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ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED MAIGHNE WIND FARM IN COUNTY KILDARE AND COUNTY MEATH

VOLUME 2 – MAIN EIS

CHAPTER 13 – TRAFFIC AND TRANSPORTATION

MARCH 2015

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13.1 Introduction

13.1.1 General

The proposed development consists of the erection of up to 47 no. wind turbines with a tip height of up to 169m, access tracks, a sub-station, a permanent meteorological mast, borrow pits and associated works, temporary compounds as well as temporary minor alterations to the public road for the delivery of turbines to the site (turbine delivery route). The turbines are arranged in five wind farm clusters. The clusters are Ballynakill (10 turbines), Windmill (3 turbines), Drehid-Hortland (21 turbines), Derrybrennan (2 turbines) and Cloncumber (11 turbines). All clusters are connected via associated underground medium voltage (MV) cables which run predominately along the public road network linking back to a proposed sub-station on-site at Drehid. Here the power will be converted to AC up to a maximum voltage of 220kV for export to the Irish national grid via high voltage (HV) underground cables to either one of two existing substations located at Woodland, Co. Meath or Maynooth, Co. Kildare.

Whether the connection point to the national electricity transmission grid will be located at the Woodlands or Maynooth substations will be determined by EirGrid plc, which is the statutory Transmission System Operator. Accordingly, the documentation submitted with this application for permission identified and evaluates 2 no. HV grid connection routes (which will operate at a voltage up to 220kV). The 2 no. HV grid connection cable routes included in this application will connect the proposed Maighne Wind Farm substation at Drehid to either one of two existing substations located at Woodland, Co. Meath or Maynooth, Co. Kildare. However, only one of these routes will be constructed following the identification of the preferred connection point by the Transmission System Operator.

This section of the EIS describes the existing roads, traffic and transportation system in the vicinity of and leading to the proposed Maighne Wind Farm development. This section also examines the various aspects of the construction, operation and decommissioning of the development which have the potential to impact on roads, traffic and transportation and the magnitude of these impacts are considered prior to mitigation. Mitigation measures are then discussed and the residual impact post mitigation measures outlined.

For the location and layout of the proposed Maighne wind farm development, refer to Figure 2.1 in Chapter 2 of this EIS.

13.1.2 Study Area

The study area for this section of the EIS is generally confined to the immediate vicinity of the proposed wind farm development (clusters) and to the network of public roads leading to, from and between these clusters. As described below, the assessment also includes proposed MV cable routes which are to be laid along public roads between the clusters. In this regard the study area for the cable routes is expanded to include these affected roads.

In relation to the HV cable route, and as described in Section 13.1.1 above, two HV cable routes are considered. The study area has therefore been expanded to include the two route options.

13.1.3 Assessment Methodology

This chapter describes the existing traffic situation, estimates the volume of traffic which will be generated by the proposed development during its construction, operation and decommissioning phases, the likely traffic distribution onto the local road network and finally makes recommendations to mitigate the impact of the projected increase in traffic on the local road network.

This assessment has been undertaken using a combination of desk-top studies, field surveys and consultation with statutory agencies and local authority representatives in line with current good practice and policy advice. The assessment looks at the wind farm development, the associated haul route for materials, underground cable routes (MV and HV) and the turbine delivery route.

The justification and rationale for undergrounding the cable routes is discussed in Chapter 1 - Introduction of this EIS.

13.2 Existing Environment

This section describes the existing environment, in respect of roads, in the vicinity of the proposed Maighne Wind Farm development. Given that, for the most part, the roads impacted by the HV cable route are different from those impacted by the wind farm and MV cable route, this section discusses the existing environment along the HV cable route separately.

13.2.1 Existing Road Network

Roads in the Republic of Ireland are classified as motorways, national (primary and secondary), regional and local roads. The NRA has overall responsibility for the planning and supervision of the construction and maintenance of motorways, national primary and national secondary roads. The local authorities have responsibility for all non-national roads. The hierarchy of roads throughout Ireland, is outlined in Table 13.1 below.

Table 13.1: Road Classification

Road Category	Description
Motorways	These are high quality multiple lane roads with limited grade separated junctions. They are high speed (120kph) roads predominantly provided to facilitate strategic traffic with reduced journey times.
National Primary Roads	These are predominantly single carriageway, with some that are dual carriageway. Generally high speed (100kph) roads that facilitate strategic traffic, with reduced journey times.
National Secondary Roads	These are medium distance through-routes connecting towns, serving medium to large geographical areas and link to primary routes to form a homogeneous arterial network.
Regional Roads	Predominantly single carriageway roads of regional and local importance. These roads generally receive more frequent maintenance criteria than Local Roads and therefore tend to be structurally sound.
Local Roads (Primary, Secondary and Tertiary)	The local road system is operated in three tiers defining local importance, usage and maintenance priorities. They form a network of single carriageway roads of varying quality.

The existing road network in the general vicinity of the Maighne Wind Farm development is outlined hereunder.

M4 Motorway

The M4 motorway is a motorway standard section of the N4 national primary road which runs from Dublin to Sligo. The M6 to Galway diverges from the route west of Kinnegad, County Westmeath. The Ballynakill cluster is closest to the motorway (less than 1 km to the north) while the other clusters (Windmill, Drehid-Hortland, Derrybrennan and Cloncumber) are located south of the motorway. In all cases the nearest motorway junction to the proposed Maighne Wind Farm development is Junction 9 Enfield.

In 2014, the M4 had an annual average daily traffic (AADT) of approximately 40,000[1].

[1] NRA permanent traffic count location 20042, M4 Maynooth. Source: NRA Website www.nratrafficdata.ie

National Roads

Apart from the M4 Motorway described above, the general area surrounding the proposed Maighne Wind Farm development is not served by national primary or national secondary roads.

Regional Roads

There are a number of regional roads in the vicinity of the proposed Maighne Wind Farm development. The R148 runs from Dublin to Kinnegad in County Westmeath. The road was previously part of the N4 National Primary Road but was re-classified following the opening of the M4 motorway. The road generally consists of a single carriageway with a single lane in each direction and a hard shoulder on both sides.
The Ballynakill cluster will be accessed directly off the R148 approximately 6 km west of Enfield, Co. Meath. The R148 has an AADT of 8,768 (ref count location 1 Table 13.2 and Figure 13.1).

The R402 is a regional road which runs from Enfield, County Meath towards Daingean, County Offaly via Johnstownbridge and Edenderry. The section of the R402, between Enfield and Edenderry was realigned and improved in 2013/2014 and included a bypass of the village of Carbury. The road generally consists of a single carriageway road with one lane in each direction and a hard shoulder on either side of the road. The R402 has an AADT of 3,069 (ref count location 4 - Table 13.2 and Figure 13.1).

The R403 is a regional road running from the R402 (at Carbury) through the settlements of Derrinturn, Allenwood, Prosperous, Clane in County Kildare to Lucan in County Dublin. The R403 generally consists of a single carriageway road with a 3 m (approximate) lane in either direction. The R403 has an AADT of between 4,643 (count location 110 at Derrinturn) and 3,922 (count location 5 NW of Allenwood) (see Table 13.2 and Figure 13.1).

The R414 runs from Allenwood (from the R403 at Shee Bridge) to Rathangan. The R414 generally consists of a single carriage road with a 2.5-3.0m wide lane in each direction. The AADT varies from 2,193 (count location 112 near Allenwood) to 1,279 (count location 12 Rathanglan/Lullymore, see Table 13.2 and Figure 13.1).

Local Roads

There is a network of local roads in the vicinity of the proposed development as depicted on Figure 13.1 which also shows the associated 'L' number, indicative haul and cable routes which follow these local roads. The sections of local road impacted by the MV/HV cable route and the haulage of material and specific impacts associated with the usage of these roads are discussed in more detail below.

13.2.2 Existing Roads – MV Cable Route

The section describes the existing roads environment along the preferred MV cable route as depicted on Figure 2.1 and Figure 13.1. Overall, it is estimated that approximately 36 km of MV underground cabling will be installed along the public road between the proposed turbines and proposed on-site substation. In total, the MV cable route will run along the regional roads network for 9.2 km with the remainder following local roads.

Windmill to Cadamstown Cross Road

At the L-1005 entrance to the Windmill cluster, the MV cable route follows the L-1005 north for approximately 0.5 km, then for another 0.5 km along the L-1002 before turning east on the L-5010. The cable route then follows the L-5010 east for approximately 1.9 km as far as Cadamstown Cross Roads where it meets the route of the MV cable route from the Ballynakill cluster as described below.

Ballynakill to Drehid

The MV cable route leaves the Ballynakill cluster and travels east along the R148 Regional Road for approximately 0.25 km before heading south along the L-5006 for a distance of approximately 3.6 km to the west of the Moyvalley Hotel and Golf Resort as far as Cadamstown. The L-5006 is generally a 2.5 -3 m wide local road.

The MV cable route then travels along the L-5005 and L-5011 local roads between Cadamstown and Cadamstown Cross Roads, a total distance of approximately 1.3 km. These roads carry local traffic and range in width from 3 to 5 m approximately.

At Cadamstown Cross Roads, the MV cable route from Ballynakill combines with the cable route from Windmill (as described above) and the cable route proceeds east for a further 2.9 km along the L-5010 as far as Kilshanroe where it meets the R402. The cable route then heads north along the R402 for approximately 0.15 km before as far the junction with the L-5012 local road. The cable route then proceeds east along the L-5012 local road (4.5 to 5 m in width) for approximately 1.6 km before entering the Drehid-Hortland cluster to the south.

Drehid-Hortland

An MV cable route is required to connect T40 – T46 of the Drehid-Hortland cluster with the proposed substation. The proposed MV cable route for this section will travel from New Bridge (at Knockanally) in a westerly direction along the L-1004 local road for approximately 4.3 km and a further 1.2 km along the L-5012 local road before entering the Drehid-Hortland site in the location indicated on Figure 2.1. The L-1004 has an estimated[2] AADT of 684 and generally consists of a single carriageway local road with a total width of approximately 4.0 to 5.0 m. It is noted that the MV cable route follows the same route as the HV cable route over c. 3.8 km section of the L-1004 as indicated on Figure 2.1.

Cloncumber to Derrybrennan

On leaving the Cloncumber entrance the MV cable route from Cloncumber to Derrybrennan first proceeds northwest along the L-7004 local road for approximately 0.7 km. The L-7004 has an AADT of 332 (see count location 113 on Table 13.2 and Figure 13.1) and consists of a single carriageway road with an overall width of approximately 3-4.5 m.

The route follows the R414 for approximately 6 km between Cappanargrid and Lullymore West before leaving the public road network for private lands towards the Derrybrennan cluster as shown on Figure 13.1.

Derrybrennan to Drehid Hortland

Figure 13.1 shows the route of the MV cable route from the Derrybrennan cluster to Drehid-Hortland. To the north of the Derrybrennan cluster, the MV cable route crosses over the Grand Canal and leaves private lands before proceeding along a local road for approximately 0.25 km from the entrance to the Bord Na Mona Lullymore facility as far as the R403 (near Abbeylough Bridge).

The MV cable route then runs along the R403 regional road for approximately 2.8 km (from near Abbeylough Bridge) to Windmill Cross Roads on the southern edge of Derrinturn. As described above, the R403 generally consists of a single carriageway road with a 3 m (approximate) lane in either direction. The R403 has an AADT of between 4,643 (count location no. 110 at Derrinturn) and 3,922 (count location no. 5 North West of Allenwood) (see Table 13.2 and Figure 13.1).

Between Windmill Cross Roads and Drehid Cross Roads, a distance of approximately 3 km, the MV cable route follows the route of the L-5022 and the L-5024 local roads. These roads are generally 3-4m in overall width and serve local traffic including multiple dwellings located these roads. Finally, the cable route follows the L-5025 from Drehid Cross Roads in an easterly direction towards Timahoe for approximately 1.3 km as far as the entrance to the Drehid portion of the Drehid-Hortland Cluster.

[2] Based on traffic count location no 106 (just north of Ballagh Cross Roads)

The L-5025 is generally 5 to 6 m in overall width and has an AADT of 740 (traffic count location no. 109 as shown on Table 13.2 and Figure 13.1).

13.2.3 Existing Roads – HV Cable Route

As described in Section 13.1.2 Study Area above, the precise grid connection point for the wind farm development is not known at this point and therefore 2 no potential HV cable routes are considered in this section.

Route Option 1 (Proposed Drehid Substation to Woodland Substation, County Meath)

Route Option 1 will follow the existing public road network as depicted on Figure 13.1. The total length of the cable route on roads is approximately 32.2 km and approximately 18.6 km of this will be on regional roads with the remainder on local roads. This section describes the existing road network along Route Option 1 working from the wind farm towards Woodland Substation.

Route Option 1 starts at the northern side of the Drehid-Hortland cluster. It will join the L-1004 local road approximately 700 m west of Dunfierth Cross Roads and travels west for approximately 250 m and then north for approximately 1.3 km on the L-1004 as far as Johnstown Bridge.
The L-1004 has an estimated[3] AADT of 684 and generally consists of a single carriageway local road with a total width of approximately 4.0 to 5.0 m. It is noted that the HV and MV cable route overlap along a short section of the L-1004 (approximately 200 m) as depicted on Figure 13.1.

The route then follows the R402 in a north-easterly direction through Johnstown Bridge for approximately 1 km towards Enfield. The R402 has an AADT of 3,079 and the road is generally single carriageway with a 3 m lane in either direction. Just south of the M4, the route will follow a local road in a north-easterly direction and cross the M4 motorway at Johnstown (using trenchless techniques) before joining the R-418 (Enfield Bypass) just south of Enfield.

The cable route then follows the route of the R148 (part of the old N4) for approximately 11km between Enfield and Kilcock. The R148 has an AADT of between 8,768 and 10,946 based on traffic count location no. 1 and 17 (see table 13.2 and Figure 13.1). Between Enfield and Kilcock the road generally consists of a single carriageway with a 3-3.5 m wide lane and a hard shoulder in each direction. Just west of Kilcock, the HV cable route will cross under the Royal Canal and western commuter railway line (Dublin to Sligo line) using trenchless techniques along the R148.

The proposed HV cable route continues northwards along the R158 (Trim Road) for approximately 0.7km (to the west of Kilcock) crossing the Rye Water River which is a tributary of the River Liffey and locally marks the boundary between County Kildare and County Meath. The R158 has an AADT of 7,354 (traffic count location no. 18, see Table 13.2 and Figure 13.1) and locally it general consists of a single carriageway road with a 3-3.5m lane in each direction. Footpaths and hard shoulders are in place along sections of the road.

The HV cable route then follows the L6228 local road in a westerly direction for approximately 0.6km. The L6228 has an overall width of approximately 5-5.5m.

The cable route then follows the R125 regional road from Dolanstown to Martinstown, a distance of approximately 3.1km. The R125 has an AADT of 916 (traffic count location no 103, see Table 13.2 and Figure 13.1). The road consists of a single carriageway with a 2.5-3 m wide lane in each direction.

At Martinstown, the proposed cable route travels east along a local road for approximately 2km as far as Mulhussey then 1.5km north past Mulhussey National School towards Jenkinstown Bridge. The width of the local road between Martinstown and Jenkinstown Bridge varies from approximately 4-4.5m (overall) to 6m.

At Jenkinstown Bridge, the cable route joins the R156 regional road which runs from Dunboyne to Mullingar. The cable route will travel west along the R156 for approximately 2.8km. Locally the R156 has an AADT of 2,724 (count location no. 102) and consists of a single carriageway with a 2.5-3 m lane and a narrow hard shoulder in each direction.

[3] Based on traffic count location no 106 (just north of Ballagh Cross Roads)

Just east of Barstown Commercial Park, the cable route leaves the R156 and follows the route of a local road L6207 (AADT 143 at count location no. 101) for approximately 2.5km and for approximately 250m along a local road before entering the grounds of the Woodland Substation.

Route Option 2 (Proposed Drehid Substation to Maynooth, County Kildare)

This section describes the existing road network along Route Option 2 working from the wind farm towards Maynooth Substation. Route Option 2 runs from the proposed substation at Drehid to the existing substation at Maynooth. The overall length of the cable route is approximately 22.3 km with approximately 17.4 km of this being on public road and 4.9 km off the public road network. Aside from crossings at a number of regional roads as described below, the cable route follows local roads.

Route Option 2 starts at the northern side of the Drehid-Hortland cluster. It will join the L-1004 local road approximately 700 m west of Dunfierth Cross Roads and travel in east along the L-1004 for approximately 3.8km towards Knockanally and New Bridge. The L-1004 has an estimated[4] AADT of 684 and generally consists of a single carriageway local road with a total width of approximately total width of approximately 4.0 to 5.0m. It is noted that the MV cable route follows the same route as the HV cable route over this c. 3.8km section of the L-1004 as indicated on Figure 13.1.

Just west of New Bridge the cable route leaves the L-1004 local road and enters private lands through the proposed wind farm site at Hortland. The cable route again joins the public road network when it meets the L-1017 (near Blackwater Bridge). The route follows the L-1004 for a distance of approximately 1km in an easterly direction as far as Ballagh Cross Roads. The L-1004 is a local road with an AADT of 855 (count location no. 107 on Table 13.2 and Figure 13.1). Its width is generally 5-5.5 m overall.

The route heads east from Ballagh Cross Roads for approximately 8.6km along the L-1009 and L-1010 local roads through Baltracey Cross Roads (R407) as far as the junction with the R408 at Lady Chapel Cross. The L-1009 and L-1010 are local single carriageway roads with a 2.5-3 m lane in each direction. The L-1009 has an AADT of 1,571 (count location no. 16 on Table 13.2 and Figure 13.1).

The final section of the cable route follows the L-5037 local road from the R408 (at Lady Chapel Cross) in an easterly direction for approximately 2.8km as far as the existing Maynooth Substation. The L-5037 is a single carriageway local road with a 2.5-3m lane in each direction. The L-5037 has an AADT of 2,577 (traffic count location no. 105 as reference in Table 13.2 and Figure 13.1).

13.2.4 Existing Traffic Volumes

In order to establish the traffic volumes on the existing road network, data was gathered from a number of sources.

The National Roads Authority maintains a network of traffic counters on national roads throughout Ireland. The nearest counter to the proposed development is located on the M4 near Maynooth which reports a 2014 AADT of approximately 40,000.

As the local roads authority, Kildare County Council gathers traffic data on many of the roads within its functional area. Following a request made by the authors of this EIS to Kildare County Council, the Roads Department provided AADT figures for a number of roads close to the proposed development. These traffic figures, as provided by the roads department, are presented in Table 13.2 below and are also depicted on Figure 13.1.

In order to establish a more comprehensive baseline assessment of the existing traffic volumes, Abacus Transportation Surveys Limited were commissioned to undertake traffic counts on a number of selected roads in the vicinity of the proposed development. These surveys, 14 no. locations in total, consisted of automatic traffic counts (ATCs) and were undertaken between 00:00 hours on Saturday 06 December 2014 and 24:00 hours on Friday 12 December 2014 (7 days in total). This survey period did not coincide with school holidays so the results can be taken as representative of normal traffic on the roads.

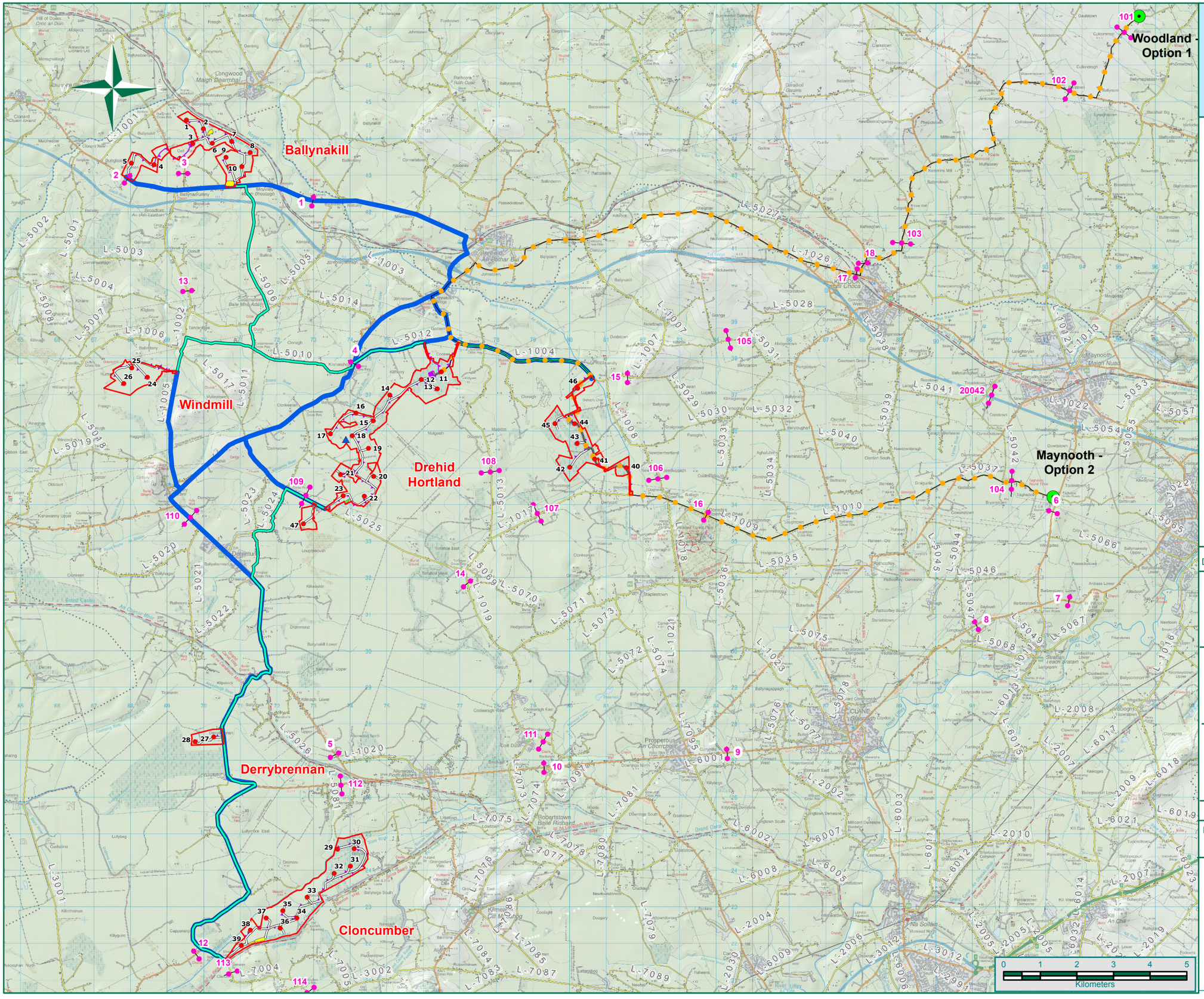
[4] Based on traffic count location no 106 (just north of Ballagh Cross Roads)

The location of all the traffic counts described above (for all sources) are presented on Figure 13.1 below and the results (for all sources) of traffic data/volumes is presented in Table 13.2 below.

Table 13.2: Traffic Data for Study Area

ID No	Location	AADT	Comment/Data reference date	Source
20042	M4 Motorway Maynooth	39,931	NRA Counter (2014 figure)	NRA Website www.nratrafficdata.ie
01	R148 Enfield - Kinnegad	8,768	July 2013	Kildare Co Co-
02	R148 Enfield - Kinnegad	9,413	Jan 2012	
03	R160 Broadford Jct - Longwood	1,081	Jan 2012	
04	R402 Kilshanroe North	3,069	Aug 2013	
05	R403 Allenwood - Derrinturn	3,922	July 2013	
06	R406 Maynooth - Barberstown	12,105	May 2012	
07	R403 Barberstown - Celbridge	5,104	June 2013	
08	R403 Clane - Barberstown	11,016	Nov 2012	
09	R403 Prosperous - Clane	8,202	Nov 2012	
10	R403 Dagwels - Allenwood	4,499	July 2013	
11	-	-	-	
12	R414 Rathangan - Lullymore	1,279	Feb 2012	
13	L1002 Broadford South, North of Clonuff Bridge Village	1,884	Oct 2011	
14	L1019 Timahoe National School	1,352	June 2014	
15	L1007 New bridge - Knockanally	441	May 2014	
16	(L1009) Donadea – Ballagh Cross	1,571	July 2013	
17	R148 Enfiled Road, Kilcock	10,946	Jan 2011	
18	R158 Trim Road, Kilcock	7,354	Jan 2011	
101	Local Road North of R156 (Culcommon)	143	Dec 2014	Abacus Count Dec 2014
102	R156 East of Mullagh Cross (Barstown)	2,724		
103	R125 North of Kilcock (Dolansown)	916		
104	(L-5037) Local Road West of R406 (Taghdoe)	2,577		
105	(L-5028) Local Road East of Newtown (Kilbride)	596		
106	Local Road North of Ballagh Cross Rds (Newtownmoneenluggagh)	684		
107	(L-1017) Local Road East of Timahoe (Coologmartin)	855		
108	(L-5013) Local Road North Timahoe (Doogary)	613		
109	(L-5025) Local Road West of Timahoe (Drehid)	740		
110	R403 North of Derrinturn	4,643		
111	Local Road East of Coill Dubh	2,629		
112	R414 West of Allenwood (South Allenwood)	2,193		
113	(L-7004) Local Road South of R414 (Cloncurry)	332		
114	(L-3002) Local Road South of R414 (Blakestown)	2,689		

R:\Map Production\2014\LE14\731\04\Workspace\EIS MAPS\Chapter 13 Traffic\LE14 731 04_Figure 13.1 Haulage Route and Traffic Counters.mxd



Legend

- Turbine Location
- Wind Farm Cluster Boundary
- Proposed Borrow Pit Location
- Proposed Compound Location
- Proposed Substation Location
- Proposed Met Mast Location
- HV Cable Route
- MV Cable Route
- MV Cable (Internal to Cluster)
- Indicative Access Tracks
- Irish Grid Connection Point
- Indicative Haul Route
- Traffic Count Location

Date 19/03/2015

Name Of Client

Element Power Ireland

Name Of Job

Maighne Wind Farm

Title Of Figure

Indicative Haul Route and Traffic Count Locations

Scale 1:100,000@ A3

Figure No. 13.1

Rev A

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13.2.5 Rail

The Dublin to Sligo *InterCity* railway line, operated by Iarnród Éireann, passes through the study area immediately adjacent to the Ballynakill cluster (for a length of approximately 2km) and also at Kilcock where HV cable option 1 crosses the same railway line. The nearest railway stations to the proposed Maighne Wind Farm development are located at Enfield and Kilcock.

13.2.6 Canals

The Royal Canal, the Grand Canal and the Barrow Line Canal (a feeder canal to the Grand Canal) are located within the study area.

The Royal Canal is the northernmost of the canals that connect Dublin with the Shannon. It runs from the River Liffey in Dublin to the Shannon in County Longford and passes through a number of towns including Maynooth, Kilcock and Enfield. The Dublin to Sligo railway line (described above) runs parallel to the canal in sections. The Ballynakill cluster is the nearest cluster to the Royal Canal and for approximately 2 km the canal runs parallel to the eastern boundary of the Ballynakill cluster (near Longwood).

The Grand Canal runs from Dublin to the River Shannon via Tullamore and a number of other towns and villages including Sallins, Robertstown, Allenwood and Edenderry. The access road and MV cable route to/from Derrybrennan crosses the Grand Canal near Abbeylough Bridge. The Derrybrennan cluster is located approximately 1.5 km west of the Grand Canal.

There are a number of feeder canals to the Grand Canal including the Barrow Line which joins the River Barrow at Athy. The closest wind farm cluster to the Barrow Line is the Cloncumber cluster which runs parallel to the northern bank of the canal for approximately 3.5 km as indicated on Figure 2.1.

Aside from the use of the canals for boating/navigation, the tow paths adjacent to the canals are used for walking and cycling.

13.3 Potential Impacts

This section considers the potential impact of the proposed Maighne Wind Farm development, prior to mitigation, for the construction, operational and decommissioning phases. Both direct and indirect impacts are considered where possible.

13.3.1 Potential Construction Impacts

A summary of the potential impacts associated with the construction of the Maighne Wind Farm development are as follows:

Wind Farm Cluster Construction

The construction works at each wind farm cluster will lead to additional construction related traffic on the existing public road network over the duration of the construction works. These impacts will include:

- Heavy Goods Vehicles (HGVs) transporting materials to and from the site, including road making materials, concrete (ready mix), building materials, drainage/ducting materials, cabling and electrical components, and excavated material
- HGV's transporting conventional earthworks machinery such as excavators, dumper trucks, rollers etc. Fuel trucks transporting fuel (for plant) to each site compound during the works
- Light goods vehicles (LGVs) such as cars, 4x4s and vans used by the workers and supervisory staff involved in the construction works
- Oversized loads including turbine components as discussed below.

Turbine Component Delivery

The delivery of turbine components including blades, tower sections and nacelles is a specialist transport operation owing to the oversized loads involved. The blades are the longest turbine component and in the case the Maighne Wind Farm project, 60 m blades were considered for the purpose of the assessment.

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

In some cases, temporary accommodation works are required along the TDR such as hedge or tree cutting, temporary relocation of powerlines/poles, lampposts, signage and local road widening.

On this project, a Delivery Route Selection and Assessment Report was prepared by Exceptional Load Services (ELS), a specialist in route surveys, permitting and traffic management. The report determined the preferred route for turbine component delivery and identified the critical 'nodes' along the route where accommodation and preparatory works will be required. A copy of the ELS report is provided in Appendix K1 of this EIS and the proposed TDR for this project is depicted on Figure 2.10 in Chapter 2 of this EIS.

Cable Route Construction (MV and HV)

The construction of the underground cable routes, both MV and HV, will involve the installation of underground ducts along the route of the existing road network. The construction approach required for the installation of the ducting is described in Chapter 2 of this EIS.

As the cable route will generally follow the existing roads, there will invariable be a disruptive impact on those using the road network. As the cable laying operations advance along the route, the works area will therefore move as will the associated impact on the roads. Without appropriate mitigation measures, the cable trenching works have the potential to lead to a significant negative impact on the road network including:

- Delay and disruption to road users
- Road safety issues should the works not be carried out in line with good traffic management practices or subject to correct reinstatement
- Inappropriate parking of construction related vehicles along the route of the works
- Soiling of the public road leading to a general lack of cleanliness and poor skid resistance on roads.

The above impacts, should they arise, will have a temporary direct negative impact on road users such as increased trip times. However, there is also the potential for indirect impacts to occur including reduction in footfall to local businesses if potential customers are prevented from taking a certain route owing to the works.

Notwithstanding the above assessment, roadworks in Ireland can only be undertaken under the terms of a Road Opening Licence which must be secured in advance of the works from the roads authority and, as such, these types of works are well regulated. Mitigation measures are proposed for the cabling works in Section 13.4 below.

13.3.2 Construction Traffic – Trip Generation

In order to assess the impact of the additional construction related traffic on the existing road network it is first required to estimate the amount of construction traffic that will be generated (trip generation) as a result of the project.

This assessment was done by estimating the amount of traffic, in the form of HGV's and LGV's that will be generated during the construction phase and then distributing it over the duration of the construction programme (approximately 23 months). In determining the number of 'trips' the estimated number of HGV vehicles was multiplied by a factor of 2 to account for a single trip 'in' and a corresponding single trip 'out'.

In the case of LGVs, the estimated number of vehicles was multiplied by 2.5 to account for some additional LGV movements e.g. some workers taking lunch breaks in the local village. The analysis allowed for a total number of trips per month to be calculated for the Maighne Wind Farm development.
For this assessment, the traffic associated with the HV cable route is discussed separately below as the roads impacted for this element of the project are generally different from those impacted by the wind farm and MV cable route construction works.

Some key assumptions taken when preparing the trip generation estimates include:

- Borrow pits will be developed at Ballynakill and Cloncumber only. There are no borrow pits at Drehid-Hortland, Windmill or Derrybrennan.
- The borrow pits at Ballynakill and Cloncumber will be used to supply general fill to sites without a borrow pit (Windmill, Drehid/Hortland and Derrybrennan). There will be no removal of soil off site from Windmill as the surplus peat will be used in the existing commercial peat operations on site.
- Excess subsoil and rock from the Drehid-Hortland and Derrybrennan clusters which cannot be beneficially re-used within these clusters, will be transported to Ballynakill and Cloncumber respectively for beneficial re-use in the proposed borrow pits. The transport of material off site at Drehid-Hortland and Derrybrennan will be done using the 'return' trip of the trucks transporting borrow pit material from Ballynakill to Drehid-Hortland and Cloncumber to Derrybrennan. Therefore, no additional trips will result from the movement of material off site at Drehid/Hortland and Derrybrennan.
- An average ready mix concrete truck carries a load of approximately $8m^3$ of concrete.

Table 13.3 below summaries the estimated number of construction related trips over the duration of the project (excluding HV cable route). An appraisal of the impact of this additional traffic is provided in 13.3.4 below.

Appendix K.2 provides a more comprehensive breakdown of the estimated traffic for each of the activities and clusters.

13.3.3 Construction Traffic – Trip Distribution

An indicative haul route is presented in Figure 13.1. This shows the expected route construction traffic will take to get to/from the wind farm clusters. These haul routes use the regional road network where possible to limit the amount of traffic on the local road network.

The indicative haul route uses the following roads:

- R418 (old N4) west of Enfield
- R402 Enfield to Carbury
- R403 Carbury towards Allenwood
- R414 (section of) Allenwood towards Rathangan
- L-1004 and L-5012 (Johnstownbridge/Kilshanroe to Knockanally)
- L-1005 Carbury to Windmill entrance
- L-5025 (section of) from the R402 east towards Timahoe Cross Roads
- L-7004 (from the R414 towards Glenaree Bridge near the proposed Cloncumber entrance)

The distribution of the construction traffic associated with the cable routes (both MV and HV) is anticipated to be along the alignment of the MV and HV cables routes themselves with some use of the surrounding local roads for access.

13.3.4 Construction Traffic Appraisal (haul routes)

Based on the proposed construction programme an analysis was carried out to estimate the monthly increase in construction related traffic, for both HGVs and LGVs, across the receiving environment over the duration of the project.

This monthly increase was also reduced to a daily number of trips so that a comparison can be made against the existing AADT of the road where known. The daily number of trips is calculated based on a 6 day working week.

The results are summarised in Table 13.3 below and a more detailed breakdown is provided in Appendix K2 of this EIS.

Over the duration of the project, the construction traffic on the roads leading to and from the overall site is estimated to be, on average, 3,630 trips per month (equivalent to 140 trips per day) over a 23 month period.

This will generally be made up of approximately 50% HGVs and 50% LGVs although the ratio of HGV/LGVs will vary depending on the activities being undertaken each month. The increase will be distributed across the various public roads used to access and transport material to/from the proposed wind farm development. While the HGVs will generally be spread out over the working day, the LGV trips will be biased towards the start and end of the working day as workers travel to and from work.

As shown in Table 13.3 above, the busiest overall month is predicted to be month 11 when the increase is estimated to be 7,381 trips per month (or 284 trips per day) with an approximate 50/50 split of HGVs and LGVs. The last 3 to 4 months of the project will result in far less construction traffic as the wind farm is tested and commissioned.

The analysis indicates that the peak months for the individual clusters in relation to additional traffic volumes are as follows:

- Ballynakill, month 3 - 2.330 trips/month (90 trips/day)
- Windmill, month 4 - 994 trips/month (38 trips/day)
- Drehid/Hortland, month 11 - 3,775 trips/month (145 trips/day)
- Cloncumber, month 11 - 2,188 trips/month (84 trips/day)
- Derrybrennan, month 11 - 545 trips (21 trips/day)

On wind farm projects, it is the concrete pours for each turbine bases that generally leads to the most HGV numbers on a given day. On the Maighne Wind Farm development, each base pour will require approximately[5] 550 m^3 of concrete which is equivalent to approximately 69 ready mix truck loads (or 138 HGV trips) on the day that a pour occurs.

An indicative haul route has been identified and this is shown on Figure 13.1 above. The haul route represents the anticipated routes that, unless otherwise agreed with the planning authority, will generally be used to access the various parts of the Maighne Wind Farm development and the assessment herein focuses mainly on these roads. The predicted increases have been considered against the volumes of existing traffic on the roads in the vicinity of the proposed wind farm development.

M4

It is anticipated that the site will, in the first instance, be accessed via the M4 motorway (Junction 9 Enfield). The additional construction related traffic will not have a significant impact on this relatively new motorway or the junction.

R146 (old N4)

It is envisaged that all traffic associated with the Ballynakill cluster will use the R146 (old N4) which has an AADT of 8,768. The average increase in project related construction traffic is estimated to be 619 trips per month (24 trips/day), and the maximum increase is estimated at 2,362 trip/month (month 3) which is equivalent to 91 additional trips per day (1% increase).

[5] Concrete volume subject to detailed design

R402

The R402 will be used as the haulage route to the clusters south of the M4 including Drehid-Hortland, Windmill, Derrybrennan and Cloncumber. The R402 received an extensive upgrade as part of the R402 Enfield to Edenderry Road Project completed circa 2014. The road has an AADT of 3,069. If it is conservatively assumed that all construction related traffic will use the R402 (the Ballynakill traffic will not), then the average increase in traffic will be 4,002 trips per month or 154 trips per day (a 5% increase). Similarly, the peak increase in construction traffic (in month 11) will be 7,794 trips per month (300 trips per day). This equates to a short-term increase of 9.8 % in traffic on the section of the R402 from the M4 Junction 9 to Carbury.

L-1005 (from R402 at Carbury north to Windmill entrance)

The proposed haul route to the Windmill cluster is along the L-1005 local road for approximately 3.3 km from the R402 Carbury Junction north as far as the entrance to Windmill. The L-1005 has an estimated[6] AADT of 628. The average increase in traffic on the L-1005 as a result of the proposed project is estimated to be 277 trips per month, or 11 trips per day (a 1.8 % increase). Month 4 of the project will generate the greatest construction traffic to/from the Windmill cluster via the L-1005 when an estimated additional 1,334 trips per month (51 trips per day) will occur. This is equivalent to a short-term 8 % increase in traffic using the L-1005.

L-5025 (from R402 east towards Drehid Cross Road and Timahoe Cross Roads)

The proposed haul route to the Drehid-Hortland cluster will, for the Drehid portion of the cluster (T11-T23 and T47), be accessed from the L-5025 local road. The L-5025 has an AADT of 740. It is estimated that the average increase in traffic generated by the overall Drehid-Hortland cluster to be 2,232 trips per month or 87 trips per day. However, approximately 75 % of this additional traffic will result from the Drehid portion of the cluster and 25 % associated with the Hortland portion of the cluster, and these vehicles will use different local roads for access (i.e. L-1004 and L-5012).

The average increase in the traffic using the L-5025, from the R402 to the site entrance at Drehid therefore, will be 1,674 trips per month or 65 trips per day (equivalent to a temporary 8.7 % increase). In month 11, the amount of construction traffic (using the same 75/25 split) is estimated to peak at 3,140 trips per month or 122 trips per day which will result in a temporary 16 % increase for that particular month.

L-1004 (from R402 at Johnstownbridge east to New Bridge/Knockanally) and the L-5012 east of Kilshanroe

The Hortland side of the Drehid-Hortland cluster will be accessed via haul routes passing along 5.6km of the L-1004 which runs from the R402 at Johnstownbridge east towards New Bridge/Knockanally and along a 2.8 km section of the L-5012 east of Kilshancheo. These sections of local road have an estimated[7] AADT of 684. The estimated average increase in traffic on these sections of roads due to the construction works is 558 trips per month or 22 trips per day (an increase of 3 %). However, during the busiest month (month 11), the estimate increase in traffic will be 1,046 trip per month or 40 trips per day which represents a 5.8 % increase. The impact will be greater on the days of a concrete pour.

R403 (from the R402 through Derrinturn to Abbeylough Bridge)

The Derrybrennan and Cloncumber clusters will be accessed via a section of the R403 which runs from the R402 at Carbury through Derrinturn as far as Abbeylough Bridge (northwest of Allenwood). The AADT on the R403 varies from 4,643 (north of Derrinturn) to 3,922 northwest of Allenwood. For the purposes of this assessment the average AADT of 4,282 is taken. The combined average increase in traffic associated with the Derrybrennan and Cloncumber clusters (both of which will use the R403) is 843 trip per month or 34 trips per day which equates to an increase of less than 1 %. The peak months will arise during month 11 for Derrybrennan (802) and Cloncumber (1,990) respectively during which time the combined increase is estimated to be 2,792 trip per month or 108 trips per day (an increase of approximately 2.5%).

[6] The estimated AADT for the L-1005 is, for the purposes of this assessment, based on 1/3 of the AADT of the nearest relevant traffic count location which was carried out on the L-1002.
[7] Based on the AADT of 684 taken at count location 106 just north of Ballagh Cross Roads.

Abbeylough Bridge to Derrybrennan

The proposed haul route leaves the R403 at Abbeylough Bridge and runs east along and local road approximately 250m leading into the Derrybrennan site via the entrance to the Bord Na Móna Lullymore Firepak facility. Traffic on this section of local road is estimated to be low, but the additional traffic (max 108 trips per day as described above for the R403) is not likely to lead to a significant impact over this short section of road.

The impact of traffic through the private lands at Derrybrennan is not considered as it does not have the potential to impact on the public road network.

R414 (Lullymore south to the L-7005 near the Cloncumber cluster)

South of Derrybrennan, the haul route re-joins the public road network at the R414. The R414 is a regional road from Allenwood to Rathangan. The section of the R414 that will be used has an AADT of approximately 1,279 (based on count location no 12). It is estimated that the average increase in traffic leading to/from the Cloncumber cluster will be 688 trips per month or 27 trips per day (2 % increase). The peak volume of traffic is predicated to occur in Month 11 when 1,990 trip per month or 77 trips per day (6 % increase).

L-7005 (Cloncumber entrance)

Near the Cloncumber site, the haul route leaves the R414 and runs along the L-7005 local road for approximately 730 m before reaching the entrance to the Cloncumber cluster west of the Grand Canal (Glenaree Bridge/22nd Lock). A traffic count on the L-7005 close to this location indicates an AADT of 332. The addition of 1,990 trips per month or 77 trips per day (peak month 11) to this road results in an increase of 23 %. On the day of a concrete pour, for which there will be 11 at Cloncumber, the increase in traffic will be greater (at least 138 HGV trips).

Table 13.3: Summary of Estimated Construction Traffic over the Construction Programme

	Month																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Ballynakill	170	422	579	421	256	80	80	80	106	112	26	26	1	5	0	0	0	0	0	0	0	0	0
Windmill	0	0	80	558	434	354	449	0	0	0	97	113	17	2	0	0	0	0	0	0	0	0	0
Drehid/Hortland	1192	1354	1114	1222	1219	1250	1120	1038	1036	1160	1196	940	739	737	35	35	0	0	11	0	0	0	0
Cloncumber	0	0	0	22	115	103	139	224	260	418	516	592	85	0	28	28	33	28	0	0	6	0	0
Derrybrennan	0	9	25	23	25	25	23	0	355	354	313	6	73	152	0	0	0	10	10	0	0	2	0
Total - Maighne Wind Farm	1363	1785	1798	2246	2048	1812	1812	1343	1757	2044	**2148**	1677	915	896	63	63	33	38	21	0	6	2	0
Ballynakill	341	845	***1159***	842	512	161	161	161	213	223	52	52	2	11	0	0	0	0	0	0	0	0	0
Windmill	0	0	160	***1115***	868	708	897	0	1	1	193	225	34	3	0	0	0	0	0	0	0	0	0
Drehid/Hortland	2385	2708	2228	2444	2437	2500	2241	2077	2072	2321	***2392***	1881	1478	1474	70	70	0	0	22	0	0	0	0
Cloncumber	0	0	0	44	230	206	279	449	519	836	1033	***1184***	171	0	55	55	67	55	0	0	12	0	0
Derrybrennan	0	17	49	47	49	49	47	0	***709***	707	626	11	147	305	0	0	0	20	20	0	0	4	0
Maighne Wind Farm	2726	3570	3596	4493	4096	3623	3624	2687	3514	4087	***4296***	3353	1831	1792	125	125	67	75	42	0	12	4	0
Ballynakill	450	446	***481***	461	461	36	36	36	217	217	217	217	217	227	46	5	5	5	5	5	5	5	5
Windmill	0	0	87	87	87	87	87	11	11	11	11	116	116	***121***	14	3	3	3	3	3	3	2	2
Drehid/Hortland	440	510	510	460	460	460	460	460	460	460	***718***	***718***	338	338	338	268	268	258	258	10	10	10	10
Cloncumber	0	0	39	64	***408***	***408***	383	383	383	383	383	39	215	215	215	176	181	181	181	5	5	5	5
Derrybrennan	0	7	7	7	7	7	7	7	7	7	70	70	70	***75***	12	5	67	67	5	5	67	3	2
Maighne Wind Farm	890	962	1124	1079	***1423***	997	972	896	1077	1077	1399	1160	956	976	624	457	523	513	452	28	90	25	24
Ballynakill	1124	1114	***1203***	1153	1153	89	89	89	543	543	543	543	543	568	114	13	13	13	13	13	13	13	13
Windmill	0	0	218	218	218	218	218	27	27	27	27	289	289	***302***	34	8	8	8	8	8	8	5	5
Drehid/Hortland	1100	1274	1274	1149	1149	1149	1149	1149	1149	1149	***1795***	***1795***	844	844	844	670	670	645	645	25	25	25	25
Cloncumber	0	0	98	161	***1019***	***1019***	957	957	957	957	957	98	537	537	537	439	451	451	451	13	13	13	13
Derrybrennan	0	17	17	17	17	17	17	17	17	17	176	176	176	***189***	29	13	166	166	13	13	166	8	5
Maighne Wind Farm	2224	2405	2811	2698	***3557***	2493	2431	2239	2693	2693	3498	2901	2390	2440	1559	1142	1308	1283	1129	70	224	63	60

Cluster Name	Month																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Ballynakill	1465	1958	2362	1996	1665	250	250	250	756	766	595	595	545	579	114	13	13	13	13	13	13	13	13
Windmill	0	0	379	1334	1087	926	1116	27	27	27	220	514	323	305	34	8	8	8	8	8	8	5	5
Drehid/Hortland	3485	3982	3502	3593	3587	3649	3390	3226	3221	3470	4186	3676	2322	2318	914	740	670	645	668	25	25	25	25
Cloncumber	0	0	98	205	1249	1225	1236	1406	1476	1793	1990	1282	708	537	592	494	518	506	451	13	24	13	13
Derrybrennan	0	34	66	63	66	66	63	17	726	724	802	188	323	493	29	13	166	186	33	13	166	12	5
Maighne Wind Farm	4950	5975	6407	7191	7653	6116	6055	4926	6206	6780	7794	6254	4221	4232	1684	1267	1375	1358	1171	70	236	67	60
Mean	4002																						

13.3.5 Construction Impact - Cabling Works

The traffic impact associated with both the HV and MV cabling works will fall into two main categories, namely construction traffic related impacts and road/lane closure related impacts. These are discussed below.

Construction Traffic Related Impacts (MV Cable Route)

The proposed MV cable route is shown on Figure 13.1 and the existing environment along the route is described in Section 13.2 above.

The additional construction traffic arising from the construction of the MV cable route is included in the trip generation figures and the construction traffic appraisal along the indicative haul route as described in Section 13.3.4 above. This was done as the MV cable route and the indicative haul route overlap over considerable distances including sections of the L-5012, L-1004, R403, R414 and L-7004.

However, as indicated on Figure 13.1 and as described in Section 13.2.2 above, the MV cable route travels along some local roads that are not on the indicative haul route including L-1005, L-1002, L-5010, L-5006, L-5010, L5022 and L-5024. Due to the relatively dispersed nature of the works, the relatively low levels of existing traffic on these local roads and the relatively low construction traffic anticipated along these roads as a direct result of the cabling work, there will not be any significant impact due the additional construction traffic associated with the cabling works.

Construction Traffic Related Impacts (HV Cable Route)

The two potential HV cable routes are shown on Figure 13.1 and the existing environment along each route is described in Section 13.2 above.

The HV cable route construction works will, by their nature, involve constantly moving 'work sites' as the cable installation works progress. It is anticipated that it will take approximately 10 months to complete the cable installation works from Drehid to either Maynooth or Woodland. Over this period it is estimated that the cable installation works will generate approximately 765 (465 HGV and 300 LGV) additionally trips per month. This equates to approximately 30 (18 HGV and 12 LGV) additional trips per day and this will be distributed across a number of work sites involved in the installation of the HV cabling.

Given the length of the HV cable routes (either 22.3 km or 32.2 km in length depending on which option is chosen), the dispersed nature of the works and the relatively low construction traffic anticipated there will not be any significant impact due the additional construction traffic.

HV and MV Cable Route Roadworks

The cable route construction works will require a combination of temporary traffic diversions, lane and road closures along the proposed routes.

Section 13.2.2 and 13.2.3 above describe the existing environment along the MV and HV cable routes. The impact of traffic diversions and lane/road closures on a particular stretch of road will depend on the location and volume of traffic which use that road.

While all road works will be subject to the provisions of a road opening licence, it is anticipated that the cable installation works on the regional roads will, subject to the requirements of the roads authority, be advanced using temporary 'rolling' lane closures. In these situations, the traffic will be allowed to travel in both directions albeit with the aid of either 'stop/go' signs or temporary traffic lights. The works will however result in a direct negative impact on road users owing to the delays caused by the road works.

Along local roads, it is anticipated that the cable installation works will, for the most part, be carried out using temporary road closures and traffic diversions, depending on the width of the road and subject to agreement with the roads authority. These road works will impact on road users and will lead to increased journey times for the duration of the diversion/road works.

There is an extensive network of local roads in the area and traffic will be diverted onto these local roads temporarily while the cable routes are being developed. Again, by their nature, the location of the road works will move as the cable installation works are advanced and therefore result in a temporary direct negative impact on road users.

The cumulative impact of the cabling works, both MV and HV, in parallel with the construction of the wind farm has the potential to magnify the impact on the road network and its users. This includes the potential for cabling related roadworks to be occurring on a section of local road which will be carrying other (non-cabling related) construction traffic to the wind farm on the day of a concrete pour for example.

Along the cable route, there is the potential for the works to have a temporary affect on passing trade or footfall on local businesses and this could lead to a temporary slight negative indirect impact.

13.3.6 Traffic Impact - Operational Traffic

It is estimated that the wind farm will be unmanned once operational and will be remotely monitored. The only traffic associated with the operational phase of the wind farm will be from ESB personnel visiting the sub-station and maintenance personnel who will visit individual turbines. Separately, there will be a limited amount of traffic generated as a result of routine environmental monitoring/compliance staff.

The anticipated number of vehicles will be less than 2 vehicles per day on average (4 trips).

Routine turbine maintenance is generally conducted by trained personnel climbing up inside the tower. However, there may be circumstances when a crane will be mobilised to site to conduct non routine maintenance. In this case there will be an impact on the roads leading to the site but the impact will be negligible.

The location and layout of new or modified entrances to the wind farm clusters have the potential to adversely impact on the flow of traffic and local road safety if they do not conform to acceptable junction/entrance design standards.

13.3.7 Traffic Impact – Decommissioning

The works involved in the decommissioning phase of the project are described in Chapter 2 of this EIS and will these works will be subject to a decommissioning plan to be agreed with the planning authority. The traffic impact associated with the decommissioning phase will be far less significant than those required during the construction phase as some elements may, subject to agreement, remain in place e.g. access roads and turbine foundations.

During the decommissioning phase, the dismantled turbine components will, unless otherwise agreed with the planning authority, be removed from site and this operation will be similar to the turbine component delivery which will occur during the construction phase.

13.4 Mitigation Measures

This section outlines the mitigation measures to avoid or reduce the potential impact of the proposed development.

A significant amount of ‘mitigation by design’ has already been included in the preliminary design and route selection of the proposed cabling. This section presents the proposed mitigation measures for both the construction and operational phase of the development.

13.4.1 Mitigation by Design (Route Selection)

Turbine Delivery Route

The TDR has been considered and chosen following route analysis by Exceptional Load Services (ELS). The TDR selection report is provided in Appendix K2 of this EIS.

Haul Route

The indicative haul route, as presented on Figure 13.1, shows the likely route that will be taken by most construction traffic to and from each of the cluster. The haul route has been chosen using the following objectives:

1. Where possible, the route follows regional roads including R418 (old N4), R402, R403 and R414. There are no national roads in the immediate area.
2. Where possible, bog rampard type roads which are common place in the area, have been avoided.
3. Where possible, bridges over canals have been avoided due to weight restrictions.

MV and HV Cable Routes

The route of the proposed MV and HV cable routes have been the subject of extensive route selection carried out by Arup Consulting Engineers on behalf of Element Power. The route of both the MV and HV cable routes was chosen to avoid, where possible, the need to trench along bog rampart type roads which present difficult geotechnical conditions in terms of construction and reinstatement.

This cable route selection process is discussed in Chapter 2 – Description of the Development and the alternatives are considered in Chapter 1 - Introduction of this EIS. The cable route selection process also considered the impact on the road network and the preferred route is presented in Figure 13.1.

In general, the MV cable route follows the public road network between the clusters and the proposed substation at Drehid.

Two potential HV cable routes have been considered to connect the proposed Drehid substation to two potential national grid connection points at either the existing substation at Maynooth, Co. Kildare or Woodland, Co. Meath. Route Option 1 (to Woodland) follows the public road along its length. Route Option 2 (to Maynooth) follows the public road network for the most part except for a section of the HV cable route which travels within the Drehid-Hortland cluster thereby negating the need for works on the public road at this location.

Entrance Location and Layout

Each of the entrances to the wind farm clusters was inspected on site to verify that appropriate sightlines were available for those vehicles using the entrances and for other road users. A report on the on-site survey carried out on the entrances is provided in Appendix K3.

13.4.2 Mitigation Measures – Construction Stage

The successful completion of this project will require significant coordination and planning and the following mitigation measures will be implemented prior to and during the project as appropriate:

General Traffic Mitigation Measures

1. **Traffic Management Plan (including restricted use of public roads)**- An overall Traffic Management Plan (TMP) will be prepared in advance of the works and this will be agreed with the roads authority and An Garda Síochána. The traffic management plan will clearly identify those roads that will be used to access the site/clusters and those roads that are not to be used. In some cases, the Garda Síochana and the roads authority may direct/agree that certain roads cannot be used for laden HGV's but can be used for LGV's or unladen HGV's.

In such cases, these particulars will be recorded on the TMP. The TMP will also have regard to Waterways Ireland restrictions on the use of certain bridges over the canal networks.

2. **Traffic Management Coordinator** - A dedicated competent Traffic Management Coordinator 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 on the project.
3. **Road Pre-Condition Survey** - A pre-condition survey shall be carried out on all public roads that will be used in connection with the works to record the condition of the road before the works commence. The specification and timing of the pre-construction survey will be agreed with the roads authority. A joint survey shall be undertaken if the roads authority so agrees.
4. **Road Reinstatement** - All roads, shall upon completion of the construction works, be reinstated to their pre-works condition or better and to the satisfaction of the relevant roads authority.
5. **Site Inductions** - All workers will received a comprehensive site induction which shall include, as appropriate, a section of traffic management and clear guidance on the routes to be used/not used.
6. **24 Hour Emergency Phone Number** - A 24 hour emergency phone number will be maintained for the duration of the construction works and the number will be noted on temporary signage at each works area (for cable works) and at each site entrance at a minimum.
7. **Orderly Traffic Management** - All necessary temporary traffic management will be planned and executed in accordance with best practice, including Chapter 8 of the Traffic Signs Manual as published by the NRA/Department of Transport.
8. **Letter Drops** - Subject to agreement with the planning authority, a letter drop will be carried out to notify members of the public living near the proposed site/route/roadworks, to advise them of any particularly significant upcoming traffic related matters e.g. temporary lane/road closure (if required), delivery of turbine components at night.
9. **Clear signage** - A system of clear signage relating to the project, both temporary and permanent will be agreed with the planning authority. These signs will also identify those roads to be used (and not to be used) for accessing the site in line with the objectives of the TMP.
10. **Wheel washing facilities** - temporary wheel washing facilities will be located at each site entrance, subject to agreement with the planning authority, to prevent soil/dirt from being transported onto the public road network.
11. **Road sweepers** will be utilised to maintain the public roads in a clear condition, and this will apply especially during the earthworks stages of the project.

Mitigation Measures –Cable Works

12. **Road Opening Licence** - The road works associated with the cabling will be undertaken in line with the requirements the road opening licence, the terms of which will be set out by the roads authority.
13. **Route Proofing** – in advance of the main cabling works 'route proving' will be carried out to define the precise alignment of the cables to be laid. This route proving process will include slit trenching with the aim of avoiding, where possible, existing services in the road. This step will allow for the cabling works to be carried out as expeditiously as possible thereby minimising the impact on road users.
14. **No cable works to overlap with concrete pours -** Unless otherwise agreed with the planning authority, cabling works shall not take place on the same section of local road on the same day that a turbine base pour is taking place.
15. **Maintain local access during diversions and road closures –** reasonable access to local dwellings, farms, businesses is to be maintained at all times during any road closures associated with the cable works. The details of this will be agreed with the roads authority in advance of the works in consultation with the local residents in so far as is practicable. The network of local roads in the area will be used for traffic diversions for local traffic in order to expedite the works and limit the duration of the impact owing to the cabling works.
16. **Road Cleanliness** - Appropriate steps will be taken to prevent soil/dirt generated during the trenching works from being transported on the public road.

17. **Reinstatement** - Trenches on public roads, once backfilled, shall be reinstated without delay to the satisfaction of the roads authority.
18. **Road Resurfacing/improvements** - So as to improve the condition of the local road network following the completion of the works, the local roads along which the cable routes travel, will be resurfaced in line with details/specification and timing to be discussed with the roads authority. For the avoidance of doubt the cost of these resurfacing works will be borne by the developer, subject to agreement with the planning authority.

13.4.3 Mitigation Measures – Operational Phase

No mitigation measures required.

13.4.4 Mitigation Measures – Decommissioning

All decommissioning works are to be carried out in accordance with a decommissioning plan (including details of traffic management) to be agreed with the planning authority in advance of the works.

13.5 Residual Impacts

Construction Stage

The construction of the proposed Maighne Wind Farm development will lead to additional construction traffic, including HGV, oversized loads and LGVs during the construction works. The overall construction programme will last for an estimated 23 months. This additional traffic will need to use the existing road network leading to the proposed development and this additional traffic will generally use the indicative haul route as depicted on Figure 13.1.

However, by adopting the mitigation measures proposed above, by adhering to a traffic management plan and given the relatively dispersed nature of the site, the additional traffic will have a direct slight short term negative impact on the road networks and its users.

The installation of the MV and HV cable routes will involve road works which will lead to temporary lane/road closures and diversions. The cabling works are will last for an estimated 10 months. The works will be carried out in line with the mitigation measures outlined above and in accordance with the provisions of the necessary road opening licences for the works. It is anticipated that there will be a direct moderate temporary negative residual impact on the road network and its users in the vicinity of the road works as they take place. It is important to note that the road works and the associated impact will move as the works progress therefore the impact along any one stretch of road will be temporary.

The additional construction traffic and the road works for the cabling have the potential to have indirect impacts including the potential to negatively impact local businesses. However, with the implementation of the mitigation measures outlined above and given the remote nature of the works it is anticipated that the works will have an imperceptible to slight indirect temporary negative residual impact on local business owing to the traffic impact.

Operational Stage

As outlined above, the will be no significant operational stage traffic impacts associated with the proposed Maighne Wind Farm development.

Decommissioning Stage

On decommissioning, the adoption of and adherence to a decommissioning plan which will include traffic management proposals will ensure that the residual impacts on traffic and transport at the decommissioning stage will not be significant.

13.6 Assessment of Potential Cumulative Impact with other projects

The constituent parts of the Maighne Wind Farms development including the wind farm, the MV cabling and the HV cabling are all discussed above and, as such, are not discussed under this section on cumulative impacts.

The proposed North South 400 kV Interconnection Development[8] (also known as the Meath to Tyrone 400 kV Interconnection Development) is a proposed high capacity electricity interconnector between the electricity networks of Ireland and Northern Ireland. The proposed development involves a proposed connection to the Irish national grid at the Woodland substation. There is the potential for cumulative traffic related impacts to occur should the construction phases of the proposed North South Interconnector project overlap with the construction of the proposed Maighne Wind Farm development. However, any impact would be local to the Woodland substation and would be minor in nature. Given that the timeline for the proposed interconnector project is currently not known, it is highly unlikely that there will any cumulative impact between the proposed Maighne Wind Farm development and the proposed interconnector.

There are no other known projects that could result in a cumulative impact with the proposed Maighne Wind Farm development in terms of traffic and transport.

[8] Source: http://www.eirgridprojects.com/projects/northsouth400kvinterconnectiondevelopment/overview/