Drumlins Park Wind Farm

Chapter 13: Material Assets

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13.0 Introduction

Material assets are *"resources that are valued and that are intrinsic to specific places"* which can be of human or natural origin[1]. While the meaning is less clear than other factors, Material Assets are taken to mean *"built services and infrastructure"*[2]. The majority of assets of natural origin are assessed elsewhere within this EIAR such as biodiversity, water quality, air quality and landscape. This chapter addresses, therefore, Material Assets which are of human origin, including transport, access, aviation, telecommunications, and resources & utility infrastructure. Another Material Asset of human origin, archaeology and cultural heritage, is addressed in **Chapter 10**.

13.1 Transport & Access

13.1.1 Introduction

13.1.1.1 Background and Objectives

Jennings O'Donovan & Partners Limited ('JOD'), Consulting Engineers, has undertaken an assessment of the likely significant effects on transport and access resulting from the construction, operation and decommissioning of the proposed development. Full details of the proposed development are provided in **Chapter 3**.

This chapter provides an assessment of the local road network for construction, operational and decommissioning traffic, including the turbine component haul route and reviews the site access arrangements for construction, operational and decommissioning phases of the proposed development. The relevant sections of this chapter should be read in conjunction with the Site Access Study ('SAS') presented in **Annex 3.4**.

13.1.1.2 Statement of Authority

JOD has extensive experience in the development of wind farms from planning and development through to construction. JOD has been active in the wind energy industry in Ireland since 1998 as engineering consultants for numerous completed wind farm projects varying from single wind turbine installations to large scale developments, which totals to in excess of 2,000MW.

This chapter has been prepared by Mr. David Kiely of JOD, who has prepared numerous EIS/EIARs for wind farms throughout Ireland. Mr. Kiely has over 37 years' experience in the civil engineering and environmental sector. He has obtained a Bachelor's Degree in Civil Engineering and a Masters in Environmental Protection, has overseen the construction of over 40 no. wind farms and has carried out numerous transport assessments for EIS/EIARs.

13.1.1.3 Candidate Wind Turbine & Grid Connection Option

As outlined in **Chapter 3**, a specific wind turbine model has not yet been selected and will only be confirmed following a pre-construction tendering process. Due to the nature of the road network in County Monaghan, largely comprising regional and local classed roads, in accordance with the precautionary principle, it is considered prudent to base the assessment of the likely significant transport and access impacts on the largest turbine components from the 2 no. selected candidate turbines. As a result, this chapter undertakes a 'worst case' assessment based on the General Electric GE 5.5-158 wind turbine, with a rotor diameter of 158m

[1] Draft Advice Notes for preparing Environmental Impact Statements (EPA, 2015)

[2] Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2017)

and a blade length of 79m (Option TU1).

In respect of the grid connection, of the 3 no. options discussed at **Chapter 3**, it is assessed that the 110kV substation and grid connection option (Option G3) will result in the greatest number of deliveries to the development site. Deliveries associated with the 110kV substation will utilise the main site entrance and will follow wind farm access tracks and the L62013 to the substation location.

Given that the 110kV substation option is assessed as likely to result in greater effects on transport and access, it has been used as the basis for assessment within this chapter.

13.1.2 Methodology

13.1.2.1 Assessment Methodology

This assessment used the following method, further details of which are provided in the following sections:-

- Legislation and guidance review;
- Desk study, including review of available maps and published information;
- Site walkover, including review of road network to be used;
- Evaluation of likely effects;
- Evaluation of the significance of these effects; and
- Identification of measures to avoid and mitigate any likely effects.

13.1.2.2 Planning Policy & Guidelines

This assessment has been prepared is carried out in accordance with guidance contained in the following published documents:-

- Environmental Protection Agency (September 2015): Draft - Advice Notes on Current Practice (in the preparation on Environmental Impact Statements);
- Environmental Protection Agency (August 2017): Draft – Revised Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (2003): Advice Notes on Current Practice (in the Preparation on Environmental Impact Statements);
- Environmental Protection Agency (2002): Guidelines on the Information to be Contained in Environmental Impact Statements;
- The Monaghan County Council Development Plan 2019-2025 ('the CDP');
- The Design Manual for Urban Roads and Streets ('DMURS')[3];
- The Design Manual for Roads and Bridges ('DMRB') published by Transport Infrastructure Ireland ('TII'); and
- Traffic and Transport Assessment Guidelines'[4].

The CDP states that, in relation to renewable energy projects, particular regard will be paid to the project's likely significant effects on the road network in the area. The CDP also states the following:-

> *"It is acknowledged that road transport is the only form of transport available in County Monaghan therefore investment, maintenance and improvement of our existing road infrastructure and the protection of the carrying capacity of our national road network is of key importance to the economic and social development of the county."*

[3] http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/DevelopmentandHousing/Planning/FileDownLoad%2C32669%2Cen.pdf
[4] http://www.tii.ie/tii-library/land-use-planning/Transport-Assessment-GuidelinesMay2014.pdf

An assessment of the relevant transport policies and objectives of the CDP are set out in **Table 13.1** below.

Planning Policy / Objective	Assessed	Comment
TP 1: To implement government policy as set out in Transport 21, A Sustainable Transport Future - A new transport policy for Ireland 2009-2020, Spatial Planning and National Roads – Guidelines for Planning Authorities 2012, National Cycle Policy Framework 2009, Traffic and Transport Assessment Guidelines 2014, Smarter Travel and any other National Policy which is adopted during the lifetime of this development plan.	Yes	Traffic management has been assessed in this chapter and in the SAS autotrack analysis (see **Sections 13.1.4 and 13.1.5**).
TP 2: To support the creation of an integrated and sustainable transport system to promote a choice of transport modes including public transport, cycling and walking facilities	No	Not considered relevant to the proposed development.
TP 3: To capitalise on the County's existing transport infrastructure by implementing appropriate traffic management measures to reduce congestion and minimise travel times.	Yes	Traffic management has been assessed in this chapter (see **Sections 13.1.4 and 13.1.5**).
TP 4: To plan for future traffic and transportation needs in County Monaghan and to ensure that new development does not prejudice the expansion of road and cycling corridors in the County. Proposed road routes, road realignment schemes and future cycle route corridors shall be kept free from development that would compromise their future delivery.	Yes	Traffic management has been assessed in this chapter. This chapter and the associated autotrack drawings outline where signs will need to be temporarily removed and upgrade works undertaken.
TP 5: To ensure that all new developments and extensions to existing developments have adequate car parking provision.	Yes	During construction, parking will only be permitted at the Contractor's temporary compound and not on the public road network. During operation, car parking provision will be at the substation.
TP 6: To prepare a Transportation Study for Carrickmacross Town and environs subject to the availability of resources.	No	The proposed development will not affect Carrickmacross.
TP 7: To support the provision of	No	The proposed development

Planning Policy / Objective	Assessed	Comment
charging infrastructure for electric vehicles to meet the objectives set out in the National Renewable Energy Action Plan for 10% electric vehicles by 2020 or any other related target adopted during the lifetime of this plan.		will provide renewable energy to the National Grid which will in turn support the objectives of the National Renewable Energy Action Plan.
TP 8: To require the submission of a Traffic and Transport Assessment (TTA), Road Safety Audit (RSA) and/or a Road Safety Impact Assessment (RSIA) as deemed necessary in accordance with Appendix 13 Road Safety Audit and 14 Traffic and Transport Assessment for significant development proposals.	Yes	This chapter, along with the accompanying autotrack analysis of the haul route serves as a Traffic and Transport Assessment. In accordance with the TII publication *Road Safety Audit GE-STY-01024* (December 2017), the proposed development does not propose permanent works to the National Road Network nor does it fall within the scheme categories requiring an RSA set out in Appendix A of the publication.
NRP 1: To protect the traffic carrying capacity of national roads, the level of service they deliver and the period over which they continue to perform efficiently, by avoiding the creation of new access points or the generation of increased traffic from existing accesses onto the N-2, N-53, N-54, and N-12 outside the 60 km/h speed limit, in accordance with the DoECLG's publication Spatial Planning and National Roads - Guidelines for Planning Authorities (2012).	Yes	Traffic management has been assessed and a haul route analysis has been undertaken. Specific traffic management measures will be agreed with the Local Authority prior to the commencement of development. There will be no new access points onto the N-2, N-53, N-54, and N-12.
NRP 2: To consider, in exceptional circumstances, permitting access onto national roads for developments of national and regional strategic importance where the locations concerned have specific characteristics that make them particularly suitable for the developments proposed, subject to such developments being provided for through the Local Area Plan or Development Plan making process in accordance with Section 2.6 of the	No	There will be no access onto national roads from the proposed development.

Planning Policy / Objective	Assessed	Comment
DoECLG Spatial Planning and National Road Guidelines, and in consultation with the TII.		
NRP 3: To prohibit the erection of non-traffic road signage on or adjacent to National Roads in line with the provisions of the Department of Environment, Community and Local Governments - Spatial Planning and National Roads (2012).	Yes	Traffic management has been assessed and there will be no signage erected on national roads.
NRP 4: Any development with the potential to impact on the carrying capacity and/or safety of any national primary or national secondary road shall include proposals to avoid, remedy or mitigate the impact on the national road network. Such proposals may include the payment of a contribution toward the cost of any required mitigation works.	Yes	Traffic management has been assessed and a haul route analysis has been undertaken. (**Sections 13.1.4 and 13.1.5**).
NRP 5: To seek to progress and ensure the upgrade of the N2 in co-operation with Transport Infrastructure Ireland and the relevant adjoining local authorities.	Yes	Aside from the transportation of turbine components the proposed development will not interact with the N2 and will not hinder the upgrade of the N2. (see **Sections 13.1.4 and 13.1.5**).
NRP 6: To resist the use of National, Regional and Local roads for advertising purposes and to implement the provisions of the TII policy document "Policy on the Provision of Tourism and Leisure Signage on National Roads" (2011).	No	There will be no advertising signage erected on the public road network. Temporary signage will be erected, advising of the site entrances and construction works in progress etc., during construction.
NNRP 1: Facilitate the improvement of non-public accommodation roads under the Local Improvement Scheme Programme funded by state grants and contributions from benefiting landowners.	No	This is not applicable to the proposed development.
NNRP 2: To carry out improvement works on local roads subject to the availability of resources.	Yes	It is proposed that there will be widening of local roads in the vicinity of the wind farm to allow access to the 11 no. site entrances and substation. These proposed works will assist the Local Authority to

Planning Policy / Objective	Assessed	Comment
		achieve this policy target. Upgrade works on bends on the R188, R183 and R189 will be left in-situ as agreed with the respective Municipal District Offices while the upgrade of the LS62012 and LS62013 will substantially improve the nature of these roads.
NNRP 3: To ensure that the traffic carrying capacity and the strategic nature of the County's road network is not adversely affected.	Yes	Traffic management and autotrack analysis has been undertaken and any effect on the road network will be temporary in nature and confined to the construction phase of the proposed development. (see **Sections 13.1.4 and 13.1.5**).
NNRP 4: To carry out improvement works including specific works on bridges, signage, road markings, footpaths, public lighting and traffic management facilities to improve road safety and traffic management.	Yes	It is proposed that there will be widening of local roads in the vicinity of the wind farm to allow access to the 11 no. site entrances and substation. These works will assist the local authority to achieve this policy. Widening works on bends on the R188, R183 and R189 will be left in- as agreed with the respective Municipal District Offices.
NNRP 5: To upgrade roads, junctions, footpaths and car parking facilities within the County's towns and villages in accordance with the provisions of the Design Manual for Urban Roads and Streets subject to the availability of resources.	No	This is not applicable to the proposed development.
NNRP 6: To relieve traffic congestion and facilitate the development of new roads and safe access points to serviceable lands, in partnership with benefiting landowners and developers, to improve traffic management and access in and around urban centres.	Yes	It is proposed that there will be widening of local roads in the vicinity of the wind farm to allow access to the 11 no. site entrances. These works will assist the local authority to achieve this policy. Widening works on bends on the R188, R183 and R189 will be left in-situ as agreed with the respective Municipal District

Planning Policy / Objective	Assessed	Comment
		Offices. (see **Sections 13.1.4 and 13.1.5**).

Table 13.1: Monaghan County Development Plan (2019-2025) Transport Policies and Objectives

The N2 is part of the Trans-European Transport Network (TEN-T) and categorised as being part of the 'comprehensive network' defined as:-

> *"a multi-modal network of relatively high density which provides all European regions with accessibility that supports their further economic, social and territorial development as well as the mobility of their citizens."*

The CDP outlines that TII has committed to providing additional funding for an online upgrade of the N2 extending from north of Ardee to south of the Castleblayney bypass and this project is at preliminary stages.

The R162, R183 and R188 regional roads; which partially comprise the turbine component haul route; are identified as Strategic Non-National Routes in the CDP which provide a strategic link to main settlements in the County and carry significant volume of traffic.

Thresholds relating to traffic impact assessments for new developments are detailed in the TII publication 'Traffic and Transport Assessment Guidelines'. The thresholds for the mandatory preparation of a traffic impact assessment, set out at Tables 2.1, 2.2 and 2.3 of the guidelines, have not been exceeded by the proposed development.

13.1.2.3 Desk Study

A desk study of the proposed development site, haul routes and the surrounding area was undertaken. The sources of information included documentary sources, such as those outlined at **Section 13.1.2.2** and an evaluation of aerial imagery and visualisations (e.g. Google Maps and Streetview) to assess the nature and condition of the local road network.

13.1.2.4 Field Work

A site visit including a walkover survey of the site and the local road network was undertaken on 19th March 2019. A subsequent visit to all the junctions requiring temporary or permanent upgrades along the turbine delivery haul route from Monaghan Town and the proposed site entrance locations was undertaken on 16th August 2019. The site visits were used to verify information obtained as part of the desk study and to visually assess site entrance locations and associated vehicle visibility splays.

13.1.2.5 Evaluation of Likely Effects

Following the assessment of the baseline environment, the available data was used to identify and categorise likely effects to affect the local road network used for the turbine delivery route and construction haul route.

The statutory criteria (EPA, 2017; EPA, 2003) for the assessment of impacts require that likely impacts are described with respect to their magnitude, nature (i.e. negative, positive or neutral), transboundary nature (if applicable), intensity and complexity, probability, duration, frequency, reversibility, cumulation and possibility of reducing the effects.). The descriptors used in this chapter are those set out in EPA (2002) 'Glossary of Impacts'.

Impacts may be categorised as follows:-

- Direct: where the existing traffic and transport environment in proximity to the proposed development is altered, in whole or in part;
- Indirect: where the traffic and transport environment beyond the proposed development is altered by activities related to the construction or operation of the proposed development; and
- No Impact: Where the proposed development has neither negative nor a positive impact upon the traffic and transport environment.

Sensitivity

The sensitivity of the local transport infrastructure has been identified using the criteria outlined within the TII Guidance. These criteria are outlined in **Table 13.2** below.

Importance	Criteria
Very High	Attribute has a high quality, significance or value on a regional or national scale.
High	Attribute has a high quality, significance or value on a local scale.
Medium	Attribute has a medium quality, significance or value on a local scale.
Low	Attribute has a low quality, significance or value on a local scale.

Table 13.2: Criteria for Rating Site Attributes

Magnitude

The magnitude of likely effects has been defined in accordance with the criteria provided in the 2017 EPA publication 'Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports' as outlined within **Table 13.3** below.

Magnitude of Impact	Description
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

Table 13.3: Impact Assessment Criteria

Significance Criteria

The significance of the likely effects of the proposed development have been classified by taking into account the sensitivity of receptors and the magnitude of the impacts on them, combined with the likelihood of an event occurring as defined in **Table 13.4**.

	Magnitude of Impact				
Importance of Attribute		Negligible	Small	Moderate	Large
	Extremely High	Imperceptible	Significant	Profound	Profound
	Very High	Imperceptible	Significant/ Moderate	Profound/ Significant	Profound
	High	Imperceptible	Moderate/ Slight	Significant/ Moderate	Severe/ Significant
	Medium	Imperceptible	Slight	Moderate	Significant
	Low	Imperceptible	Imperceptible	Slight	Slight/ Moderate

Table 13.4: Rating of Significant Environmental Impacts

13.1.3 Description of Existing Environment

13.1.3.1 Site Location, Context and Construction Phase Haul Routes

The proposed wind farm site is located in the townlands of Corlougharoe, Correvan, Drumlina, Tullyard, Drumacreeve, Drumanan, Drumgramph, Cornawall, Closdaw, Killyleg, Crossbane, Lislongfield, Drumcrow, Co. Monaghan. The proposed development site is predominately in agricultural use.

The proposed turbine delivery haul route is provided at **Annex 13.1**. While the selection of a precise port of entry will be determined by the selected turbine manufacturer, it is likely that Dublin Port will be utilised in this case. The general turbine delivery haul route to the proposed development site will likely be via the M50, M1, N33, N2, N54, R162, R188, R183 and R189.

Due to constraints in Monaghan Town, it is proposed that, rather than a direct left turn from the N54 onto the R162, oversized HGVs transporting turbine components will continue along the N54 and use the R189 to turn and approach the N54/R162 junction from the west and turn right onto the R162. This will significantly reduce the volume of works required within the urban setting and the subsequent disruption to traffic.

The Site Access Study (**Annex 3.4**) provides further details of both permanent and temporary works which will be required along the proposed turbine delivery haul route. This study should also be read in conjunction with **Chapter 3**.

The undertaking of civil engineering works during the construction phase, including the construction of site entrances, access tracks, crane hardstands and turbine foundations, will require the importation of aggregates and other general construction materials to the subject site. Due to the absence of rock within the site,

hardcore materials will be sourced from approved and licensed local quarries, subject to the availability of appropriate material and quantities. Ready-mix concrete, for turbine foundation construction and substation foundations, will also be sourced from local licensed quarries.

The selection of material suppliers will be subject to a competitive tendering process prior to construction and, therefore, it is not possible to confirm the precise source of these materials at this stage. However, a number of candidate quarries have been identified as potential suppliers and are indicated at **Annex 2.5**. In addition, the likely haul routes from these suppliers to the main site entrance are also identified. While the haul routes do not always represent the most direct route to site, these routes have been selected to ensure that all movements occur on regional roads and, insofar as possible, avoid local roads which may not be suitable to accommodate HGVs.

It is likely that all hardcore material and concrete will be sourced from local suppliers and will be delivered using standard HGVs. Other material deliveries will also use standard HGVs and use the local, regional and national road network, as necessary. Staff employed on the site will use the site entrance closest to the temporary construction compound but, as they majority of associated vehicular movements will comprise light goods vehicles (LGVs) or cars, they will not be restricted to the use of specific roads.

13.1.3.2 Local Road Network

The road network in the vicinity of the proposed wind farm site generally comprises regional and local roads. In addition, the N2 National Primary Road is located approximately 16km to the northeast of the proposed development site and, as outlined above, will be used for the transportation of turbine components. The N54 National Secondary Road is located approximately 6km north of the subject site and is also proposed to be used during the transportation of turbine components.

The R189 Regional Road, from which the main site entrance will provide access to the site, will be subject to minor permanent upgrade works in the village of Newbliss. The R189 is a regional road (not upgraded)[5] with an 80km/h speed limit and is approximately 6m wide. The road is generally in good condition with road markings. However, there is no pedestrian walkway or road lighting in rural areas.

The R183 Regional Road, which will be subject to permanent upgrade works at 1 no. location, is a regional road (not upgraded) with an 80km/h speed limit. The road is also approximately 6m wide and in good condition with road markings but with no pedestrian walkway or road lighting.

The R188 Regional Road, which also comprises part of the turbine delivery haul route, is likely to accommodate general construction traffic. The R188 is a regional road (not upgraded) with an 80km/h speed limit and will be subject to permanent upgrade works at 3 no. locations. The road is again approximately 6m wide and is regularly used by HGV traffic. The road is considered to be in good condition with road markings but with no pedestrian walkway or road lighting in rural areas.

13.1.3.3 Road Access to the Proposed Development Site

Access to the proposed development site will be provided by a site entrance (Site Entrance 1) from the R189. Site Entrance 1 will provide access to a proposed arterial access track which runs in a westerly direction to its junction with the LS6210 Local

[5] As per Table 15.5 of the Monaghan County Development Plan 2019-2025

Road (Site Entrance 2). The access track then proceeds (Site Entrance 3; west of the L6210) towards Turbine 7. From Turbine 7, the access track will proceed to its junction with the L62013. From here, construction traffic will follow the L62013 and L62012 to Site Entrances 5, 6, 7 and 8.

To accommodate construction traffic along the L62013 and L62012, it is proposed that the running width of the existing carriageway will be increased to c. 5m. These works will include the piping and filling of adjacent drainage ditches, hardcoring of existing grass verges and removal of vegetation and hedgerows, where necessary, to provide the increased running width. Where it is proposed to remove hedgerows, stockproof fencing will be erected and all hedgerows will be replaced following the completion of road widening works.

From Site Entrance 8, site access tracks will proceed to Turbines 2, 3 and 4 before intersecting with the LT62011 (Site Entrances 9 and 10) and continuing to Turbine 8 and the 38kV substation associated with the Shankill grid connection option (Option G1). The final site entrance, Site Entrance 11 located off the L62013, provides access to the 110kV substation grid connection option.

Access to the proposed meteorological mast does not require a dedicated site entrance and all vehicular movement can be accommodated by the existing access point. All construction related traffic will be instructed to access the proposed development site using the above described vehicular access arrangement and fully laden HGVs will not be permitted to use alternative routes in the immediate vicinity of the proposed development site.

In relation to the provision of vehicle visibility splays (sightlines), all site entrances have been carefully designed, including following consultation with the roads engineers at the Ballybay-Clones Municipal District Office, to ensure compliance with the requirements of Table 15.5. of the Monaghan County Development Plan 2019-2025. Site Entrance 1, being located off the R189 Regional Road, provides for visibility splays of 120m to the south and northeast along the R189 and to the north along the L6200, while Site Entrances 2-11 provide splays of 50m or 70m, as relevant to their classification.

13.1.3.4 Delivery Vehicle Specification

The delivery of wind turbine components will be carried out by specialised HGVs. The largest vehicles to be used will facilitate the delivery of the wind turbine blades. As outlined above, the General Electric GE 5.5-158 turbine (Option TU1), with blade lengths of 79m (Diameter 158m) have been used for this assessment.

Blades will be transported in 2 no. separate sections of 63m and 16m respectively. **Figure 13.1** illustrates the typical suite of transportation vehicles which will be used in the delivery of components, including a transportation vehicle used to transport the 63m blade component.

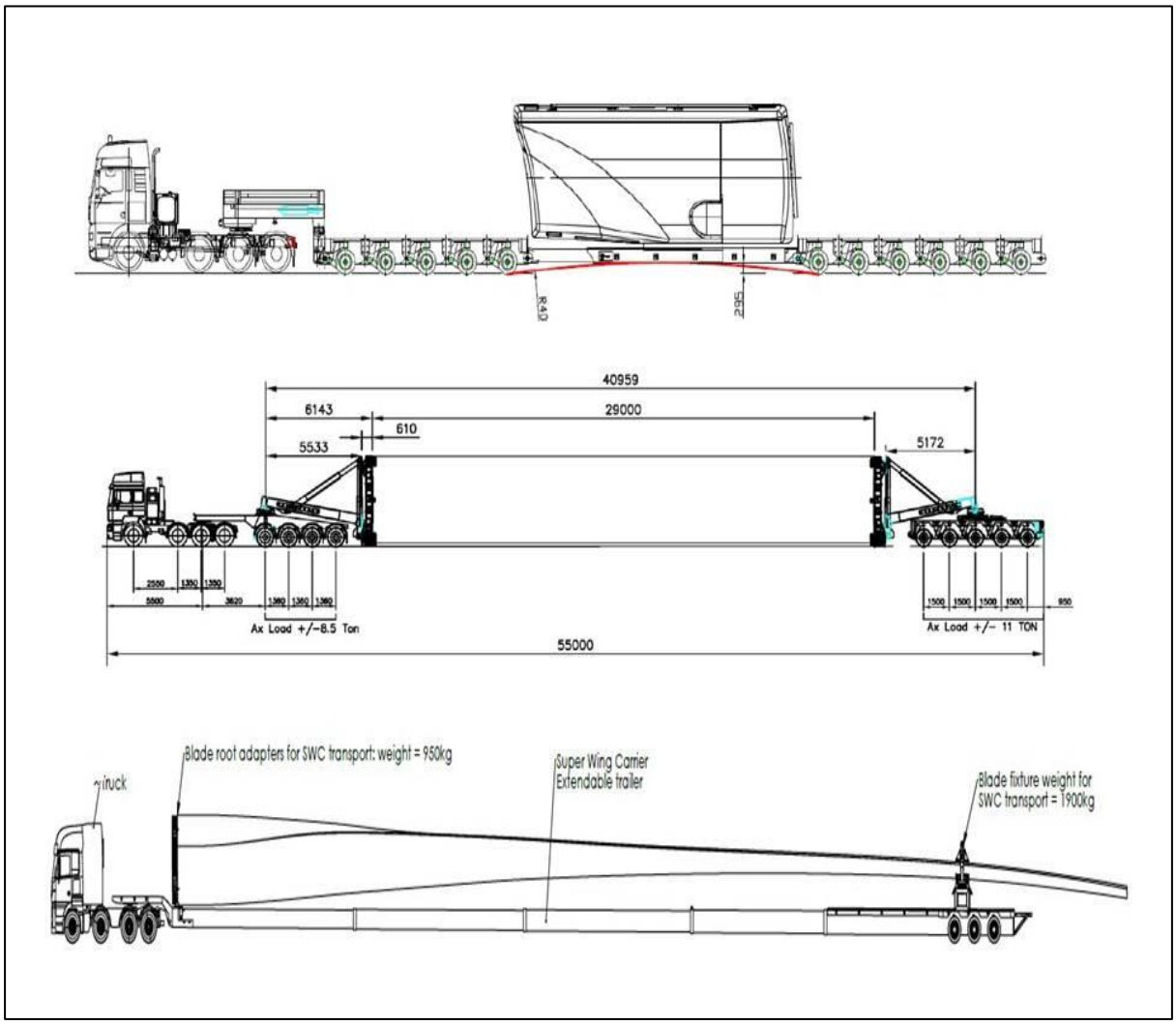

Figure 13.1: Typical Turbine Component Delivery Vehicles

Delivery of general construction materials and aggregates to site for the construction of the proposed wind farm will be undertaken using standard HGVs, cement mixer trucks, and dump trucks, the largest of which is anticipated to be a 16.5m articulated vehicle as shown in **Figure 13.2** below.

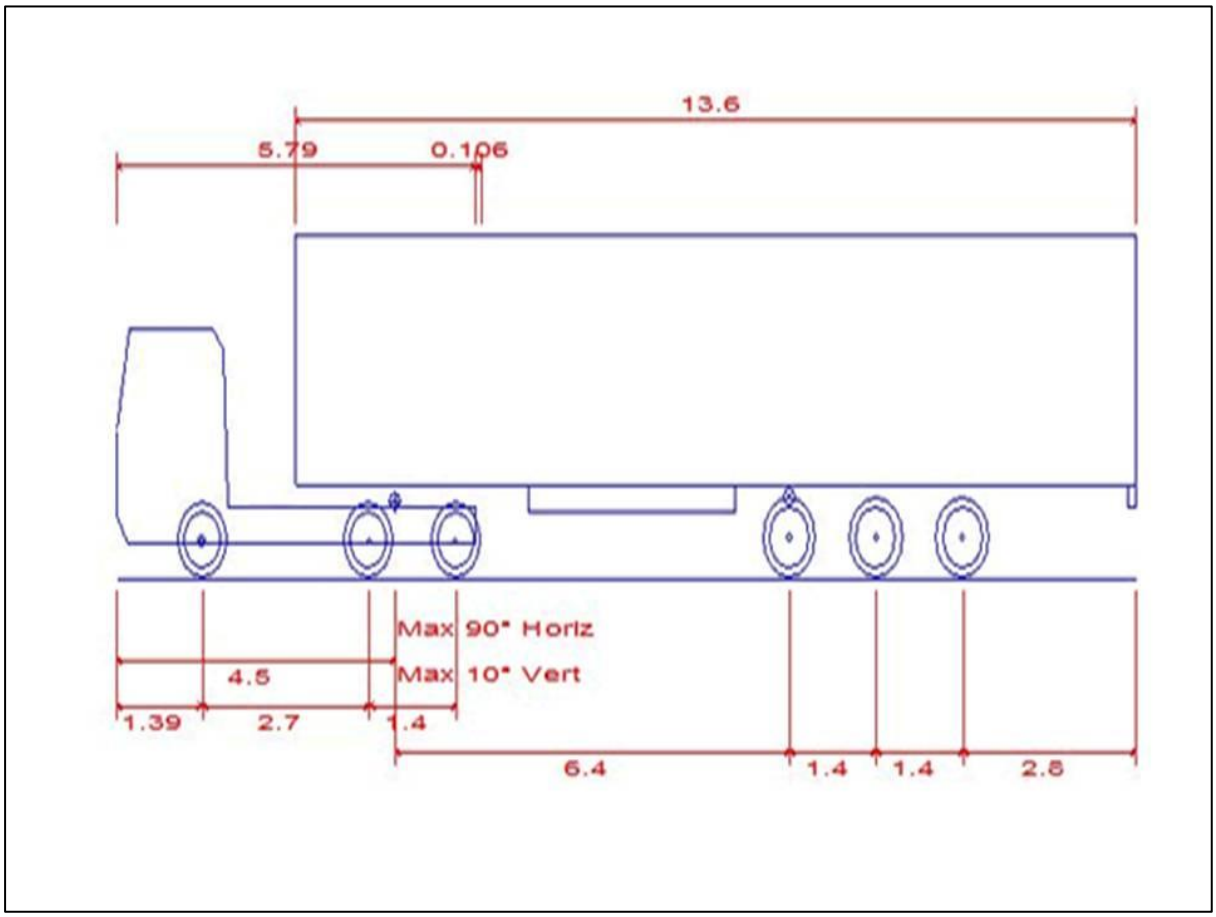

Figure 13.2: Standard HGV

13.1.4 Description of Likely Significant Effects

13.1.4.1 Construction Phase

The construction period of the proposed development is estimated to take approximately 12-18 months, with the majority of traffic movements being associated with the construction of access tracks, hardstands and turbine foundations. During this period, there will be trips associated with the arrival and departure of construction staff and with the delivery of aggregates, reinforcing steel and ready-mix concrete. Staff trips will mainly be made using cars and vans, while deliveries of steel, concrete, and rock and other general construction materials will be made by HGV.

In order to facilitate HGV movements associated with the construction phase, works (permanent and temporary) will be required at a number of locations along the proposed turbine delivery haul route.

The construction phase of the development will comprise a six-day week with normal working hours from 07.30 to 20.00 Monday to Friday and 07.30 to 18.00 on Saturdays. It may be necessary to undertake works outside of these hours to avail of favourable weather conditions (e.g. during time of low wind speed to facilitate turbine erection etc.) or during extended concrete pours (e.g. turbine foundation pours must be completed within 24 hours etc.). Where construction activities are necessary outside of the normal working hours, local residents and the Planning Authority will receive prior notification.

Haul Route for Abnormal Loads

While the proposed turbine delivery haul route is assessed to be generally capable of accommodating abnormal loads. Works will be required at a total of 18 no. locations, with 5 no. of these locations requiring permanent works and 13 no. temporary upgrade works (9 no. of these between Dublin Port and Monaghan town and the remainder between Monaghan town and the main site entrance), to facilitate turbine component deliveries, as discussed at **Annex 3.4**.

Between Monaghan Town and the site at 4 no. of these locations, works are temporary and relatively minor in nature, and will include for example the verge widening and temporary removal of street furniture and signage as outlined and illustrated at **Annex 3.4**. Permanent upgrade works will be required at 5 no. locations. Precise details of the scope of works at each location are provided in **Table 3.4** at **Chapter 3** and **Annex 3.4**.

HGV Deliveries

The estimated timescale for the completion of the construction phase is approximately 12-18 months, inclusive of all works related to the construction of the wind farm, grid connection option, haul route upgrade works and erection and commissioning of turbines. This allows approximately 12 months for civil construction and approximately 3-6 months for erection and commissioning of the turbines.

It is estimated that during civil construction, approximately 6,537 no. loads will be delivered to site. Assuming a 12 month civil works construction phase, this equates to approximately 545 no. loads per month or an average of 21 no. loads per day excluding Sundays and public holidays.

The peak number of deliveries per day will occur during the concrete pour for turbine foundation construction. An estimated 100 no. cement mixer and other truck deliveries will be required per turbine foundation. Other materials are also likely to be delivered on such days, and therefore a realistic estimation of peak deliveries during the eight days of foundation pours is approximately 110 to 120 no. deliveries per day. These pours will take place from 06:00 and typically take 12 hours to complete and involve approximately 8 no. trucks per hour.

The majority of civil construction material, such as aggregates and concrete, will be delivered to site using standard rigid trucks, HGVs and ready-mix trucks. Due to the absence of rock available at the site for use in the construction phase, rock will be imported for use in the construction of hardstands, access tracks, site entrances, construction compound area and substation compound. Aggregates will also be imported to the locations of permanent or temporary road upgrades, as relevant.

It is estimated that a total of 99,750 tonnes (4,988 no. loads) of rock will be imported to site. In the event that rock material is encountered during excavations, it will be utilised during construction, as appropriate, to reduce the volume of importation. There will be an estimated 100,000 tonnes of spoil material excavated for the construction of the turbine foundations, hardstands and access tracks with the entirety of this material being used on-site is the reinstatement or landscaping process, or being disposed of at the spoil deposition areas.

Excavated material arising from the proposed haul route upgrade works will be used for reinstatement purposes with excess material, estimated to be approximately 1,540 tonnes (77 loads), being disposed of to a licensed facility. Additional excavated material which cannot be reused or deposited on-site may also be disposed of at a licensed facility.

The grid connection options are not assessed as likely to give rise to significant

volumes of vehicle movements. Due to the linear nature of the Clones (Option G1) and Shankill (Option G2) grid connection options, vehicle movements will be spread out across the route and will result in a likely imperceptible effect on transport and access. The 110kV substation grid connection option (Option G3) will require the importation of aggregates, construction materials and electrical equipment together with the removal from site of excess spoil which may arise. However, the volume of vehicular movements would be unlikely to be significant and would not result in a perceptible increase in vehicle movements additional to those outlined in respect of the proposed wind farm development.

Turbine components will be delivered to site over a period of approximately 4 – 6 weeks and will commence at the latter end of the civil works phase. It is estimated that approximately 138 loads of turbine components and crane parts will be delivered during this period. Some of these loads (turbine tower sections, nacelles and blades) will be classified as oversized abnormal loads and the relevant approvals and permits will be obtained by the turbine supplier, or its appointed haulage contractor, before deliveries take place.

Following completion of the construction works, it is estimated that approximately 40 loads will be needed to remove all temporary equipment, plant and machinery and materials used on site e.g. temporary compound, fencing, cabins, storage containers etc. **Table 13.5** details the estimated amount of deliveries to/from the proposed development site.

Material	Quantity	No. of Deliveries
Concrete & Reinforcing Steel	6,910m^3	812
Substation Building electrical equipment	-	5
Other – Geotextile Mats, Tools, Fencing etc.	-	25
Grid Connection Materials	-	410
Met Mast Materials	-	4
Steel Tower Sections	-	32
Nacelles	-	40
Hub	-	8
Rotor Blades	-	48
Transformers, Panels and Cabling	-	8
Crane Deliveries to site, including ballast, booms, etc.	2 Cranes	10
Imported rock for road and hardstands	99,750 tonnes	4,988

Material	Quantity	No. of Deliveries
Export of excavated material	2,134 tonnes	107
Removal of all temporary on-site equipment and materials	-	40
TOTAL	-	**6,537**

Table 13.5: Estimated Construction Materials and No. of Deliveries (based on Manufacturer's Specifications)

The expected number of HGV deliveries is based on best estimates of trips generated by similar sized wind farms, previous experience in wind farm planning and civil construction, and based on the design of the project to date. Subject to planning permission being granted, these figures will be subject to refinement following the detailed design process, detailed pre-construction site investigations and consultation with the appointed contractor.

Based on the above estimated vehicular movements, which includes the cumulative effects of the 'worst case' grid connection option (Option G3), the predicted effect on the road network as a result of the increase in HGV movements associated with the entire proposed development is moderate, negative, direct, high probability but short term. This assessment has been reached in consideration of the temporary duration of the proposed construction phase and the modest estimated daily increase in vehicular movements of 21 no. movements on average.

Works on Proposed Development Site

As discussed in **Chapter 3**, a total of 11 no. site entrance will be either created or upgraded to facilitate the construction of the proposed wind farm development. A total of 10 no. entrances will be required to accommodate access to wind turbine locations, while 1 no. additional entrance will provide access to the 110kV substation grid connection option. Appropriate visibility splays will be provided at each site entrance.

During the construction phase, all works related to the construction of these entrances will be undertaken from private lands which will ensure that there are no significant direct transport and access effects on the local road network through disruption or delay to traffic flows. As a result, effects are assessed to be moderate, negative, short-term and of a high probability.

It is proposed to undertake upgrade works to the L62012 and L62013 local roads to facilitate construction traffic between wind turbine locations. During these works, the relevant sections of road will be closed to public traffic. While these closures may result in effects on road users, it should be noted that there are no inhabited dwellings adjacent to these road sections. The proposed works, including widening and resurfacing of the respective road carriageways, in accordance with the requirements of the Local Authority, will bring about an overall improvement in the road network at these locations and will improve access along these routes.

Grid Connection Options

The 38kV grid connection options to either the Clones or Shankill substations would require significantly lesser volumes of traffic than would the 110kV substation and grid connection option. Poles and electrical cabling would not be delivered to a

central location but would, instead, be delivered to designated locations (compounds) along the respective routes. Following the delivery of materials to these designated compounds, vehicular movements would only be associated with personnel accessing the works locations on a daily basis and the removal of any excess material which may arise. Due to the linear and transient nature of these grid connection options, the overall likely significant effect on transport and access is assessed to be imperceptible.

Construction Personnel

The number of staff employed at the proposed development site will vary according to the phase of works, peaking at up to approximately 120 no. It is expected that the majority of workers will arrive on site in LGVs and crew vehicles. Vehicle sharing will be actively encouraged to reduce vehicular movements. It is expected that c. 30 no. vehicles will visit the site on a daily basis during the peak construction period.

Parking for staff will be provided at the temporary construction compound. No parking will be allowed for construction workers on the public road network. The additional vehicular movement associated with staff travelling to site are not assessed as likely to result in significant effects on transport and access. Effects are assessed to be imperceptible/slight, negative, short-term and of high probability.

Overall Classification of Effects

The above sections have assessed the effects of the proposed development on transport and access which may arise as a result of the construction phase. Overall, the effects are not assessed to be significant and are concluded to be a slight, negative effect of short-term duration and high probability.

13.1.4.2 Operational Phase

During the operational phase, the proposed development will generally be unmanned. Operational and remote monitoring activities will be carried out on an ongoing basis. However, regular visits to the site will be undertaken for routine inspections and maintenance. Under normal circumstances, the operation of the wind farm would require 1-2 no. visits to the site per week by maintenance personnel. Maintenance staff will be instructed not to park on any public road and parking will be available at turbine hardstands and the on-site substation. In the case of a major fault; e.g. breakdown of a turbine component; larger machinery may require access to the site.

Overall, the volume of traffic predicted to be generated during the operational phase is very low. Therefore, the effect of traffic associated with the operation of the proposed development on the existing public road network will be imperceptible as a result of the type of traffic and the low volumes generated.

13.1.4.3 Decommissioning Phase

During the decommissioning phase of the proposed development, the total volume of HGV traffic will be significantly reduced compared to the construction period. It is likely that some infrastructure, for example access tracks, will be retained for continued agricultural use thus reducing the requirement for materials to be removed from site. This phase could be expected to last approximately three months. Overall, the impact of the decommissioning phase is assessed to be slight and negative of short-term duration and high probability.

13.1.4.4 Cumulative Effects

The above assessment has included consideration of the likely in-combination

effects which may arise from the construction, operation and decommissioning of the proposed development and grid connection options. In addition, it is necessary to assess the likelihood for the development to result in cumulative effects with other existing, permitted or proposed developments, including other wind farms.

Cumulative effects are assessed as only likely to occur during the construction and decommissioning phases of the proposed development. Cumulative effects are unlikely to occur during the operational phase as wind farms do not generate a significant amount of traffic during operation as outlined in **Section 13.1.4.2**.

Other developments which have been included within the cumulative assessment are listed at **Chapter 1**. The majority of developments listed, for example one-off rural dwellings and agricultural developments do not generate significant volumes of traffic during either the construction or operational phases such that would have the likelihood to result in cumulative effects.

In relation to other wind farm developments, the nearest such project is the operational Bindoo Wind Farm, Co. Cavan located c. 12km to the southeast of the proposed wind farm. Additional wind farm developments located within 20km of the proposed development include Mountain Lodge Wind Farm, Edrans Wind Farm, Carrickallen Wind Farm (all located in Co. Cavan) and the Mullananalt Wind Farm in Co. Monaghan. Each of these developments are operational which, in addition to the separation distances involved, will not give rise to any likelihood of significant cumulative effects.

Planning permission was granted for 6 no. poultry sheds in 2018 on lands adjacent to the main site entrance (Site Entrance 1). This development has the potential likelihood for cumulative effects, if both projects are constructed concurrently. The majority of traffic generated as a result of this permitted development would be HGVs and LGVs and, given that both sites are served by the R189 which already accommodates volumes of HGV traffic, it is assessed that there is no likelihood for significant cumulative effects to arise. The cumulative effect, if it were to occur, is predicted to be moderate, negative, direct and short-term. There is also potential likelihood for effects during the operational phase of the two developments; however, given that neither development will generate substantial volumes of traffic during this phase, the effect is assessed to be slight and negative.

It is noted that a number of developments have been proposed and permitted at Scotshouse Quarries which has been identified as a candidate quarry for the sourcing of construction materials and aggregates. Having reviewed the nature of the various developments at Scotshouse Quarries, it is assessed that there is no likelihood for significant transport or access effects to arise and the likelihood of cumulative effect is assessed to be slight, negative, direct and short-term.

13.1.5 Mitigation & Monitoring Measures

13.1.5.1 Mitigation

The likely effects of the proposed development have been identified as being slight to moderate and temporary in nature and associated with short-term construction and decommissioning activities. Likely effects during the operational phase have been assessed as being imperceptible and hence mitigation measures are not deemed to be necessary.

While the likelihood of effects are not assessed to be significant, even in the absence of mitigation, a suite of mitigation measures are available which will further reduce any likely effects during the construction phase. The following mitigation measures

will be implemented:-

- Traffic movements will be limited to 07:30 - 20:00 Monday to Friday and 07:30 – 18:00 on Saturdays with no movements on Sundays or public holidays. It may be occasionally necessary to undertake works outside of these hours to avail of favourable weather conditions or during extended concrete pours. Where construction activities are necessary outside of the normal working hours, local residents and the Planning Authority will receive prior notification.;
- Wheel washing equipment will be used, as necessary, to prevent any debris being transferred from site to the adjacent public roads. All drivers will be required to ensure that their vehicle is free from dirt and stones prior to departure from the construction site. Where conditions exist for dust to become friable, techniques such as damping down of the affected areas will be employed and vehicles/loads will be covered to reduce dust emissions;
- A Traffic Management Plan shall be agreed as part of the Construction Environmental Management Plan (CEMP) with the Local Authority prior to the commencement of development;
- All works to the public road shall be undertaken in consultation with, and agreed in advance with, the Local Authority;
- All reasonable steps shall be taken to ensure that only national and regional routes are used to transport all materials to the site, in so far as is possible;
- Prior to and post construction, pavement and bridge surveys will be undertaken along access routes;
- Adequate signage shall be provided at entrances providing access, safety and warning information;
- Traffic restrictions shall be kept to minimum duration and extent;
- Appropriate traffic management; including maintenance of local access, pedestrian access (where safe to do so) and diversions; shall be implemented to facilitate continued public use of roads where temporary traffic restrictions have to be put in place;
- The timing of oversized loads shall be agreed with the relevant local authorities and An Garda Síochána;
- A designated contact point and coordinator will be put in place to manage all access arrangement and to interface with the public and the Local Authority;
- No hedgerows or potential breeding habitats to be removed during the summer breeding season; and
- The site shall be closed to the public during the construction phase.

13.1.5.2 Monitoring

The proposed turbine delivery and construction material haul routes will be monitored during construction to identify any damage which may have been caused by construction traffic. Where any damage has been caused by traffic associated with the proposed development, it shall be repaired by the appointed contractor as soon as possible.

A post-construction pavement and bridge survey will be undertaken to determine if any deterioration has occurred as a result of construction related vehicles. If deterioration is identified, repair work shall be undertaken to the satisfaction of the Local Authority.

13.1.6 Residual Effects

13.1.6.1 Construction Phase

There are no significant residual effects, positive or negative, assessed as likely to

occur during the construction phase. Mitigation measures have been proposed to offset any likely effects and any residual effects are assessed to be slight, negative and short-term. The residual negative effects are likely to arise as a result of upgrade works along the turbine component haul routes, increases in traffic volumes on regional roads in the vicinity of the proposed development site and grid connection route options. Positive residual effects are likely to accrue as a result of permanent upgrades to regional roads and improvements to the pavement condition of the L62012 and L62013.

13.1.6.2 Operational Phase

There will be no residual effects during the operational phase as only occasional light vehicles are envisaged to visit the site during operation for routine checking and maintenance. Positive residual effects are likely to accrue as a result of permanent upgrades to regional roads and improvements to the pavement condition of the L62012 and L62013.

13.1.6.3 Decommissioning Phase

Decommissioning phase effects are assessed to be similar to those of the construction phase but of a reduced scale. In particular, the public road upgrades and improvements will be retained thus eliminating any likelihood of significant effects. Similarly, access tracks and some ancillary wind farm infrastructure is likely to be retained resulting in a reduction in vehicular movements associated with the decommissioning phase.

13.1.6.4 Transboundary Effects

The proposed development has not been assessed as likely to result in any transboundary effects. No elements of the proposed turbine component or construction material haul routes are located within Northern Ireland and, therefore, significant effects on transport and access are not anticipated as likely.

13.1.7 Summary

This section has assessed the likelihood of significant effects arising from the proposed development on transport and access. The proposed development has generally been assessed as having the likelihood to result in likely effects of a negative, slight/moderate, direct, short-term, and high probability. After mitigation, the likely residual effects have been assessed as imperceptible/slight, negative and short-term in nature. In addition, there will also be a likely positive residual effect from permanent upgrades to the public road network including the resurfacing of local roads in the vicinity of the wind farm

Likely cumulative effects, with the attendant grid connection and other developments in the vicinity, have been assessed as being imperceptible to moderate negative, short term and high probability.

Overall, this assessment has identified no likelihood of significant effects on transport and access which could arise as a result of the construction, operation or decommissioning of the proposed development either individually or in combination with other existing, permitted or proposed developments. A suite of mitigation measures have also been proposed which will further serve to further mitigate and prevent any likelihood transport and access effects.

13.2 Aviation

13.2.1 Introduction

This section assesses the likelihood for effects on aviation to arise as a result of the construction, operation or decommissioning of the proposed development. The requirement for an assessment of the likely effects on aviation is set in the Wind Energy Development Guidelines for Planning Authorities (2006) which state:-

> *"The siting of wind turbines may have implications for the operations of communications, navigation and surveillance systems used for Air Traffic Control for the separation and safety of aircraft. Wind turbine siting may also have implications for the flight paths of aircraft."*

13.2.2 Candidate Wind Turbine

The specific design of the proposed wind turbines is not assessed to be a critical consideration for likely effects on aviation. The proposed wind turbines will have an overall maximum tip height of up to 180m and, as such, both candidate turbines (see **Chapter 3**) are likely to result in similar effects. However, given the larger 'swept area' of the General Electric GE 5.5-158 (Option TU1) and the potential likelihood for increased effects on aviation radar systems, this turbine has been selected as the basis for assessment in this section.

13.2.3 Methodology

The assessment involved consultation with various stakeholders including the Irish Aviation Authority (IAA) and Department of Defence. In addition, publications issued by the IAA and the Department were reviewed to determine if the proposed development site was assessed as being of significance or if significant effects were likely. A desktop study was also undertaken to determine the presence of aerodromes or airstrips within 50km of the subject site.

This assessment has also had regard to the Draft Air Corps Wind Farm/Tall Structures Position Paper (August 2014) (**Annex 13.2**) which sets out the Air Corps position to the appropriate siting and management of wind farms and tall structures. This assessment includes a detailed review of this position paper, a comparison of the proposed development site and identified 'Danger Areas', 'Restricted Areas' and 'Low Level Flying Areas'.

13.2.4 Consultation

Consultation was undertaken with the IAA and Department of Defence to establish if any effects on aviation were likely. A consultation letter was issued to both in January 2019 and again in May 2019 (see **Chapter 1**) which included a Scoping Report, a general description of the proposed development and site location drawings.

Correspondence was received from both parties (see **Annex 1.4**), with no aviation effects having been identified. The IAA has requested the imposition of a condition of consent requiring specific details to be agreed with the IAA. The Department of Defence responded, stating that:

> *"The Irish Air Corps would be interested in this development and may have observations for the EIAR."*

13.2.5 Description of Existing Environment

There are no major airports in the vicinity of the proposed development and the site is therefore assessed as being unconstrained. The proposed wind turbines are

located c. 100km northwest of Dublin Airport and c. 85km south west of Belfast International Airport.

According to the IAA, there are no aerodromes or airstrips in the immediate vicinity of the proposed development or indeed within counties Monaghan or Cavan. The nearest aerodrome in the Republic of Ireland is at Athboy in County Meath at an approximate distance of 60km while the Abbeyshrule Aerodrome in Longford is located c. 68km distant. In Northern Ireland, St. Angelo Airport (Enniskillen) is located c. 42km northwest of the proposed development site. St. Angelo Airport does not accommodate commercial flights and is largely used for private flights or pilot training.

The proposed development site is not located within any 'Danger', 'Restricted' or 'Military Operating' area as identified at Annex A, B or C of the Air Corp Position Paper. Similarly, the subject site is not located within 3 no. nautical miles of any critical low level route identified at para. 2(2)(c) and illustrated at Annex D of the Paper.

Air traffic control radar is of two types. Primary Surveillance Radar (PSR) equipment sends out pulses of electromagnetic energy which will reflect off objects in their path. The radar's receiver antenna detects the returning 'echoes' and these are displayed on the radar screen. The time taken for the pulse to travel out to the target and back gives an indication of the range of the object from the radar

Secondary Surveillance Radar (SSR) is the second type of radar equipment used for air traffic control. Like primary radar, SSR relies on an antenna rotating continuously through 360°. However the radar does not transmit raw pulses of energy; it transmits an interrogation signal. The signal is received at the SSR antenna, decoded, and the height and location of nearby aircraft are presented on the radar screen. This enables controllers to positively identify radar returns on their screens and (after verbal confirmation from the pilot) to confirm the aircraft's height.

Rotating wind turbine blades within radar range can impart a Doppler shift to any radar energy reflecting off the blades. The radar's processor could detect this as a non-static target and therefore display the turbines as objects on the radar screen.

13.2.6 Description of Likely Effects

13.2.6.1 Construction Phase

Due to the general 'low level' of activity during the construction phase, it is assessed that there will be no likely impact on aviation. During the erection of wind turbines, cranes will be fitted with appropriate aviation warning lighting to alert pilots to the presence of tall structures.

13.2.6.2 Operational Phase

Following the completion of the construction phase, and subject to the implementation of measures outlined within the IAA consultation response, no likely significant effects are assessed as likely to occur. Similarly, due to the absence of other tall structures within the vicinity of the proposed development site, no cumulative effects are assessed as likely to occur.

The proposed development site is not located within any low flying areas, restricted areas, danger areas, military operating areas or low level routes identified within the Air Corps Wind Farm/Tall Structures Position Paper. It is concluded, therefore, that the operation of the proposed wind turbines and meteorological mast will not result in any likely significant effect on the Air Corps or associated activities.

13.2.6.3 Decommissioning Phase

The likely effects during the decommissioning phase are assessed to be similar to those during the construction phase with no significant effects assessed as likely to occur.

13.2.6.4 Grid Connection

No significant effects on aviation are assessed as likely as a consequence of the construction, operation or decommissioning of any of the 3 no. grid connection options, including the respective associated substations. The construction of overhead line (OHL) infrastructure associated with the Clones and Shankill route options (G1 and G2) will have a maximum height of c.16m; while the strain towers associated with the 110kV substation option (G3) will also have a maximum height of up to 16m. At these low heights, there is no likelihood for effects on, or interactions with, aviation.

13.2.7 Cumulative & Transboundary Effects

Due to the absence of other tall structures in the wider vicinity of the proposed development site and given that the nearest wind farm development is in excess of 10km from the subject site, it is assessed that there is no likelihood for the proposed development to have any significant effects on aviation, in combination with other existing, permitted or proposed developments. Similarly, due to the absence of any likely effects on aviation in Northern Ireland, it is assessed that there is no likelihood for significant transboundary effects resulting from the proposed development, either individually or in combination with other developments.

13.2.8 Mitigation & Monitoring Measures

13.2.8.1 Construction Phase

Due to the absence of likely impacts, there are no specific mitigation measures proposed. As is best practice, warning lights to be fitted to cranes during the installation of the proposed wind turbines.

Prior to the commencement of construction, and as requested by the IAA in their consultation response, a scheme of aeronautical warning lighting for the proposed development will be agreed with the Planning Authority. The 'to be constructed' turbine coordinates, ground and tip height elevations will be provided to the IAA a minimum of thirty days prior to commencement of development.

13.2.8.2 Operational Phase

The proposed wind turbines will be fitted with aviation warning lighting in accordance with the specification to be agreed with the IAA. The precise lighting specification will also be agreed with the Planning Authority prior to the commencement of development.

The developer will continue to liaise with the IAA during the operation phase to ensure that any necessary mitigation measures are being implemented. At a maximum of thirty days following the installation of the proposed turbines, 'as-built details' will be provided to the IAA to allow for the updating of mapping charts, including:-

- The number of wind turbines;
- WGS-84 coordinates of each turbine;
- Ground elevation of each turbine (Malin Head OD);
- Blade tip elevation of each turbine (Malin Head OD);

- Height of Turbine;
- Contour maps at the requisite scale; and
- A note of which turbines have been fitted with obstacle warning lights.

In the event that the obstacle warning lights fail or if there are plans to withdraw them from use for a period of time, the IAA will be contacted, via AISOPs@iaa.ie, as a matter of urgency, to request that a NOTAM (Notice to Airmen) is issued concerning the absence of obstacle lights. The following information will be provided to the IAA:-

- Obstacle ID;
- Obstacle type;
- Obstacle Position;
- Elevation; and
- Colour of Light.

It should also be noted, however, that the proposed wind turbines will be fitted with an uninterruptable power supply (UPS) to ensure that the aviation warning lights remain operational even in the event of a power outage. This UPS is sufficient for a period of twelve hours; after which, the warning lights can be powered by a small generator should the power outage continue.

13.2.8.3 Decommissioning Phase

Mitigation measures proposed during the construction phase will also be implemented during the decommissioning phase.

13.2.8.4 Grid Connection

Given that no significant effects are assessed as likely to occur from the construction, operation or decommissioning of the identified grid connection options, no mitigation measures are proposed, or required.

13.2.9 Residual Effects

No likely significant residual effects are assessed as likely to occur.

13.2.10 Summary

This assessment concludes that the proposed development, including grid connection options, is unlikely to result in any significant effect on aviation. The proposed development site is not located within an area identified as being of particular sensitivity or importance in the Air Corps Position Paper on military aviation or located close to any civilian aerodrome, airfield or airport. Accordingly, with the installation of appropriate aviation warning lighting, no significant effects are assessed as likely to occur. As a result, it is assessed that significant effects on aviation are unlikely to occur as a result of the proposed development, either individually or in combination with other existing, permitted or proposed developments.

13.3 Telecommunications

13.3.1 Introduction

As noted in the Wind Energy Development Guidelines for Planning Authorities (2006), wind turbines, like all electrical equipment, produce electromagnetic radiation, and this can interfere with broadcast communications. This section considers the likely effects of the proposed development upon a range of communications infrastructure, including telecommunications networks, civil and military aviation, broadcast radio and television and fixed infrastructure such as telecommunication masts. In theory, interference could affect all electromagnetic communications including:-

- Satellite Communications;
- Cellular Radio Communications; and
- Television Broadcasting Signalling.

13.3.2 Candidate Wind Turbine

The specific design of the proposed wind turbines is not assessed to be a critical consideration for likely effects on telecommunication. The proposed wind turbines will have an overall maximum tip height of up to 180m and, as such, both candidate turbines (see **Chapter 3**) are likely to result in similar potential effects. However, given the larger 'swept area' of the General Electric GE 5.5-158 (Option TU1) and the potential for increased effects on telecommunication links, this turbine has been selected as the basis for assessment in this section.

13.3.3 Methodology

The methodology employed in assessing the likelihood for significant effects on telecommunication networks consisted of desk based research and consultation with various telecommunication companies and relevant authorities. Desk based research was undertaken to identify:-

- Locations of known telecommunications facilities;
- Known telecommunication fixed links; and
- Known television broadcast and re-broadcast facilities;

During the EIAR scoping process (see **Chapter 1**), the following telecommunication companies and authorities were consulted with;-

- Airspeed Telecom;
- An Garda Síochana;
- Arden Broadband;
- Broadcasting Authority of Ireland;
- BT Communications Ireland;
- Commission for Communications Regulation;
- Eir Ltd;
- Imagine Group;
- Irish Aviation Authority;
- Mosaic Net;
- National Ambulance Service;
- Netshare Ireland;
- Open Eir;
- Ripplecom;
- 2rn (RTE Transmission Network Ireland);
- Tetra Ireland Communications Ltd;

- Three (3) Ireland;
- Towercom;
- Virgin Media Ireland;
- Vodafone Ireland Ltd; and
- OFCOM – Fixed Links.

The responses received from these organisations can be viewed at **Annex 1.4**

Consultation responses received from service providers generally confirmed that there would be no significant impact on the telecommunications network in the area of the proposed development. 2rn (RTE Transmission Network Ireland) have advised that there is potential for interference to the terrestrial television network in areas of existing marginal coverage. 2rn recommend that a pre-construction signal survey is undertaken and that a protocol arrangement is entered into with 2rn to ensure appropriate remediation of any effects which may be experienced.

13.3.4 Description of Existing Environment

The consultations undertaken illustrates that the proposed development site is not a significant location for telecommunication links. While there are telecommunication masts located within the wider environs of the subject site[6], on the basis of the consultations undertaken there are no telecommunication links located within the proposed development site which have the potential to be affected byt the proposed development. The consultation responses received from 2rn advises that the existing terrestrial television network provides marginal coverage to areas north and west of the proposed development site.

13.3.5 Description of Likely Effects

13.3.5.1 Construction Phase

No significant effects are assessed as likely to occur during the construction phase.

13.3.5.2 Operational Phase

Potential Interference of Wind turbines with Electromagnetic Transmissions

The operation of wind turbines can potentially affect electromagnetic transmissions in two ways: by blocking or deflecting line of sight radio or microwave links or by 'scattering' transmission signals.

Microwave UHF (Ultra High Frequency) and VHF (Very High Frequency) television signals

These are generally quite narrow signals that travel in a straight line. Wind turbines (or any structure) can disturb microwave signals if they obstruct the line of sight between the transmitter and the television aerial of a nearby residence.

The blades of the proposed turbines have the potential to block some signals, or they could act as an unwanted relay transmitter, causing TVs in local residences to receive a 'ghost' signal. Wind turbines may cause a reception shadow when they stand between a TV transmitter and dwellings with TV aerials pointing through the wind turbines towards the transmitter. Television viewers in such locations will have their signal scattered, causing loss of detail, loss of colour or a buzz from their television. Generally, careful choice of turbine siting can mitigate any likely significant impacts, as the separation distance required to avoid problems is

[6] http://siteviewer.comreg.ie/#explore

generally a matter of a few hundred meters. However signal boosting measures installed post wind farm completion can also be effective.

Scattering of signal mainly affects domestic TV and radio reception, and the general public may be concerned that a wind farm will interfere with these services. Experience has shown that, when this occurs, it is of a predictable nature and can generally be alleviated by the installation or modification of a local repeater station or cable connection, or by using a more directional kind of aerial.

Analogue and Digital Television Signals

The UK OFCOM document *"Tall structures and their impact on broadcast and other wireless services"*[7] in order to provide an overview for developers and planning authorities on how tall structures such as wind turbines may affect reception of wireless services.

There are two potential problems that can occur due to interference from tall structures: (1) signal blocking, and (2) reflection. Signal blocking can occur when a tall structure is situated between the transmitter and receiver. This causes a shadow behind the structure that can reduce signal levels. The severity of the reduced signal can vary depending on a number of factors such as the height of the structure.

Signal reflection can occur when wireless signals are reflected from the sides of structures. In the case of wind turbines, because the blades are rotating, the reflections can fluctuate and be quite complex. Reflections from turbines can also vary depending on the speed at which the blades are rotating and the angles of the blades. According to OFCOM, digital television signals are much better at coping with signal reflections, and pictures do no experience ghosting.

As analogue television has been phased out in Ireland, problems with ghosting and signal reflection due to interference from turbines will be reduced. The digital television signal is much better at coping with signal reflection. Since the digital switchover, the power of transmitters emitting the digital signal has been increased to deal with the demand. This higher output is likely to overcome any signal interference and is not likely to effect the reception received on televisions. Overall, the likely extent of any potential problems is much less significant with digital television than with analogue television.

Mobile Phone Signals

Despite the presence of a number of telecommunication (mobile phone) masts in the wider area, the consultation process has not identified the likelihood for significant interference to occur and no service provider has raised any concerns and, therefore, significant effects on mobile phone signals are not assessed as likely.

13.3.5.3 Decommission Phase

No significant effects are assessed as likely to occur during the decommissioning phase on existing telecommunications links.

13.3.5.4 Grid Connection

None of the grid connection options (see **Chapter 3**) are assessed as likely to result in any significant effects on existing telecommunications links.

[7] OFCOM: Tall structures and their impact on broadcast and other wireless services, August 2009, http://licensing.ofcom.org.uk/binaries/spectrum/fixed-terrestrial-links/wind-farms/tall_structures.pdf

13.3.6 Cumulative & Transboundary Effects

Due to the absence of other tall structures in the vicinity of the proposed development site which may affect telecommunication links, it is assessed that there is no likelihood for the proposed development to have any significant effects on telecommunications, in combination with other existing, permitted or proposed developments. Service providers and agencies in Northern Ireland have also been consulted with and it is assessed that there is no likelihood for any significant transboundary effects as a result of the proposed development.

13.3.7 Mitigation & Monitoring Measures

13.3.7.1 Construction Phase

As no likely significant effects are assessed as likely to occur during the construction phase, no specific mitigation measures are proposed.

13.3.7.2 Operational Phase

Extensive consultation with telecommunications providers has confirmed that significant adverse effects to existing telecommunication signals are unlikley to result from the operation of the proposed development. While the proposed development is assessed as unlikely to interfere with any microwave links, all operators will be kept informed of any changes to the layout should these occur to ensure that compliance with telecommunications constraints is maintained.

In their consultation response, 2rn has identified potential mitigation measures and recommended that a protocol agreement be entered into with 2rn to ensure that any complaints received from the local public concerned are appropriately remediated. This is the standard protocol for such development proposals and has been agreed between the parties and is enclosed at **Annex 13.3**. A pre-construction signal strength survey will be undertaken at various locations in the vicinity of the site to determine areas of low signal strength which may experience interference. This pre-construction survey will allow for a greater understanding of whether interference is occurring as a result of the proposed development or another source.

If, despite precautions, significant signal interference in any form is identified by a post-construction survey and is attributed to the proposed development, appropriate remedial measures will immediately be undertaken. A range of technical measures are available to mitigate any instances of interference including signal amplifiers, active deflectors and relay transmitters, repeater stations, booster units, realignment of domestic aerials, installation of higher quality aerials and the installation of suppression equipment. Remedial works will be promptly undertaken to ensure uninterrupted telecommunication, broadcasting and mobile phone service provision.

13.3.7.3 Decommissioning Phase

As no likely significant effects are assessed as likely to occur during the decommissioning phase and no specific mitigation measures are proposed or required.

13.3.7.4 Grid Connection

Given that no significant effects are assessed as likely to occur from the construction, operation or decommissioning of the identified grid connection options, no mitigation measures are proposed or required.

13.3.8 Residual Effects

No likely significant residual effects are assessed as likely to occur.

13.3.9 Summary

It can be concluded that, on the basis of a desktop assessment and extensive consultation with stakeholders, the proposed development will not result in likely significant effects on the telecommunications network. The implementation of mitigation measures will ensure that any likely significant effects on terrestrial television signals are appropriately managed and mitigated in accordance with an agreed protocol. As a result, it is assessed that significant effects on telecommunications are unlikely to occur as a result of the proposed development, either individually or in combination with other existing, permitted or proposed developments.

13.4 Resources & Utility Infrastructure

13.4.1 Introduction

This section provides details of the likelihood for significant effects or interactions with existing renewable and non-renewable resources and existing utility infrastructure. Within the wider environs of the proposed development site there is evidence of the extraction and use of resources; particularly in relation to quarrying activities, existing wind energy developments, including a number of micro-generation sites (including in Northern Ireland), and mining activities in the Clontibret and Carrickmacross areas.

There is also the presence of utility infrastructure, with overhead electricity lines connecting to the majority of dwellings, medium and high voltage electricity lines traversing the landscape and telecommunication lines located adjacent to the majority of local roads.

13.4.1.1 Candidate Wind Turbine

The specific design of the proposed wind turbines is not assessed to be a significant consideration in assessing the likely significant effects on resources and utility infrastructure. Notwithstanding this, the General Electric GE 5.5-158 (Option TU1) is used for the basis of the assessment in this section as it is likely to result in a greater potential effect on natural and non-natural resources, due to the greater requirement for material to be imported to the site during the construction phase and would result in a greater effect on the national electricity grid due to the greater volume of renewable electricity being exported to the grid network.

13.4.2 Description of Existing Environment

13.4.2.1 Renewable Resources

The 2013 Sustainable Energy Association of Ireland (SEAI) Wind Speed Atlas identified the proposed development site as having a wind speed of between 7.80m/s and 8.10m/s. An existing meteorological mast, erected in accordance with exempted development provisions of the Planning and Development Act 2000 (as amended), has been measuring wind speed on the proposed development since November 2018 and has, to date, recorded a mean wind speed of c. 7.5m/s.

There are 2 no. existing wind farm developments located within County Monaghan. These developments are the Mullananalt Wind Farm comprising 5 no. wind turbines and the Old Mill Wind Farm comprising 6 no. wind turbines. The developments are located c. 18km and c. 20km respectively west of the proposed development. The Mountain Waters Wind Farm and Coolberrin Wind Farm, both of which are permitted but not yet constructed, are located c. 23km north of the proposed development site. In County Cavan, the Bindoo Wind Farm/Mountain Lodge Wind Farm/Carrickallen Wind Farm complex is located c. 12km to the south. In addition to the above, a number of single turbine developments are located in the wider area including the Castlecool Wind Turbine and a number of micro-generation sites in counties Monaghan, Cavan and Fermanagh.

13.4.2.2 Non-Renewable Resources

There are a number of extant quarrying and mining activities within County Monaghan. There are no quarries located within the proposed development site or in its immediate vicinity. The nearest quarry is located c. 5km southwest of the proposed site at Scotshouse. As there are no borrow pits proposed as part of the proposed development, aggregates for the construction phase will be imported

from authorised quarries in the vicinity. Further details on the importation of such materials are provided at **Section 13.1**.

13.4.2.3 Utilities Infrastructure

The existing electricity network in south County Monaghan comprises 38kV and 110kV electricity transmission lines. The network, however, is weaker in more northern and western areas of the county. **Figure 13.3**, below (reproduced at **Annex 13.4**), illustrates the existing electricity transmission network in the wider region of the proposed development site.

Eirgrid is the TSO responsible for both the planning and operation of Ireland's high voltage national grid (≥110kV) while ESB Networks are responsible for the development of medium and low voltage lines (≤38kV). As discussed in **Chapter 3**, this EIAR provides an assessment of the likely significant effects on the environment of 3 no. grid connection options to the existing network including to the Clones 38kV substation, Shankill 110kV substation or by connecting to the 110kV network via an existing overhead line to the south-east of the proposed wind farm. **Figure 13.3** Indicates the proximity of the 110kV network to the proposed development site.

In addition, there is an extensive telecommunications network in the wider environs of the proposed development site.

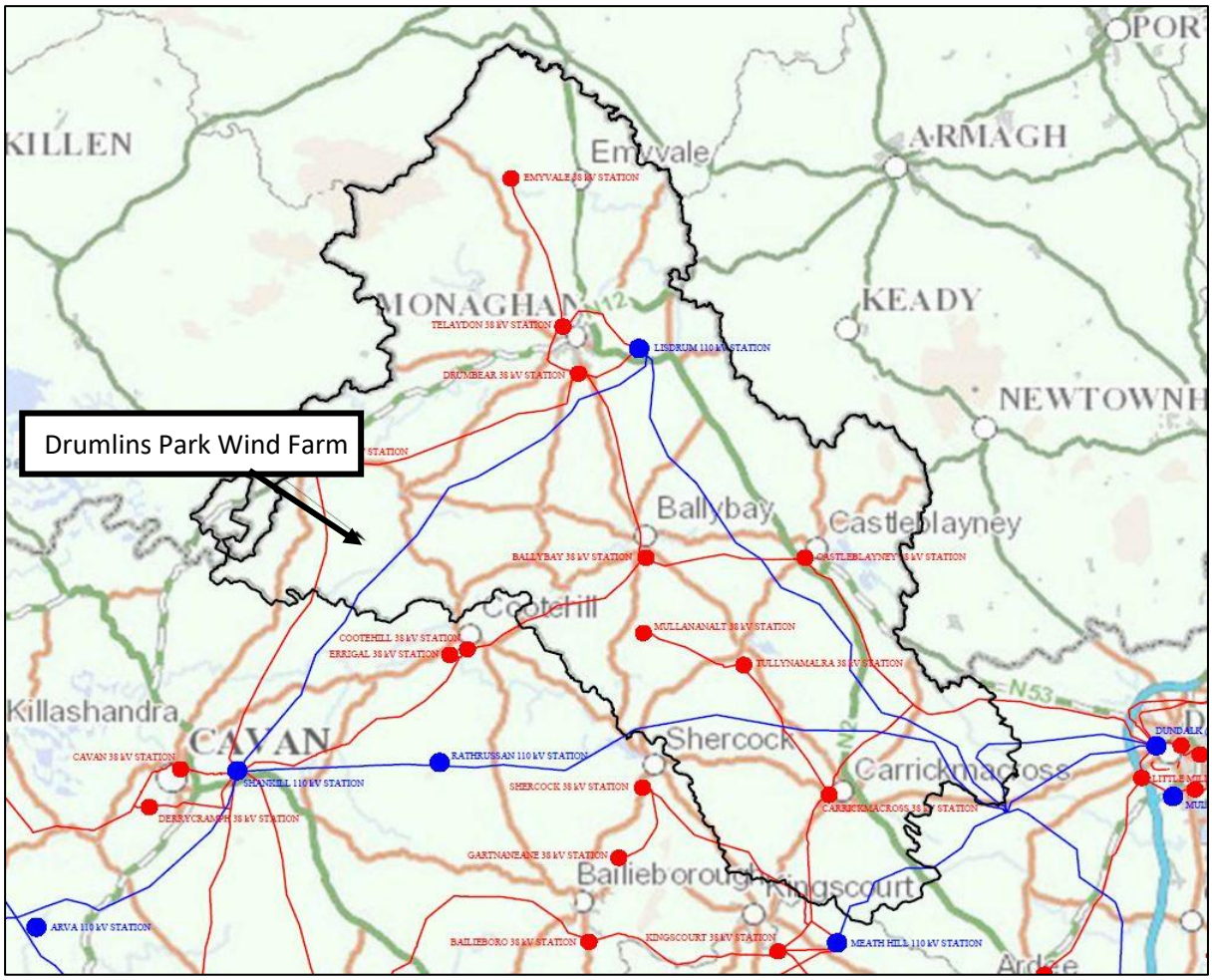

Figure 13.3: Electricity network in County Monaghan and surrounding counties

Note: 38kV network indicated in red; 110kV network indicated in blue

13.4.3 Description of Likely Effects

13.4.3.1 Construction Phase

The construction phase of the proposed development is not likely to have any significant impacts on existing renewable or non-renewable resources, or utilities infrastructure. The construction phase will not inhibit the export of renewable energy generated from other sources nor will it impact upon existing utility services. While there is a potential for interaction with utility services (e.g. accidental collision with overhead wires during the construction phase), this can be mitigated through good construction practices. During the process of connecting the proposed development to the national grid (via any of the identified connection options), some minor, temporary disruption to electricity supply, at a local level, may occur. However, during this process, Eirgrid or ESB Networks (as appropriate) will balance the loading on the network to ensure that no significant disruption occurs and significant effects do not arise.

The construction phase will result in the extraction of non-renewable resources in the form of aggregates for the construction of access tracks and areas of hardstanding and concrete for turbine foundations and substation construction. However, aggregates will only be sourced from quarries with have full planning permission and have been subject to EIA, and therefore the effects of this extraction have already been fully assessed. As a result, it is assessed that significant effects on the environment are unlikely to occur as a result of the proposed development, wither individually or in combination with other existing, permitted or proposed developments.

13.4.3.2 Operational Phase

The operational phase of the proposed development will not result in any likely effect on existing utility infrastructure or renewable or non non-renewable resources. The connection of the proposed development to the national grid will strengthen the electricity network infrastructure in the wider region either through the addition of electrical plant at the Clones or Shankill substations or through the construction of a 110kV substation which will serve the national network.

It may be necessary to occasionally import aggregates to the site during operations to maintain access for service vehicles; however, materials will again be sourced from authorised quarries with full planning permission and no likely significant effects will occur.

The proposed development will have no likely operational phase effects on existing renewable resources. It is assessed that the proposed development will have a likely overall positive effect in terms of carbon reduction and climate change (see **Chapter 8**). It is assessed, therefore, that significant effects on the environment are unlikely to occur in respect of resources and utility infrastructure during the operational phase as a result of the proposed development, either individually or in combination with other existing, permitted or proposed developments.

13.4.3.3 Decommissioning Phase

No likely significant effects are assessed as likely to occur during the decommissioning phase in respect of resources and utility infrastructure.

13.4.3.4 Grid Connection

The construction and operation of any of the 3 no. grid connection options (see **Chapter 3**) is likely to result in an improvement and strengthening of the

electricity/utility network in the wider region of the proposed development. The proposed development will significantly increase the volume of renewable electricity generated in Co. Monaghan without resulting in any likely adverse effects on renewable or non-renewable resources.

13.4.3.5 Cumulative Effects

The proposed development is not assessed as likely to result in any cumulative effects on resources or utility infrastructure, either individually or in combination with other existing, permitted or proposed developments. Similarly, it is assessed that there is no likelihood for transboundary effects to arise as a result of the proposed development.

13.4.4 Mitigation & Monitoring Measures

13.4.4.1 Construction Phase

No specific mitigation measures are proposed or required during the construction phase.

13.4.4.2 Operational Phase

No specific mitigation measures are proposed or required during the construction phase.

13.4.4.3 Decommissioning Phase

No specific mitigation measures are proposed or required during the construction phase.

13.4.5 Residual Effects

No likely significant residual effects are assessed as likely to occur.

13.4.6 Summary

This assessment concludes that the proposed development, including grid connection options, is unlikely to result in any significant adverse effect on renewable and non-renewable resources or on utilities infrastructure. The operation of the proposed development will bring about a benefit in terms of electricity generated from renewable sources and a strengthening of national electricity grid infrastructure in the wider region of the proposed development site. This assessment similarly concludes that the proposed development is unlikely to result in any significant adverse cumulative effects in combination with existing, permitted or proposed developments.