Foxford, to +5.4% on the N59 between Crossmolina and Bangor-Ennis, to +3.4% on the N59 just to the east of the L-52926 on the way to the site. On the local L-52926 road approaching the proposed site it is forecast that traffic flows will slightly more than double (+105.6%).

The most significant traffic impact may be experienced during these delivery periods primarily due to the slow speeds, size and geometric requirements of these vehicles. The provision of traffic management measures, including ensuring that these deliveries are made at night as is proposed, (as set out in Sections 14.1.7 and 14.1.10.6 and the Traffic Management Plan included as Appendix 14-2 of this EIAR), 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 21 days on the delivery route 55 additional PCUs (made up of cars and standard articulated HGV movements to the site and back) will travel on the study network. On the days this impact occurs, volumes will increase by between +0.5% on the N17 between Tuam and Claremorris to +0.8% on the N58 between Ballylahan and Foxford, to +2.1% on the N59 between Crossmolina and Bangor-Ennis, to +1.3% on the N59 just to the east of the L-52926 on the way to the site. On the local L-52926 road approaching the proposed site it is forecast that traffic flows will increase by +41.5%.

Table 14-13 Development traffic during site preparation and groundworks 345 days – Stage 1

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 L-52926 to site	121	12	133	80	34	114	201	46	247

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
2a N59 east of L-52926	3,005	1,154	4,159	80	34	114	3,085	1,188	4,273
2b N59 west of L-52926	3,005	1,154	4,159	80	34	114	3,085	1,188	4,273
3 N59 between L-52926 and Ballina	2,324	269	2,593	80	34	114	2,404	303	2,707

Table 14-14 Effects of development traffic during turbine 21 days concrete pouring – Stage 1

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 L-52926 to site	121	12	133	80	360	440	201	372	573
2a N59 east of L-52926	3,005	1,154	4,159	80	360	440	3,085	1,514	4,599
2b N59 west of L-52926	3,005	1,154	4,159	80	360	440	3,085	1,514	4,599
3 N59 between L-52926 and Ballina	2,324	269	2,593	80	360	440	2,404	629	3,033

Table 14-15 Development traffic during turbine construction - extended artics (large turbine components) – Stage 2

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 L-52926 to site	121	12	133	40	100	140	161	112	273
2a N59 east of L-52926	3,005	1,154	4,159	40	100	140	3,045	1,254	4,299
2b N59 west of L-52926	3,005	1,154	4,159	0	0	0	3,005	1,154	4,159

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
3 N59 between L-52926 and Ballina	2,324	269	2,593	40	100	140	2,364	369	2,733
4 N26 between Foxford and Ballina	8,686	914	9,600	40	100	140	8,726	1,014	9,740
5 N58 between Ballylahan and Foxford	6,502	566	7,068	40	100	140	6,542	666	7,208
6 N5 between Swinford and Charlestown	6,013	970	6,984	40	100	140	6,053	1,070	7,124
7 N17 between Charlestown and Knock	6,819	898	7,716	40	100	140	6,859	998	7,856
8 N17 Tuam and Claremorris	10,604	1,143	11,747	40	100	140	10,644	1,243	11,887
9 M17 between N63 and M6	12,191	1,670	13,861	40	100	140	12,231	1,770	14,001

Table 14-16 Effect of development traffic during turbine construction – other deliveries (small turbine components) – Stage 2

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 L-52926 to site	121	12	133	40	15	55	161	27	188
2a N59 east of L-52926	3,005	1,154	4,159	40	15	55	3,045	1,169	4,214
2b N59 west of L-52926	3,005	1,154	4,159	0	0	0	3,005	1,154	4,159
3 N59 between L-52926 and Ballina	2,324	269	2,593	40	15	55	2,364	284	2,648
4 N26 between Foxford and Ballina	8,686	914	9,600	40	15	55	8,726	929	9,655

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
5 N58 between Ballylahan and Foxford	6,502	566	7,068	40	15	55	6,542	581	7,123
6 N5 between Swinford and Charlestown	6,013	970	6,984	40	15	55	6,053	985	7,039
7 N17 between Charlestown and Knock	6,819	898	7,716	40	15	55	6,859	913	7,771
8 N17 Tuam and Claremorris	10,604	1,143	11,747	40	15	55	10,644	1,158	11,802
9 M17 between N63 and M6	12,191	1,670	13,861	40	15	55	12,231	1,685	13,916

Table 14-17 Summary effect of development traffic during site preparation and ground works

Link	Background	Development	Total	% increase	Estimated No. of days
1 L-52926 to site	133	114	247	86.0%	345
2a N59 east of L-52926	4,159	114	4,273	2.7%	345
2b N59 adjacent to L-52926 at site	4,159	114	4,273	2.7%	345
3 N59 between L-52926 and Ballina	2,593	114	2,707	4.4%	345

Table 14-18 Summary effect of development traffic during turbine concrete pouring – Stage 1

Link	Background	Development	Total	% increase	Estimated No. of days
1 L-52926 to site	133	440	573	331.8%	21
2a N59 east of L-52926	4,159	440	4,599	10.6%	21
2b N59 west of L-52926	4,159	440	4,599	10.6%	21
3 N59 between L-52926 and Ballina	2,593	440	3,033	17.0%	21

Table 14-19 Summary effect of development traffic during turbine construction – extended artics (large turbine components)

Link	Background	Development	Total	% increase	Estimated No. of days
1 L-52926 to site	133	140	273	105.6%	38
2a N59 east of L-52926	4,159	140	4,299	3.4%	38
2b N59 west of L-52926	4,159	0	4,159	0%	0
3 N59 between L-52926 and Ballina	2,593	140	2,733	5.4%	38
4 N26 between Foxford and Ballina	9,600	140	9,740	1.5%	38
5 N58 between Ballylahan and Foxford	7,068	140	7,208	2.0%	38
6 N5 between Swinford and Charlestown	6,984	140	7,124	2.0%	38
7 N17 between Charlestown and Knock	7,716	140	7,856	1.8%	38
8 N17 Tuam and Claremorris	11,747	140	11,887	1.2%	38
9 M17 between N63 and M6	13,861	140	14,001	1.0%	38

Table 14-20 Summary effect of development traffic during turbine construction – other deliveries (small turbine components)

Link	Background	Development	Total	% increase	Estimated No. of days
1 L-52926 to site	133	55	188	41.5%	21
2a N59 east of L-52926	4,159	55	4,214	1.3%	21
2b N59 west of L-52926	4,159	0	4,159	0%	0
3 N59 between L-52926 and Ballina	2,593	55	2,648	2.1%	21

4 N26 between Foxford and Ballina	9,600	55	9,655	0.6%	21
5 N58 between Ballylahan and Foxford	7,068	55	7,123	0.8%	21
6 N5 between Swinford and Charlestown	6,984	55	7,039	0.8%	21
7 N17 between Charlestown and Knock	7,716	55	7,771	0.7%	21
8 N17 Tuam and Claremorris	11,747	55	11,802	0.5%	21
9 M17 between N63 and M6	13,861	55	13,916	0.4%	21

An assessment of the impact on link capacities in the study area was undertaken for the various construction stages as set out in Table 14-21, Table 14-22, and Table 14-23. The capacity for each link in the study area is shown in Table 14-21. The capacities range from a daily flow of 11,600 vehicles on the N17, N5 and N26, and 5,000 vehicles per day on the N58 and N59 roads, and are based on road widths and capacities set out in the TII Standards document DN-GEO-03031 Road Link Design, Table 6/1. The width of the L-52926 leading to the site is of variable width less than 6.0m and is therefore <5,000 per day.

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

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

Background, or do nothing traffic flows, are compared to flows forecast for the various construction delivery stages in Table 14-22 with the percentage capacity reached for each link and stage shown in Table 14-23. Based on this assessment for a construction year of 2028 the following points are noted;

- On the external network the N58 between Ballylahan and Foxford is the busiest road with the link capacity forecast to operate at 141% for the do-nothing scenario by the year 2028, increasing to a maximum of 150% during the 21 days that the concrete foundations will be poured.
- The N17 between Tuam and Claremorris is also forecast to operate at capacity with this section of road forecast to operate at 101% for the do-nothing scenario by the year 2028, increasing to a maximum of 105% during the days that site works and general construction will take place.
- All other roads leading to the site are forecast to operate well within link capacity for all scenarios.

Table 14-21 Carriageway widths, link type and link capacity

Link	Width (m)	Link type	Link capacity
1 L-52926 to site	<6.0	Type 3 single	<5,000
2 N59 adjacent to L-52926 at site	5.0	Type 3 single	5,000
3 N59 between L-52926 and Ballina	6.0	Type 3 single	5,000
4 N26 between Foxford and Ballina	7.5	Type 1 single	11,600
5 N58 between Ballylahan and Foxford	6.0	Type 3 single	5,000
6 N5 between Swinford and Charlestown	7.5	Type 1 single	11,600
7 N17 between Charlestown and Knock	7.5	Type 1 single	11,600
8 N17 Tuam and Claremorris	7.5	Type 1 single	11,600
9 M17 between N63 and M6	2 x 2 lane	Motorway	52,000

Table 14-22 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
1 L-52926 to site	5,000	133	573	NA	273	188
2 N59 adjacent to L-52926 at site	5,000	4,159	4,599	NA	4,299	4,214
3 N59 between L-52926 and Ballina	5,000	2,593	3,033	NA	2,733	2,648
4 N26 between Foxford and Ballina	11,600	9,600	NA	NA	9,740	9,655

Link	Link capacity	Construction delivery stage				
5 N58 between Ballylahan and Foxford	5,000	7,068	NA	NA	7,208	7,123
6 N5 between Swinford and Charlestown	11,600	6,984	NA	NA	7,124	7,039
7 N17 between Charlestown and Knock	11,600	7,716	NA	NA	7,856	7,771
8 N17 Tuam and Claremorris	11,600	11,747	NA	NA	11,887	11,802
9 M17 between N63 and M6	52,000	13,861	NA	NA	14,001	13,916

Table 14-23 Link capacity and % of link capacity (Level of Service D) by construction delivery stage

Link	Link capacity	Construction delivery stage				
		Background traffic	Concrete pour	Other site works	Turbine plant	Turbine equipment
1 L-52926 to site	5,000	3%	11%	5%	5%	4%
2 N59 adjacent to L-52926 at site	5,000	83%	92%	85%	86%	84%
3 N59 between L-52926 and Ballina	5,000	52%	61%	54%	55%	53%
4 N26 between Foxford and Ballina	11,600	83%	NA	NA	84%	83%
5 N58 between Ballylahan and Foxford	5,000	141%	NA	NA	144%	142%
6 N5 between Swinford and Charlestown	11,600	60%	NA	NA	61%	61%

Link	Link capacity	Construction delivery stage				
7 N17 between Charlestown and Knock	11,600	67%	NA	NA	68%	67%
8 N17 Tuam and Claremorris	11,600	101%	NA	NA	102%	102%
9 M17 between N63 and M6	52,000	27%	NA	NA	27%	27%

14.1.6.2 Expected Traffic on Link Flows – During Operation

Once the wind farm is operational it is estimated that two operation and maintenance staff will access the site at any particular time in order to carry out operational maintenance, with a similar number of vehicle trips. Junction Capacity Assessment – During Construction

14.1.6.3 Junctions Capacity Assessment – During Construction

Guidance relating to the requirement to undertake a detailed junction capacity assessment at junctions in the proximity of a Proposed Development is set out in Document PE-PDV-02045 Traffic and Transport Assessment Guidelines, TII, May 2014. The guidance states that a capacity assessment should be undertaken where the Proposed Development results in an increase in traffic volumes of 10% or greater, in situations where the network is not currently congested. As the traffic volumes on the N59 are forecast to increase by greater than this threshold during the construction of the Proposed Development (+10.8% during the 21 concrete delivery days), a detailed capacity assessment was undertaken for the existing N59 / L-52926 junction. As the impact on other junctions on the route are below this threshold it is considered that no further junctions were required to be the subject of a detailed capacity assessment.

The capacity of the N59 / L-52926 junction was assessed using the industry standard junction simulation software PICADY, which permits the capacity of a priority junction to be assessed with respect to existing or forecast traffic movements and volumes for a given 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 Table 14-17 to 14-20 above, the most substantial

effect will be experienced during peak hours when, during peak construction periods, up to 80 workers (40 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.

N59 / L-52926 Junction Capacity Test Results

The AM and PM peak hour traffic flows through the N59 / L-52926 junction were established from the classified turning counts and are shown for the year 2021 and for 2012 Covid-19 adjusted scenarios in Figures 14-4a and 14-4b respectively. Background traffic flows for the assumed construction year of 2028 are shown in Figure 14-4c. Traffic flows generated by the Proposed Development during the AM and PM peak hours are shown in Figure 14-4d while the year 2028 traffic flows with development generated traffic are shown in Figure 14-4e.

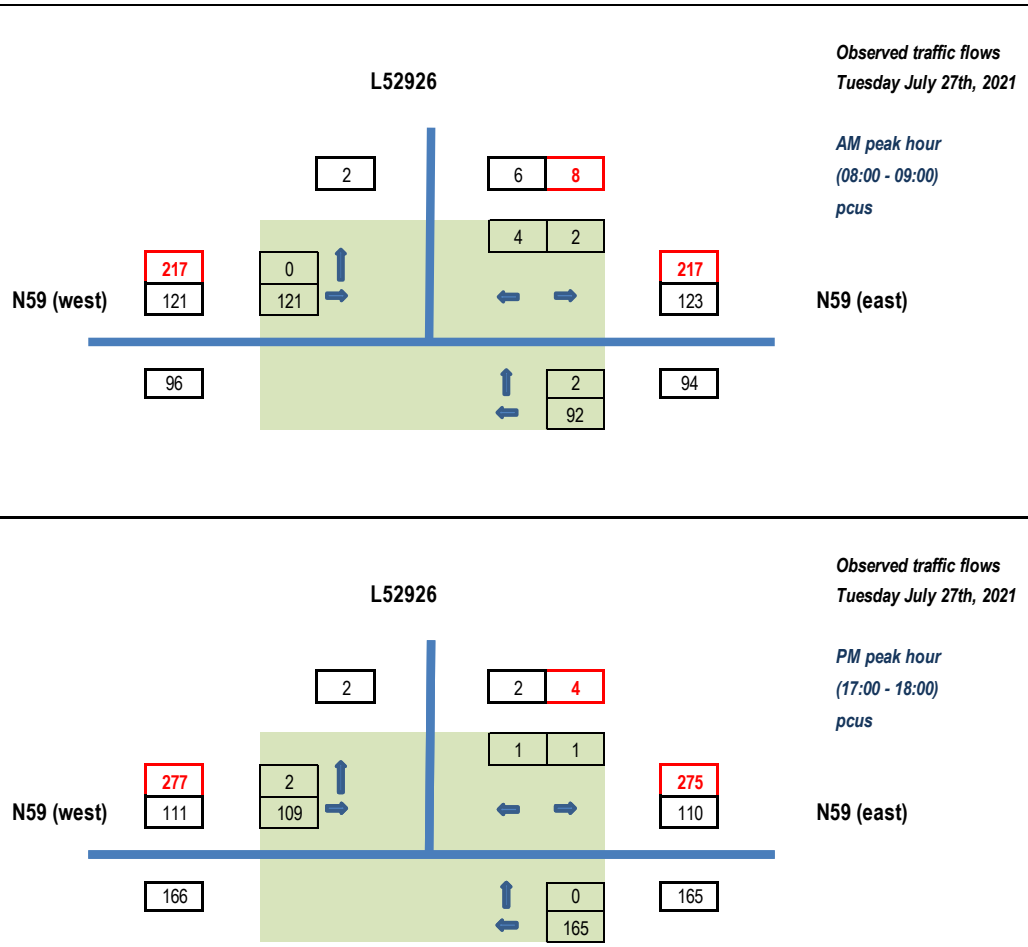
The results of the capacity assessment, as set out in Tables 14-24 and 14-25, show that additional car trips passing through the junction will be accommodated by the existing junction with a maximum ratio of flow to capacity (RFC) forecast to increase from 0.4% from the do nothing scenario to 8.1% (exit from the L-52926 onto the N59) with the Proposed Development construction traffic in place during the PM peak hour, with an increase from 0.6% to 4.8% (right turn from the N59 into the L-52926) during the PM peak hour. All of these movements are forecast to operate well within the acceptable limit of 85%.

Table 14-24 Junction capacity test results, N59 / L-52926 junction, without and with construction staff, year 2028, AM peak

Period	Location	Without construction traffic			With construction traffic		
AM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From L-52926	1.6%	0.02	0.11	1.6%	0.02	0.11
	Right turn into L-529260	0.6%	0.01	0.09	4.8%	0.07	0.10

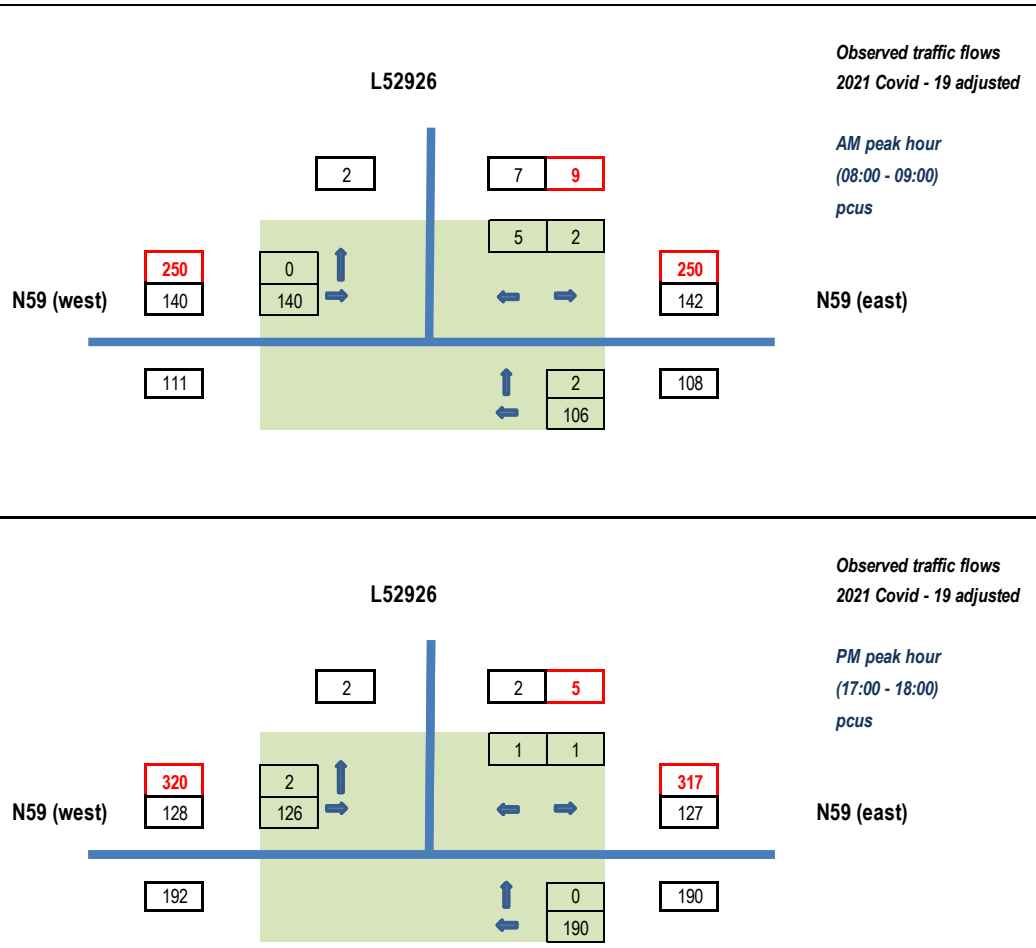
Table 14-25 Junction capacity test results, N59 /L-52926 junction, without and with construction staff, year 2028, PM peak

Period	Location	Without construction traffic			With construction traffic		
PM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From L-52926	0.4%	0.00	0.11	8.1%	0.09	0.12
	Right turn into L-529260	0.0%	0.00	0.00	0.0%	0.00	0.00



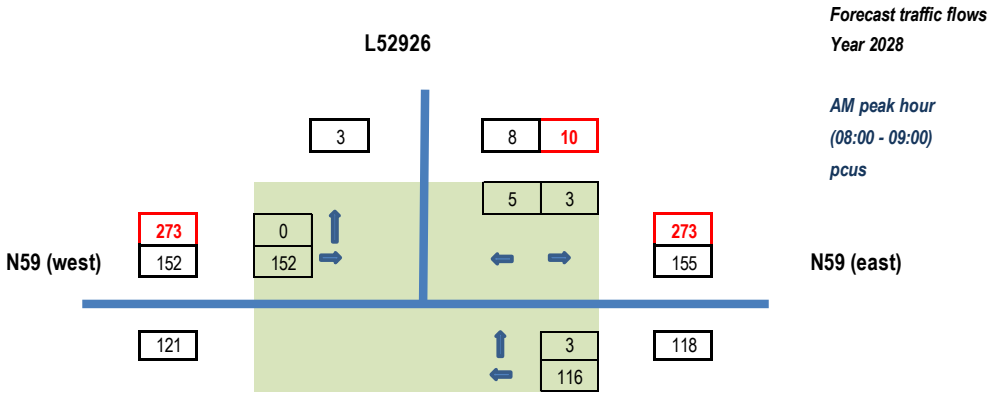
ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

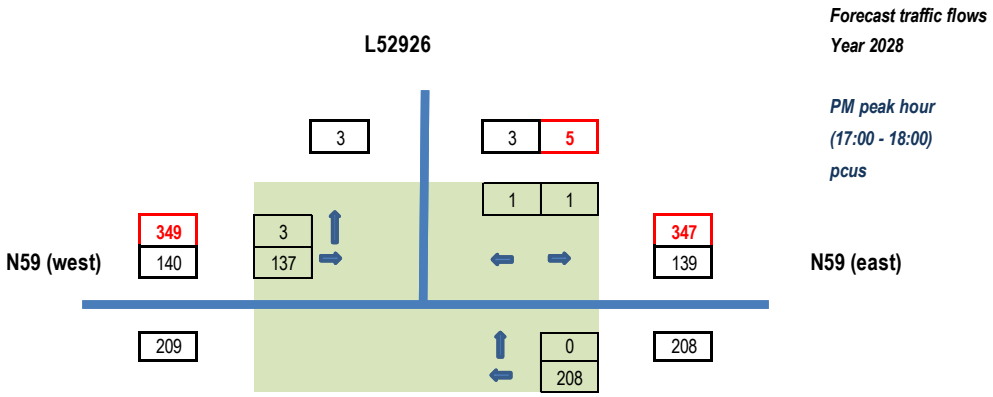
Figure 14-4a Observed traffic flows, N59 / L52926 junction, AM & PM peak hours, Year 2021, July



ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

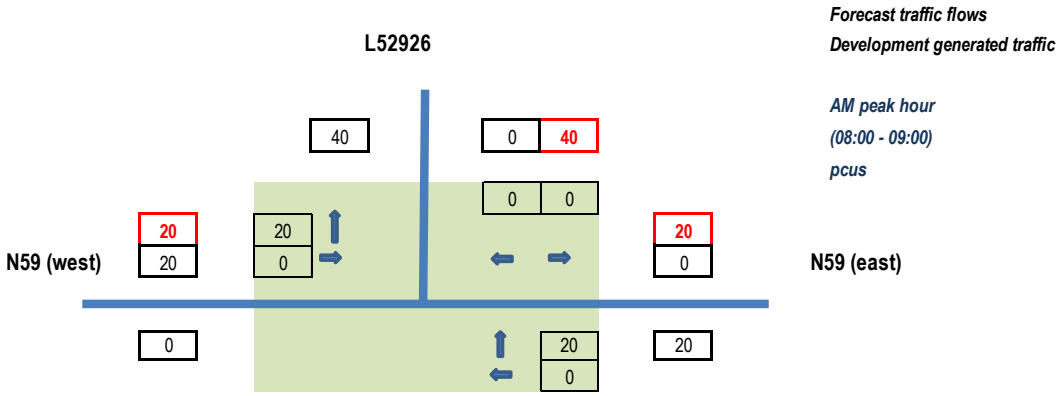
Figure 14-4b Observed traffic flows, N59 / L52926 junction, AM & PM peak hours, Year 2021, Covid - 19 adjusted

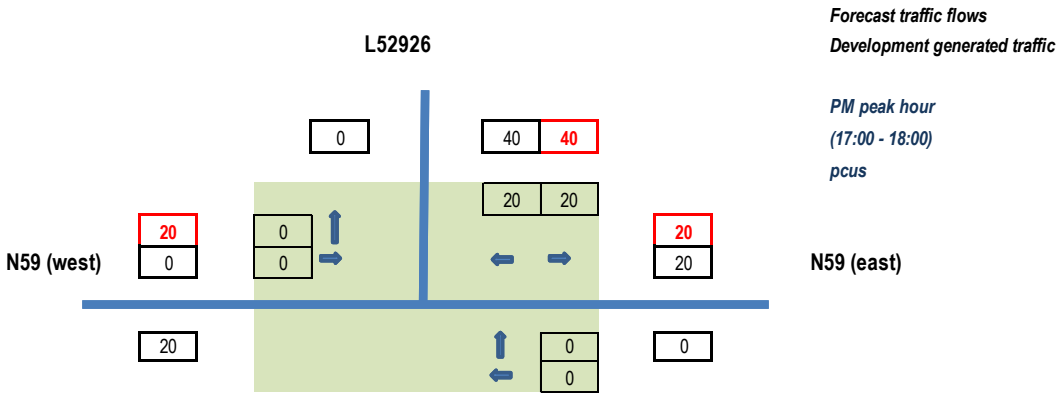




ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

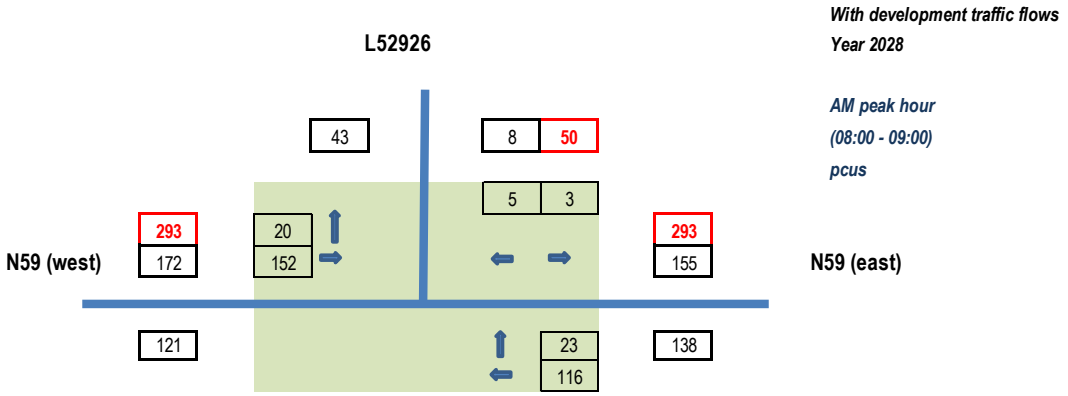
Figure 14-4c Background traffic flows, N59 / L52926 junction, AM & PM peak hours, Year 2028

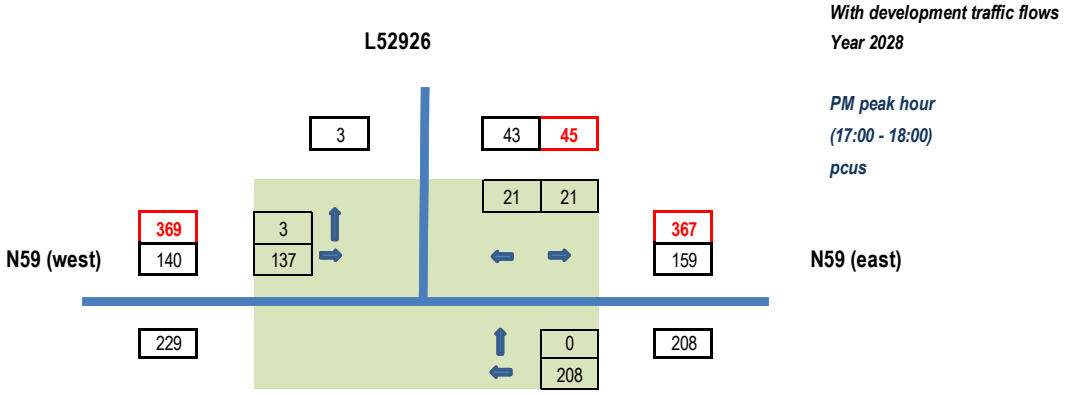




ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Figure 14-4d Development generated traffic flows, N59 / L52926 junction, AM & PM peak hours





ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Figure 14-4e With development traffic flows, N59 / L52926 junction, AM & PM peak hours, Year 2028

14.1.6.4 Junctions Capacity Assessment – During Operation

As discussed in Section 14.1.6.2 it is forecast that once operational, the development will generate approximately 2 trips per day for maintenance purposes and 20 trips recreational and amenity purposes. Therefore, the junction will operate will within the acceptable limit of 85%.

14.1.6.5 Expected Traffic on Link Flows – During Decommissioning

The traffic volumes that will be generated during decommissioning will be substantially less compared to those generated during the construction of the Proposed Development as set out in Section 14.1.6.1. Refer to Appendix 4-7 for details in relation to the decommissioning phase of the proposed Sheskin South Wind Farm development.

14.1.6.6 Traffic on Network due to Grid Connection

The 110kV grid connection between the on-site substation and the existing substation at Bellacorick is not included in the planning application for the Proposed Development. An estimate of the traffic impacts during its construction is, however, set out below

The proposed grid connection route is shown in Figure 4-1a of Chapter 4 of this EIAR with the construction methodology set out on Section 4.9.7 of this EIAR.

The construction methodology of providing a cable route under and along local road networks is well established and accepted nationwide. There are in excess of 270 wind farms currently operational in Ireland and the majority of these are connected to the national grid via underground cable connections predominantly along the public road networks.

The grid connection will be a total of 6.9 km in length with approximately 2.1 km being along a forestry road followed by 1km travelling south on the L-52926, then 3.6km travelling east on the N59, with the remaining 0.2km traveling north along the access track linking into the Bellacorick substation.

The connection will be installed at one location, with approximately 90 metres of cable constructed per day. For the 1 km section of the L-52926, it is estimated that it will take approximately 11 days to construct this section. While the L-52926 too narrow to retain traffic flow localised widening will require to be provided in order to retain access for residents.

For the 3.6 km section of the grid connection cable route which travels along the N59 it is estimated that the construction will take approximately 40 days. During the construction of this section two- way traffic flow on the N59 will be maintained by means of a “Stop and Go” traffic management arrangement.

During the total of 77 days (for 6.9kms) during which the cable grid connection is constructed it is estimated that an additional 15 no 2-way HGV trips, and 3 no additional 2-way car/lgv trips will travel on the local road network.

14.1.7 Traffic Management for Large Deliveries

The greatest effect on the road network will likely be experienced on the approximately 42 days during which the 5 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, below, and include the following:

- Identification of a delivery schedule,

- Details of the alterations required to the infrastructure identified in Section 14.1.8 of this report and any other minor alteration identified,
- 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 and the various local authorities. Turbine components are often transported at night when traffic is lightest and this is done in consultation with the roads authorities and An Garda Síochána, and special permits are generally required.

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 as assessed in Section 14.1.4 above. During these periods, it may be appropriate to operate local diversions for through traffic as described in the Traffic Management Plan in Appendix 12-2. It is noted that it is proposed that all deliveries of abnormally sized loads will be made during night time hours, as is the norm for such deliveries. A dry run using a vehicle with the dimensions as per the blade delivery vehicle will be undertaken by the haulage company prior to the construction phase.

14.1.8 Abnormal Load Route Assessment

A route assessment was undertaken covering the proposed delivery route for the abnormal loads, with the route and assessment locations shown in Figure 14.2. The route assessment discussed in this section, undertaken by Collett & Sons Ltd, indicates that the optimum route to the site would be from the port of entry in Galway followed by the N6 and N17 to Tuam, the N17 to Charlestown, the N5 to Ballyvary, the N58 to Foxford, the N26 to Ballina, followed by the N59 to the L-52926 from which the site is accessed. This route was therefore selected as the transport route for the abnormal loads. All locations along the route referred to in this section are highlighted in Figure 14.2. For these locations, preliminary road and junction alignments, based on site surveys, were supplied by the project team. A swept path analysis was then undertaken using Autotrack in order to establish the locations where the wind turbine transport vehicles will be accommodated, and the locations where some form of remedial measure may be required.

The assessment also presents the proposed design of the proposed site access junction off the L52926.

It should be noted that any accommodation works required along the public road network are not included in this planning application.

The locations discussed are as follows;

Co. Galway

- Location 1 (Dwg No. 348276-045A1.1) – Junction of Monivea Road and Connolly Avenue
- Location 2 (Dwg No. 348276-050A1.1) – Junction of Connolly Avenue and Tuam Road R336
- Location 3 (Dwg No. 348276-055A1.1) – Tuam Road (R336) / N6 junction
- Location 4 (Dwg No. 348276-056A1.1) – Left turn in N6 through Coolagh Roundabout
- Location 5 (Dwg No. 348276-057A1.1) – Kilmore Roundabout, Tuam Bypass N17
- Location 6 (Dwg No. 348276-070A1.1) – Mountpotter Roundabout, Tuam Bypass N17

Co. Mayo

- Location 7 (Dwg No. 348276-100A1.1) – Bracklagh Roundabout – N17/N5 slip road, Charlestown
- Location 8 (Dwg No. 348276-110A1.1) – Westbound N5 Slip road from N17, Charlestown
- Location 9 (Dwg No. 348276-120A1.1) – N5 / N58 junction, Ballyvary
- Location 10 (Dwg No. 348276-141B1.1) – Right turn on N58, Foxford
- Location 11 (Dwg No. 348276-142B1.1) – N58 / N26 junction, Foxford
- Location 12 (Dwg No. 348276-143B1.1) – River Moy Bridge Crossing on N26, Foxford
- Location 13 (Dwg No. 348276-154B1.1) – Junction of Killala Road R314 / Sli Ectra, Ballina
- Location 14 (Dwg No. 348276-160B1.1) – Junction of Sli Ectra / L1119 McDermott Street, Ballina
- Location 15 (Dwg No. 348276-170B1.1) – Gurteens Roundabout, Ballina
- Location 16 (Dwg No. 348276-180B1.1) – Roundabout junction, Crossmolina
- Location 17 (Dwg No. 348276-181B1.1) – S Bend on N59 Church Street, Crossmolina
- Location 18 (Dwg No. 348276-200B1.1) – Right bend on N59 at Bellacorick
- Location 19 (Dwg No. 348276-210B1.1) – N59 / L-52926 junction, Ballymunnelly
- Location 20 (Dwg No. 348276-220B0.1) – Bend on L-52926 junction
- Location 21(Dwg No. 348276-230B0.1) – Site entrance via existing forestry access track.L-52926.

The following text summarises the findings of the swept path analysis for Locations 1 to 18. The assessment undertaken by Collett & Sons Ltd is included as Appendix 14-1.

All of the works that are required on the public road network highlighted in the following text will be temporary in nature, and will be required during the period that the abnormally sized loads are delivered to the site. On completion of this stage all locations requiring temporary measures will be reinstated. It is estimated that these measures will require to be in place for a total of 39 nights spread over a 19 week period.

Location 1 – Junction of Monivea Road and Connolly Avenue

Collett Drawing No 348276-045A1.1

The autotrack assessment based on a surveyed base shows that oversail of footpaths will be required on both sides of the junction and that a lamp post and traffic light column will require to be temporarily removed during the delivery of the abnormal loads.

Location 2 – Junction of Connolly Avenue and Tuam Road

Collett Drawing No 348276-050A1.1

The autotrack assessment shows that temporary over-run of the footpath and verge will be required in addition to oversail on both sides of the junction. Two lamp posts will be temporarily removed temporarily.

Location 3 – Tuam Road (R336) / N6 junction

Collett Drawing No 348276-055A1.1

The autotrack assessment shows that temporary oversail of the western carriageway of the Tuam Road and the south eastern corner of the junction will be required. One lamp post and two road signs on the

nearside prior to the junction will require to be removed. A lamp post, a traffic light on the offside, and pedestrian guard rails on both sides of the slip road will require to be removed on order to accommodate the abnormally sized loads.

Location 4 – Left turn on N6 through Coolagh Roundabout

Collett Drawing No 348276-056A1.1

Temporary oversail will be required on both sides of the southbound N6 approach to the roundabout and over a small section of the centre island. Road signs and 2 lamp posts will also require to be temporarily removed.

Location 5 – Kilmore Roundabout, Tuam

Collett Drawing No 348276-057A1.1

The autotrack assessment shows that temporary oversail will occur on the nearside of both the entry and exits of the roundabout, the N83 splitter island and the roundabout island. Three lamp posts and 2 road signs on the nearside, and 2 road signs on the roundabout island will require to be removed on a temporary basis.

Location 6 – Mountpotter Roundabout, Tuam

Collett Drawing No 348276-070A1.1

The autotrack assessment indicates that the blade will require temporary oversail of the nearside entry and exit, at the entry and exit splitter island, at the opposing carriageway on the offside, and the roundabout island. The temporary removal of 2 lamp posts, and a road sign on the nearside, and 2 road signs on the central reservation will also be required.

Location 7 – Bracklagh Roundabout – N17/N5 slip road, Charlestown

Collett Drawing No 348276-100A1.1

The assessment indicates that an area of 3rd party land will be required for oversail on the south east corner of the roundabout in order that the blade transporter may negotiate this location. Road widening will be required on the offside of the roundabout entry. Temporary oversail will also occur on both sides of the entry to the roundabout, at both splitter islands, and the roundabout island. Two lamp posts, 2 road signs on the offside and 3 roads signs on the 2 splitter islands will require to be removed on a temporary basis. Shrub and trees on the offside will also require to be trimmed / removed on a temporary basis during the delivery phase for the abnormally sizes loads.

Location 8 – Westbound N5 Slip road from N17, Charlestown

Collett Drawing No 348276-110A1.1

Third party land will be required on both sides of this junction to accommodate localised road widening, while the southwest corner will be levelled in order that the blade can oversail at this location. In addition the blade tip will require to oversail into the opposing traffic lane. Trees and vegetation will require to be trimmed / removed and road signs will be removed temporarily during the delivery period.

Location 9 – N5 / N58 junction, Ballyvary

Collett Drawing No 348276-120A1.1

Third party land will be required on the nearside of the N5 to allow the rear projection of the blade to oversail. Trees and hedges behind the wall on the nearside will require to be removed or lowered. The splitter island on the nearside of the N5 will require to be removed temporarily. Oversail will also occur on the nearside of the junction.

Two lamp posts, a bollard, the wall and four road signs will require to be removed from the grass verge on the offside of the junction of the N5 and N58 on a temporary basis. The footpath on the nearside of the N58 will require temporary ramping to allow the abnormally sized vehicles to over-run the footpath.

Location 10 – Right turn on N58, Foxford

Collett Drawing No 348276-141B1.1

Third party land will be required on the nearside of the N58 prior to the right turn to allow the rear of the blade to oversail. Temporary over-run of the footpath will be required on both sides of the junction. Overhead wires crossing the N58 will require to be temporarily re-located.

Location 11 – N58 / N26 junction, Foxford

Collett Drawing No 348276-142B1.1

Third party land is required on the offside of the N58 to allow the rear of the blade to oversail. Temporary over-run of the footpath will be required on the nearside of the junction. A lamp post on the offside of the N58 will require to be temporarily relocated.

Location 12 – River Moy Bridge Crossing on N26, Foxford

Collett Drawing No 348276-143B1.1

Third party land will be required on the nearside of the road. The assessment shows that overhead wires crossing the road will require to be temporarily relocated on order to accommodate the elevated blade.

Location 13 – Junction of Killala Road R314 / Sli Ectra, Ballina

Collett Drawing No 348276-154B1.1

The assessment shows that oversail into third party land will be required in order to accommodate temporary oversail on the eastern side of the R314. The blade will also oversail on the nearside of the R314 and the offside of Sli Ectra. Overhead wires will require to be temporarily relocated during the delivery period.

Location 14 – Junction of Sli Ectra / L1119 McDermott Street, Ballina

Collett Drawing No 348276-160B1.1

Road widening will be required on the offside of the junction. Oversail on an area of land on the nearside of Sli Ectra will be required at this location on a temporary basis during the turbine delivery phase. The blade will require to temporarily oversail at the junction on both sides of Sli Ectra and the nearside of McDermott Street.

Location 15 – Gurteens Roundabout, Ballina

Collett Drawing No 348276-170B1.1

Temporary over-run of islands will be required on the offside of the entry to the roundabout, through the roundabout and the exit splitter island in order to accommodate the abnormally sized vehicles. Street furniture and the sculpture will require to be removed from the roundabout and splitter islands on a temporary basis. The first overhead wires crossing the N59 will require to be temporarily relocated. The blade will then be lowered to pass underneath the subsequent overhead wires.

Location 16 – Roundabout junction, Crossmolina

Collett Drawing No 348276-180B1.1

Temporary oversail of the rear of the blade will occur on the nearside of the road at the junction with Chapel Street.

Location 17 – S Bend on N59 Church Street, Crossmolina

Collett Drawing No 348276-181B1.1

Temporary over-run will be required on both sides of the road. Rear projection of the blade will occur on both sides of the road prior to the bend and the tractor will temporarily oversail the footpath on both sides of the road after the bends. No third party issues are raised at this location. Overhead wires crossing the road will require to be temporarily relocated.

Location 18 – Right bend on N59 at Bellacorick

Collett Drawing No 348276-200B1.1

The autotrack assessment undertaken at this location is based on the temporary road that bypasses the sharp bend recently constructed for a previous wind farm development. Road widening will be required at both sides of the start of the temporary road and the offside of the exit. Oversail will occur on both sides of the N59 prior to the junction and both sides of the temporary road. A road sign on the offside of the temporary road will require to be removed temporarily.

Location 19 – N59 / L-52926 junction, Ballymunnelly

Collett Drawing No 348276-210B1.1

The autotrack assessment indicates that local road widening into third party land will be required on the nearside of the L-52926 road to allow the abnormally sized loads to turn at this location. Further temporary oversail will occur on the nearside of the junction. Street furniture and road signs will require to be removed and an overhead wire will require to be temporarily relocated during the delivery phase. A ditch on the west side of the L-52926 will require to be filled.

Location 20 – Bend on L-52926

Collett Drawing No 348276-220B0.1

A strip of road widening will be required on both sides of the L-52926 while oversail of the blade tip will also occur temporarily during the turbine delivery phase of the blade transport vehicles.

Location 21 – Site entrance on L-52926.

Collett Drawing No 348276-230B0.1

A new junction will provide access to the site from the local L-52926 for all vehicle types. Third party land will be required on the offside of the L-52926 to facilitate rear projection oversail, and the offside after the left turn for road widening. Road widening is required on both sides of the L-52926. Steel plating should be used directly above the line of the gas pipeline. The ditch should be culverted or filled. A fence and post will require to be removed.

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 as 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.

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 accommodation works carried out on the local road network as a result of the Proposed Development and therefore no direct or indirect effects on roads and traffic will occur.

14.1.10.2 Construction Phase Effects

The 21 days when the concrete foundations are poured will result in an increase in traffic levels between +17.0% on the N59 between the site and Ballina, to +10.6% on the N59 just to the east and west of the L-52926 on the way to the site. On the local L-52926 road approaching the proposed site where existing traffic volumes are very low (133 vehicles daily) it is forecast that traffic flows will increase by a factor of 4.3 fold or +332%. Therefore, during this period, there will be a temporary, slight, negative impact on traffic using the surrounding road network.

During the remaining 345 days for the site preparation and ground works when deliveries to the site will take place, the effect on the surrounding road network will be negative and will be between 4.4% on the N59 between the site and Ballina, to +2.7% on the N59 just to the east and west of the L-52926 on the way to the site. On the local L-52926 road approaching the proposed site it is forecast that traffic flows will almost double (+86.0%). On these days, the impact will be negative, temporary and will be slight on traffic using the surrounding road network.

During the 38 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 between +1.2% on the N17 between Tuam and Claremorris to +2.0% on the N58 between Ballylahan and Foxford, to +5.4% on the N59 between Crossmolina and Bangor-Ennis, to +3.4% on the N59 just to the east of the L-52926 on the way to the site. On the local L-52926 road approaching the proposed site it is forecast that traffic flows will slightly more than double (+105.6%).

The assessment assumes that the large turbine components will be delivered during daytime hours and reflects the most conservative scenario. The direct effect will be reduced from moderate to slight if the delivery of the large plant will be done during night time hours, as is proposed. As there it is the industry norm to make these deliveries during night time hours the impacts incurred by existing traffic on the local highway network will be negative, temporary (over 38 nights) and will be slight.

During the 21 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 ranging from +0.5% on the N17 between Tuam and Claremorris to +0.8% on the N58 between Ballylahan and Foxford, to +2.1% on the N59 between Crossmolina and Bangor-Ennis, to +1.3% on the N59 just to the east of the L-52926 on the way to the site. On the local L-52926 road approaching the proposed site it is forecast that traffic flows will increase by +41.5%. The effect during this period will be temporary and will be imperceptible to slight.

Of all of the links assessed on the delivery route it was determined that the N58 between Ballylahan and Foxford is forecast to operate over link capacity (138%) by the year 2028 for the do-nothing scenario. It is forecast that during the construction of the Proposed Development, the most substantial impact will occur during the 21 days when cement is delivered for the construction of the turbine foundations, when this is forecast to increase to 147%. This will reduce to a 140% for the majority of the construction phase. While the assessment indicated that this section of the N58 will operate over capacity by the year 2028, the impacts of the construction traffic generated by the Proposed Development will be negative, slight and will be temporary.

It was determined that the junction between the N59 and L-52926 will operate within capacity for all days within the construction period.

During the construction of the Grid Connection there will be closures along the route along a 1km section of the L-52926 for up to 11days. As traffic volumes are very low, and the resulting diversion will be short via localised widening, the direct effect will be negative, temporary and slight.

14.1.10.3 Operational Phase Effects

During the operational phase the direct effect on the surrounding local highway network, including junctions, will be neutral and long term given that there will be approximately two maintenance staff travelling to site at any one time, resulting in typically two visits to the site on any one day made by a car or light goods vehicle.

Should the proposed wind farm be consented and developed, the recreational and amenity proposals set out in Chapter 4, Section 4.7 will be implemented which means that there will be traffic accessing the site for amenity use during the operational stage. This traffic will access the site via the N59 / L-52926 junction and the proposed access junction on the L-52926. The proposed amenity car park will be accessed via the main site access junction. The volumes are likely to be small (up to a maximum of 20 car trips per day) based on information from other similar wind farm developments. Given the capacity of the local highway network there is no significant effects anticipated on roads and traffic.

14.1.10.4 Decommissioning Phase Effects

When the site is decommissioned, cranes will disassemble each turbine tower and all equipment.

All turbine 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, visitor car park and walkways 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.

The effects on the network during decommissioning will be less significant compared to those during the construction phase as presented in this section of the EIAR as the volume of materials transported to and from the site will be significantly less.

14.1.10.5 Cumulative Effects

A detailed assessment of all developments at varying stages in the planning process (from proposed to operational), is set out in Section 2.8 and Figure 2-3 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 Proposed Development delivery highway network (low to high)
- Traffic volumes (low to high)

From a review of all existing and approved projects in Section 2.3 it has been determined that the potential for cumulative impacts will only occur with other wind farms that have yet to be constructed as the traffic generation for existing operational wind farms is very low.

There are 4 developments within 20k of the Proposed Development, not yet constructed, that have the potential to cause cumulative effects in relation to traffic and transport; ABO Sheskin Wind Farm (permitted) 8 turbines Oweninny Wind Farm Phase 3 (pre-planning, 18 turbines), Glenora Wind Farm (pre-planning, 22 turbines) and a proposed Hydrogen Plant that will be located adjacent to the existing Bellacorrick substation, all located within close proximity of the Proposed Development and accessed via the N59.

As the majority of delivery routes for the abnormally large turbine deliveries and for general construction traffic are common to the 3 developments described above and the Proposed Development, in the event that the construction of the Proposed Development coincides with any or all of these developments, then traffic related cumulative impacts would be negative, short-term and moderate for the 3 wind farm developments and slight for the Hydrogen Plant, based on associated traffic generation. The construction phase of the Proposed Development will be scheduled to take account of other wind farms and developments under construction in the area. This will ensure that the potential for cumulative effects is minimised.

It is noted that all general forestry activity will be curtailed on the site during the construction of the proposed development.

14.1.10.6 Mitigation Measures

This section summarises the mitigation measures to minimise the effects of the Proposed Development during both the construction operational and decommissioning stages.

Mitigation Measures During the Construction Stage

The construction of this development will require significant coordination and the following 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 wind farm.

Delivery of abnormal sized loads

The following are the main points to note for these deliveries. These will take place after peak evening traffic:

- The delivery of turbine components is a specialist transport operation with the transportation of components carried out at night when traffic is at its lightest and the impact minimised.

- The deliveries will be made in consultation with the Local Authority and An Garda Síochána.
- It is estimated that 189 abnormal sized loads will be delivered to the site, comprising 38 convoys of 5, undertaken over 38 separate nights.
- These nights will be spread out over an approximate period of 19 weeks and will be agreed in advance with the relevant authorities
- In order to manage each of the travelling convoys, for each convoy there will be two police escort vehicles that will stop traffic at the front and rear of the convoy of 5 vehicles.
- There will also be two escort vehicles provided by the haulage company for each convoy.

Other traffic management measures

A **Traffic Management Plan (TMP)** is provided specifying details relating to traffic management and as Appendix 14-2 this EIAR. Prior to the commencement of the construction phase of the Proposed Development a detailed Traffic Management Plan will be prepared by the Contractor for agreement with the relevant local authorities and An Garda Síochána . The TMP includes recommendations, which will include the measures below as a minimum requirement, for 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 the County Council in advance of deliveries of turbine components to site. Liaison with the relevant local authorities and Transport Infrastructure Ireland (TII) will be carried out where required regarding requirements such as delivery timetabling. The programme will ensure that deliveries are scheduled in order to minimise the demand on the local network and minimise the pressure on the access to the site.
- **Information to locals** – Locals in the area will be informed of any upcoming traffic related matters e.g. temporary lane/road closures (where required) or delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the 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** – Where required by the local authority, a pre-condition survey of roads associated with the Proposed Development will be carried out immediately prior to construction commencement to record an accurate condition of the road at the time. A post construction survey will be carried out after works are completed to ensure that any remediation works are carried out to a satisfactory standard. Where required the timing of these surveys will be agreed with the local authority. All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.
- **Liaison with the relevant local authority** - Liaison with the County Councils and An Garda Síochána / Police Service of Northern Ireland, will be carried out during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required. Once the surveys have been carried out and “prior to commencement” status of the relevant roads established, (in compliance with the provisions of the CEMP), the Roads section will be informed of the relevant names and contact numbers for the Project Developer/Contractor Site Manager as well as the Site Environmental Manager.
- **Implementation of temporary alterations to road network at critical locations** – at locations highlighted in section 14.1.8. In addition, in order to minimise the impact on the existing environment during turbine component deliveries the option of blade adaptor trailers will also be used where deemed practicable.

- **Identification of delivery routes** – These routes will be agreed with the County Councils and adhered to by all contractors.
- **Delivery times of large turbine components** - The management plan includes the option to deliver the large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage.
- **Travel plan for construction workers** – While the assessment above has assumed the worst case in 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 routes to / from the site.
- **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. These are set out in the CEMP which is contained in Appendix 4.3.
- **Re-instatement works** - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.

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

When the Proposed Development is decommissioned, a decommissioning plan will be prepared for agreement with the local authority, as described in Section 4.11 of Chapter 4. This plan will include a traffic management plan and other similar mitigation measures to those implemented during the construction phase. In terms of traffic effects the decommissioning stage will generally mirror the constructions stage although the effects will be significantly reduced as the volumes of materials removed from the site will be less.

14.1.10.7 Residual Impacts

Construction Stage

During the 18-month construction stage of the Proposed Development, it is forecast that the additional traffic that will appear on the delivery route indicated in Figure 14-2a will have a negative 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. The effects will be slight to imperceptible during all of the construction stage, with the exception of the delivery of the abnormal loads, which will reduce from moderate to slight if these deliveries are undertaken during the night, as proposed.

Operational Stage

As the traffic impact of the Proposed Development will be imperceptible during the operational stage, no mitigation is required and the residual effects will also be imperceptible.

Decommissioning Stage

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

14.1.10.8 Significance of Effects

Based in the above assessment it is concluded that the Proposed Development will have no significant effects in relation to background traffic movements or on the existing road network.

14.2 Other Material Assets

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

14.2.1 Introduction

The Proposed Development is located within existing commercial forestry properties in the townlands of Sheskin, approximately 6 kilometres (km) east of the village of Bangor Erris, Co. Mayo. The site location context is shown in Figure 1-1a and Figure 1-1b. The site is located in a rural setting with a low population density with a low volume of built services. The purpose of this section is to determine the potential for impact on built services by the Proposed Development during the construction, operation and decommissioning phase and to determine the residual effects once mitigation, where required, has been implemented.

14.2.1.1 Methodology and Guidance

This section of the assessment focuses particularly on the scoping and consultation exercise conducted with relevant stakeholders such as Gas Networks Ireland, Irish Water, Eirgrid, ESB and various 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, and section 3.3 of the EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports. 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 of the EIAR.

The assessment of likely significant effects on material assets uses the standard methodology and classification of impacts as presented in Section 1.7.1 of Chapter 1 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 Karen Mulryan and reviewed by Eoin McCarthy, of MKO. Karen holds a BA from NUI, Galway and a MSc from Edinburgh, in archaeology. Her project experience includes watching briefs, surveys and desk based assessments for a wide range of projects including wind energy developments, project management of wind energy developments and input into EIAR chapters and environmental reports. Eoin holds a B.Sc. (Hons) in Environmental Science from NUI, Galway. His project experience includes a significant range of energy infrastructure in addition to project managing circa 600MW of wind energy projects. Both Karen and Eoin have completed numerous Material Assets (Other Material Assets) sections of EIARs for wind farm developments.

14.2.2 Utilities

14.2.2.1 Gas

The Corrib gas pipeline runs west to east through the southern portion of the wind farm site before turning south as it exits the eastern site boundary and subsequently runs south within L-52926 road, turning east into third party land. Early engagement by the applicant was undertaken with Gas Networks Ireland (GNI) and they were formally contacted in January 2021. A response was received on the 18th May 2021 which included the GNI *Code of Practise* which details required construction notification zones and turbine location setbacks and an indicative map of the gas pipeline through the site. GNI requested to be kept informed of the final turbine locations. In December 2021 the final turbine locations and dimensions were issued to GNI. No response was received.

14.2.2.2 Water Supply

A scoping request letter was issued to Irish Water in March 2021. A follow up scoping request was issued to Irish Water in June and August 2021. No response was received to date.

The GSI maintain a groundwater database of wells drilled throughout Ireland. There are no groundwater wells abstractions within the EIAR site boundary. The nearest public water supply is the Crossmolina Eskeragh Ground Water Supply located 15km southeast of the site. The nearest groundwater private well is located at Bellacorick Power Station approximately 5km east of the site.

14.2.2.3 Electricity

14.2.2.3.1 *Infrastructure*

Two 38kV overhead lines are located 1.4km south of the Proposed Development site. Both lines run east to west from the Bellacorick 110kV substation to the Bangor Erris 38kV substation, located 5km and 6km southeast and southwest of the Proposed Development site, respectively. The lines traverse the L-52926 road which provides access to the site. The local rural supply provides electricity from these overhead lines to the receptors dotted along the N59. A scoping request was issued to Eirgrid in March 2021 and again in December 2021. No response was received to date. A scoping request was issued to ESB. Their response is detailed in section 14.2.6 below.

14.2.2.3.2 *Supply*

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

14.2.3 Telecommunications and Aviation

The following section describes the way in which wind turbines can potentially interfere with telecommunications signals or aviation activities. Section 14.2.7.2 presents details on how such effects will be avoided, with the likely significant effects assessed (and mitigation measures that will be implemented) in Section 14.2.6.

14.2.3.1 Background

14.2.3.1.1 *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 wind farm is directly in line with the transmitter radio path.

14.2.3.1.2 *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.

14.2.3.1.3 *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 airports to the Proposed Development site are Ireland West Airport in Knock, County Mayo, located approximately 59 kilometres southeast of the site and Sligo Airport, also located approximately 66km to the northeast.

Potential effects on broadcast communications are generally easily dealt with by by the use of repeater relay links out of line with the wind farm (i.e. diverting the telecommunications signal path).

14.2.3.2 Preventing Electromagnetic Interference

14.2.3.2.1 *National Guidelines*

Both the adopted 2006 and the 2019 draft 'Wind Energy Development Guidelines for Planning Authorities' produced by the Department of the Environment, Heritage and Local Government (DOEHLG) 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; full details are provided in Section 2.6 in Chapter 2 of this EIAR.

The layout and design of the Proposed Development has taken into account nearby telecommunications links.

14.2.4 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 to identify any other additional licensed operators in the vicinity of the proposed site to be contacted, who may not have been on the list of main operators. These operators were subsequently contacted, and their responses are summarised below in Table 14-26.

Table 14-26 Telecommunications and Aviation Scoping Responses

Consultee	Response	Potential for Interference Following Consultation Exercise
Broadcasting Authority of Ireland	Received 5th February 2021	No
ComReg (Commission for Communications Regulation)	Received 9th March 2021	No
Department of Defence	Received 7th April 2021	See Section 14.2.8.3
Eir	Received 22nd January 2021	No
EMR Integrated Solutions	Received 5th February 2021	No
eNet	Received 22nd January 2021	No
ESB Telecoms	Received 28th January 2021	No
Ireland West Airport Knock	Received 24th March 2021	See section 14.2.8.3
Imagine Group	Received 22nd January 2021	No
Irish Aviation Authority	Received 14th April 2021	See Section 14.2.8.3
Openeir	Received 22nd January 2021	No
Ripplecom	Received 24th May 2021	No
RTÉ Transmission Network (2rn)	Received 5th February 2021	See Section 14.2.8.1
Sligo Airport	Received 24th May 2021	See Section 14.2.8.3
Tetra Ireland Communications (Emergency Services)	Received 12th February 2021	No

Consultee	Response	Potential for Interference Following Consultation Exercise
Three Ireland Ltd	Received 26th January 2021	No
Towercom Ltd.	No Response Received	N/A
Viatel	Received 25th January 2021	No
Virgin Media	Received 26th January 2021	No
Vodafone Ireland	Received 25th January 2021	No

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

14.2.4.1 Broadcasters

RTÉ Transmission Network (operating as 2rn), replied on the 5th of February 2021 to a scoping request from MKO stating that the operation of the proposed wind farm will not have any impact on RTÉ fixed links. However, 2rn have stated that there is a risk of interference to digital terrestrial television services in the area around the wind farm and have requested a protocol agreement between the telecoms Operator and the wind farm Developer should the wind farm application be granted.

Virgin Media replied on the 26th of January 2021 to scoping requests from MKO stating that this development will have no impact on their presence in the area.

14.2.4.2 Other Operators

Of the scoping responses received from telephone, broadband and other telecommunications operators, no potential interference concerns have been raised in relation to the final proposed turbine layout.

14.2.4.3 Aviation

As noted in **Error! Reference source not found.**26 above, in terms of aviation consultees, a scoping response was received from the Department of Defence, the Irish Aviation Authority and Sligo Airport. An automated response was received from Ireland West Airport.

Department of Defence

The Department of Defence replied to a scoping request from MKO Ireland on the 7th of April 2021

1. *All turbines or tall structures should be illuminated by high intensity obstacle lights that will allow the hazard be identified and avoided by aircraft in flight.*
2. *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.*
3. *Due to the nature of flight operations by the Irish Air Corps the above lighting requirements are separate to ICAO and IAA lighting requirements.*

The final design layout was sent to the Department of Defence on the 8th November 2019 and a response restating item 3, as above, was returned on 7th December 2019.

In response to the lighting requirements requested by the Department of Defence (Items 1 to 3 above), the turbines will be included on mapping, fitted with obstruction lighting and entered into aircraft navigation databases to ensure they will be avoided during flight.

Sligo Airport

A scoping response was received from Sligo Airport on the 24th May 2021. The response noted that the development falls outside of the area that would be of concern to the airport but recommend the IAA is contacted.

Ireland West Airport, Knock

Ireland West Airport was issued a scoping request on the 24th March 2021. An automated response was received on the same day with a list of phone numbers. Further attempts were made via phone call however no representative for the airport was reached.

Irish Aviation Authority

The Irish Aviation Authority (IAA) replied to a scoping request on the 14th of April 2021. The IAA noted that as the turbine dimensions and locations were not provided at that stage a full review could not be complete. They stated however that since the nearest airports, Sligo Airport and Ireland West Airport were 66km and 59km away from the proposed wind farm site, respectively, and therefore the following general observations would be proffered during a formal planning process:

1. *agree an aeronautical obstacle warning light scheme for the wind farm development,*
2. *provide as-constructed coordinates in WGS84 format together with above mean sea level tip height elevations at each wind turbine location*
3. *notify the Authority of intention to commence crane operations with at least 30 days prior notification of their erection.*

The final turbine coordinates and dimensions were issued to the IAA on the 21st December 2021. An acknowledgment response was received on the same day. The above requests will be complied with should the Proposed Development receive a grant of planning permission.

14.2.5 Existing Waste Management Services

There are no EPA-licensed or local authority-authorised waste facilities or activities located within the site boundary. The closest, authorised municipal waste facility is located approximately 27km east of the Proposed Development site, at Ballina, Co. Mayo.

The CEMP, Appendix 4-3 of this EIAR, includes a waste management plan (WMP) which outlines the best practice procedures, that will be implemented, during the demolition, excavation and construction phases of the project. 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 seen as a last resort.

14.2.6 Likely Significant Effects and Associated Mitigation Measures

14.2.6.1 'Do-Nothing' Scenario

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

14.2.6.2 Construction Phase

14.2.6.2.1 *Gas*

Pre-Mitigation Impact

The Corrib gas pipeline cuts through the southern portion of the site boundary (as shown in Figure 3-1b of this EIAR). Construction works in the immediate of the gas pipeline includes road upgrades adjacent to the gas pipeline and construction of new roads over the pipeline. These construction works, if carried out in the absence of the necessary control measures may cause damage to the gas pipeline. In the unlikely event of damage to the gas pipeline, that gas supply will need to be shut off. This will have a short-term significant negative impact on gas supply. Although unlikely, wind farm construction activities related to the construction of roads within the pipeline corridor may cause leaks or pipeline breakages. This will have a short term negative impact on health and safety of construction staff and nearby receptors.

Mitigation by Design

GNI requires construction zone setbacks from gas pipelines to prevent impacts on supply and to safeguard against any potential health and safety emergencies.

The GNI turbine setbacks (Table 14-27 below) were incorporated into the wind farm design stage to ensure no turbines were sited within this area. Furthermore, borrow pits, compounds and the onsite substation are also excluded from this area. An existing road runs parallel to the immediate south of the gas pipeline within the site boundary. It is proposed to provide an upgraded road along the northern boundary of the gas line which will give GNI continuous, improved access. A crossing point is proposed on the pipeline route to provide construction, operational and recreational access from the southern portion of the wind farm site to the north. The proposed road upgrade and crossing point will be constructed as per the methodology outlined in Chapter 4, Section 4.9.4 of this EIAR.

The required construction zone setbacks listed below will be adhered to during the construction activities. Where works fall within these areas, e.g., road upgrades, and crossing points, the required notification timeframes will be provided to GNI.

Table 14-27 GNI Setbacks from specific activities including wind farm construction. Source: GNI code of Practise, section 14.

Activity	Distance within which GNI shall be consulted
Any excavation actions	10m
Piling	15m
Surface Mineral Extraction	100m
Land filling	100m

Demolition	150m
Blasting	400m
Wind Farm	2 times turbine mast height from the nearest edge of a transmission pipeline

Mitigation Measures

- GNI will be notified within a minimum of 5 working days prior to commencement of construction.
- A minimum of 3 working days will be provided to GNI to mark out the transmission pipeline route.
- The marked area will be fenced off from wind farm vehicle or personnel entry during the construction phase. However, continuous access will be provided to all GNI members.
- The required construction zone setbacks as listed in Table 14-2 above will be in place and adhered to for the duration of the construction phase. As required in the GNI *Code of Practise*, where works e.g. road upgrades and crossing points fall within these zones, notification will be given to GNI. +
- Should any backfilling over, or alongside the transmission pipeline, the developer will seek GNI's agreement to proceed. GNI require two working days' notice prior to any proposed backfilling.
- In the event of gas leakage do not switch any machinery on or off in the vicinity of the leak.
- Prohibit smoking, the use of naked flames, the use of electrical switches, the use of mobile phones and the use of all other ignition sources in the vicinity of the leak/damage.
- Evacuate all personnel away from and up wind of the affected area.
- Ensure that no one approaches the affected area without the consent of Gas Networks Ireland.
- Once clear of the area, report the damage or leakage, however minor it may appear, to the Gas networks Ireland 24hr Emergency Service on 1850 20 50 50.
- Do not attempt to repair the damage or stop the leak.
- All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan.
- All health and safety measures as detailed in Section 5 of Construction Environment Management Plan and Chapter 5: Population and Human Health will be adhered to during the construction, operation and decommissioning phases.

Residual Impact

With the implementation of the above measures, there will be a short-term potential slight negative residual effect on gas supply.

Significance of effects

There will be no significant direct or indirect effect on gas supply from the Proposed Development.

14.2.6.2.2 *Water Supply*

Pre-Mitigation Impact

There are no public water schemes or private wells within 5km of the main wind farm site. Prior to grid connection works, confirmatory surveys of the proposed route to confirm the presence services such as water supply will be undertaken. If encountered, the utility provider will be contacted to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works. Any works undertaken will be carried out in accordance with the specifications of the relevant utility provider.

Mitigation Measures

In advance of any construction activity for the grid route, the contractor will undertake pre-commencement surveys of the proposed route to confirm the presence or otherwise of any services such as water supply. If found to be present, the relevant service provider will be consulted with in order to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works. In the event that water mains are encountered the water supply will be turned off by the utility so work can commence on diverting the service. The section of existing pipe will be removed and will be replaced with a new pipe along the new alignment of the service within the public road corridor. The works will be carried out in accordance with the specifications of the relevant utility provider.

Residual Impact

There will be a short-term imperceptible negative residual effect on water supply.

Significance of Effects

There will be no significant direct or indirect effect on water supply from the Proposed Development.

14.2.6.2.3 *Electricity*

Pre-Mitigation Impact

Two 38kV overhead lines which connect to the local rural supply are located 1.4km south of the Proposed Development site. These lines traverse the L-52926 road which provides access to the site. There is potential for these lines to be impacted through interference or breakage during the construction phase, specifically during the delivery of turbine components and the laying of grid connection cables along the L-52926. There will also be a requirement, to temporarily take down the overhead electricity lines during the turbine delivery phase (Please refer to Appendix 14-1 of this EIAR). This will temporary, moderate negative impact on local electricity supply.

Mitigation Measures

- Goal posts will be established under the two overhead lines for the entirety of the construction phase. They will not exceed a height of 4.2 metres, unless specifically agreed with ESB Networks
- The suitability of machinery and equipment for use near power lines will be risk assessed.
- All staff will be trained on the routes and operating voltages of overhead electricity lines running across the L-52926. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the sites are made aware of the location of lines before they come on to site.

- Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire.
- Prior to the delivery of turbines to the Proposed Development site, a dry run of the route using vehicles with similar dimensions will occur. Please see section 14.1 above for details.
- When activities must be carried out beneath overhead lines, e.g. component delivery or grid cable laying, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used is undertaken prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required.
- Information on safe clearances will be provided to all staff and visitors.
- Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on site.
- All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan.
- All health and safety measures as detailed in Section 5 of Construction Environment Management Plan and Chapter 5 Population and Human Health will be adhered to during the construction, operation and decommissioning phases.

Residual Impact

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

Significance of Effects

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

14.2.6.2.4 *Telecommunications and Aviation*

The potential for electromagnetic interference from wind turbines 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 therefore no mitigation required.

14.2.6.3 Operational Phase

14.2.6.3.1 *Gas*

Pre-Mitigation Impact

During the operational phase, interactions with the gas pipeline corridor will be limited to very occasional wind farm road maintenance by the developer. Although unlikely, it may be required to shut down gas supply during road maintenance activities. Also unlikely, road maintenance activities may cause a leak or pipeline breakage. The potential for maintenance activities to impact on gas supply is considered to have long-term slight negative unlikely effect during this phase. The potential for maintenance activities within the gas pipeline corridor to impact on the health and safety of employees and public health is considered to be a long-term slight negative unlikely effect during this phase.

Mitigation Measures

Any maintenance works by the developer in the pipeline area will first require approval by GNI and all health and safety measures detailed in section 14.2.7.2.1 will be adhered to.

Residual Impact

With the implementation of the above measures, the residual impact is considered to be long-term imperceptible negative on gas supply and health and safety of employees and the public.

Significance of Effects

There will be no significant direct or indirect effect on gas supply or health and safety from the Proposed Development during the operational phase.

14.2.6.3.2 *Water Supply*

Pre-Mitigation Impact

No interactions with water supply are foreseen during the operational phase.

Mitigation Measures

No measures are proposed.

Residual Impact

With the implementation of the above measures, the residual impact is considered long-term imperceptible negative on water supply.

Significance of Effects

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

14.2.6.3.3 *Electricity*

Electricity Infrastructure

Pre-Mitigation Impact

In the unlikely event that a replacement of turbines components is required during this phase, the impacts described in section 14.6.2.3 will be the same.

Mitigation Measures

The measures listed in section 14.6.2.3 which relate to the delivery of turbine components will be implemented.

Residual Impact

There will be no residual effect on electrical infrastructure during the operational phase.

Significance of Effects

There will be no significant effect on electrical infrastructure from the Proposed Development during the operational phase.

Electricity Supply

Pre-Mitigation Impact

It is the intention to connect the proposed wind farm development into the existing Bellacorick 110kV substation, km southeast of the development site. The proposed Sheskin South Wind Farm will supply a significant amount of renewable electricity to the national grid during the operational phase, offsetting the use of fossil fuels within the electricity generating sector. The Proposed Development has the potential to provide enough electricity to the grid to supply between 91,980 and 130,507 households (Refer to Chapter 4, Section 4.3.1.5 of this EIAR) .

Mitigation Measures

None are proposed

Residual Impact

There will be a long-term, moderate, positive residual effect on electricity supply during the operational phase.

Significance of Effects

The proposed Sheskin South Wind Farm will have a moderate positive effect on national electricity supply.

14.2.6.3.4 *Telecommunications and Aviation*

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 other operators. There are no microwave links traversing the site of the Proposed Development (refer to Section 14.2.4 above).

Mitigation Measures

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 can be dealt with by the use of divertor relay links out of line with the proposed wind turbines.

Residual Impact

The Proposed Development will have no residual impact on the telecommunications signals of any 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.

14.2.6.3.5 *Aviation*

Pre-Mitigation Impact

No scoping response was received from Ireland West Airport. Sligo Airport indicated no potential for impact due to the separation distance between the airport and the Proposed Development site. The IAA indicated that due to the separation distance between the Ireland West Airport and Sligo Airport, just general observations regarding lighting and as built turbine coordinates are to be provided. The scoping response of the Department of Defence and IAA requested that standard lighting requirements be used at the proposed wind farm.

Mitigation Measures

IAA noted that given the distance from the site to the airports, general observations pertaining to lighting and turbine coordinate provision should be followed (Refer to Section 14.6.2.3 above). The Department of Defence provided general observations pertaining to lighting specifications. . The requiredments outlined in Section 14.6.2.3 will be adhered to.

Residual Impact

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

Significance of Effects

There will be no significant effect on aviation during the operational phase.

14.2.6.4 Decommissioning Phase

14.2.6.4.1 *Gas*

Pre-Mitigation Impact

The proposed upgraded road which will run parallel to the gas pipeline and the crossing point will remain *insitu* after the site is decommissioned. Therefore, no ground works are proposed near the pipeline route. Therefore, there is no impact on the pipeline foreseen during the decommissioning phase.

Mitigation Measures

- All measures proposed during the construction phase above will be implemented during the decommissioning phase.

Residual Impact

No decommissioning works are proposed near the gas pipeline. All health in safety measures will be implemented during this phase and notification. As such, there is no residual impact on gas supply during this phase.

Significance of effects

There will be no significant direct or indirect effect on gas infrastructure during decommissioning.

14.2.6.4.2 *Water Supply*

The impact assessment outcome of the decommissioning phase on water supply is considered to be the same as the operational phase. There will be no significant effect on water supply during this phase.

14.2.6.4.3 *Electricity*

Pre-Mitigation Impact

During the decommissioning phase, the removal of turbine components from the site will be required. Therefore, impacts during the construction phase are considered to be the same as the decommissioning phase.

However, should the Proposed Development be decommissioned and not be repowered this will have a slight, negative impact on the national electricity supply.

Mitigation Measures

The measures outlined for the construction phase are considered the same for the decommissioning phase.

Residual Impact

The residual impact for this phase is considered the same as the construction phase.

Significance of Effects

There will be no significant effect on electricity supply with the decommissioning of the Proposed Development.

14.2.6.4.4 *Telecommunications and Aviation*

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

14.2.6.5 Cumulative Effect

Chapter 2, Section 2.8 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. There are 3 no. operational wind farms (Bellacorick Wind Farm, Oweninny Wind Farm Phase 1 and Phase 2),, 1 no. permitted (Sheskin Wind Farm ABO) and 2 no. proposed (Oweninny Wind Farm Phase 3, Glenora Wind Farm) within 20 kilometres of the proposed Sheskin South Wind Farm.

There will be a significant positive cumulative effect on electrical supply with the commissioning of all granted and proposed wind farms. The Corrib gas pipeline runs through the site boundary of Oweninny Phase 2 and Phase 3. However, with adherence to GNI guidelines, no significant cumulative effect on gas infrastructure is foreseen. There are no public water supplies or wells within the site boundaries of any of the above proposed, permitted or under construction wind farms therefore no significant cumulative effects are foreseen.

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 Aviation Authorities to ensure that the proposal 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 is not predicted to arise.