13 MATERIAL ASSETS – TRAFFIC

13.1 INTRODUCTION

1 This chapter presents an evaluation of the proposed development as set out in Chapter 6, **Volume 3B** of this Environmental Impact Statement (EIS), in relation to traffic.

2 That chapter describes the full nature and extent of the proposed development, including elements of the overhead line (OHL) design and the towers. It provides a factual description, on a section by section basis, of the entire line route. The proposed line route is described in that chapter using townlands and tower numbers as a guideline. The principal construction works proposed as part of the development are set out in Chapter 7, **Volume 3B** of the EIS.

3 This chapter concentrates on the Cavan Monaghan Study Area (CMSA). Chapter 13, **Volume 3D** of the EIS, contains an evaluation of the Meath Study Area (MSA).

4 The primary means of transporting materials and labour to / from site will be by means of vehicles using the existing public road network. This will result in a temporary increase in traffic on public roads in the CMSA and as such necessitates that the impacts of this traffic be considered.

5 The CMSA for this evaluation includes a greater area than the footprint of the infrastructure described above. The CMSA includes the existing road infrastructure in the vicinity of the proposed development and the haul routes within a much wider area, which will be used to bring materials to the work areas. The extent of the CMSA for this evaluation is shown on Figure 13.18, **Volume 3C Figures** of the EIS.

6 This chapter should be read in conjunction with **Chapters 6**, **9**, **Chapter 10**, **11** and **14** of this volume of the EIS as well as **Chapters 6** and **7** of **Volume 3B** of the EIS.

13.2 METHODOLOGY

7 This section of the EIS has been prepared in accordance with relevant EU and Irish Legislation and guidance, including the requirements of Annex IV of the EIA Directive and in accordance with Schedule 6 of the *Planning and Development Regulations 2001* (as amended) and conforms to the relevant requirements as specified therein.

8 The scope of the appraisal is based on a review of legislation, guidance documents, other EISs, feedback from public consultation, consultation with prescribed authorities, pre-application consultation with An Bord Pleanála (the Board), and a consideration of the likelihood for significant impacts arising, having regard to the nature of the receiving environment and the

nature and extent of the proposed development. The following guidance and policy documents were reviewed during the preparation of this chapter:

- National Roads Authority's (NRA) *Traffic and Transport Assessment Guidelines* (May 2014);
- *Monaghan County Development Plan 2013 – 2019*;
- *Cavan County Development Plan 2014 – 2020;*
- National Roads Authority (NRA) *Design Manual for Roads and Bridges TD* 27 (November 2011) *Cross Sections and Headroom*;
- NRA Design Manual for Roads and Bridges TD 41-42 (November 2011) *Geometric Design of Major / Minor Priority junctions and Vehicular Access to National Roads*; and
- NRA *Project Appraisal Guidelines* (January 2011).

9 The scoping opinion received from the Board (see Appendix 1.3, **Volume 3B Appendices** of the EIS) identified the following issues as being relevant to this chapter of the EIS:

- A construction traffic management plan will be required, which should address stringing operations, road closures / detours and impacts on railway infrastructure;
- Identify the means of access for construction and on-going maintenance and the treatment of new widened construction entrances; and
- Identify and assess public road crossings, including the construction methodology. Particular regard should be had to the relationship with the national primary and secondary road network and with the proposed Leinster Orbital Route, to include issues and separation.

10 Following a meeting with the Board in December 2013 to clarify the scope of the construction traffic management plan referred to above, the Board clarified that a fully detailed construction management and construction traffic management plans would not necessarily be required at the time of submitting the planning application. A detailed construction traffic management plan, implementing all the elements of the outline construction traffic management plan will be further developed in the event that approval is granted in respect of the proposed development. An outline construction traffic management plan is included within Appendix 7.2, **Volume 3B Appendices** of the EIS. In addition, however, details of the methods that will be used for construction are outlined within Chapter 7, **Volume 3B** of the EIS and within this chapter describes mitigation measures that have been included in the outline construction traffic

management plan and will also will form part of the detailed construction traffic management plan.

11 The operational phase of the transmission line will generate minimal traffic flows as towers are unmanned. Maintenance of the proposed transmission line and towers will generate some traffic but this will be rare and the volumes involved negligible. The operational phase of the transmission line, therefore, has not been considered in great detail.

12 The construction phase of the development, as outlined in Chapter 7**, Volume 3B** of the EIS will generate significantly larger volumes of traffic compared to the operational phase, including long / heavy vehicles, concentrated over a shorter time span. This allied with the largely rural nature of the surrounding road network, means the impact of the construction traffic needs to be considered. However, as discussed further in this chapter, that is not to say that the construction of the proposed development will generate significant volumes of construction traffic.

13 Sources of information used to undertake the evaluation of the construction traffic impacts for the proposed development are as follows:

- Project construction methodology;
- Ordnance survey mapping;
- Aerial photography;
- Consultation with the NRA;
- Consultation with Cavan County Council; and
- Consultation with Monaghan County Council.

14 The above sources of information, combined with feedback received during landowner engagement, as well as other expert and experienced input concerning construction of transmission infrastructure, were used to identify the locations where access to tower locations and stringing areas (areas used to install conductors onto the towers) can be achieved and the likely haul routes that will be used by construction traffic to travel to these access locations. Based on these haul routes, a qualitative evaluation of the ability of these roads to cater for the vehicles, which will be utilised during construction, was undertaken.

15 The development of a construction methodology was used to estimate the number and type of vehicles (both light and heavy vehicles) that will be generated by the construction of each individual tower and associated temporary access routes for accessing tower locations. This information was then used to further estimate the volumes of traffic that will be generated at the

construction material storage yard, and the access between that yard and the construction sites of this linear development.

16 Locations where each tower location and stringing area can be accessed from the public road have been identified. The location identified for these have been chosen to make use of existing entrances and field tracks where possible. The locations of these temporary access routes are shown in Figure 13.14 – 13.17, **Volume 3C Figures** of the EIS.

17 By considering the proposed construction methodology and phasing, the location of the identified temporary access route locations and the haul routes that will be used to access these locations, an estimate of the volumes of construction traffic that will use individual roads within the CMSA can be generated. These estimates can be used to evaluate the impact on individual roads within the road network in numerical terms (i.e. numbers of vehicles).

18 Data collection, in the form of 'Automatic Traffic Counts' were carried out to ascertain the typical existing traffic volumes currently using the roads which will be impacted by the construction of the proposed development (refer to Appendix 13.2, **Volume 3C Appendices** of the EIS). By comparing the projected increase in traffic to the existing background traffic levels, the level of impact has been ascertained.

19 In addition to the impacts on traffic capacity and road condition, other traffic related impacts should be considered. These include:

- Road Safety;
- Air Pollution;
- Noise and Vibration;
- Flora & Fauna;
- Cultural Heritage; and
- Landscape.

20 With the exception of road safety, the above impacts are evaluated in other chapters of this volume of the EIS in respect of the CMSA and **Volume 3D** of the EIS in respect of the MSA. Regarding road safety, in order to get an understanding of the road accident history of the area, road accident data for the roads that will be affected by the development has been obtained from the Road Safety Authority website (www.rsa.ie).

13.3 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

21 A detailed description of the proposed development is provided in Chapter 6, **Volume 3B** of the EIS and the construction methodology is outlined in Chapter 7, **Volume 3B** of this EIS. As described in Chapter 7, **Volume 3B** of the EIS, the operational phase of the development will result in negligible volumes of traffic, with the primary traffic impact occurring during the construction phase.

22 The proposed OHL will effectively result in a long linear construction site with multiple isolated areas where construction activities will take place. In order to facilitate construction at the areas where construction activities will be occurring, materials, personnel and equipment will be transported to / from these sites.

23 Transportation of these materials personnel and equipment will primarily be achieved using the existing public road network. Access to the individual sites will generally be achieved via existing field accesses and existing internal tracks where available.

24 Despite the scale of the proposed development, the volumes of vehicles required to attend each individual construction location along the length of the linear development will be relatively low and this traffic will be spread out over several weeks which is the duration it will take to construct individual towers.

25 Due to the length of the proposed line, traffic will be dispersed over a large area during the construction phase, notwithstanding the fact that construction will occur in any one location for a relatively short duration. It is proposed that a construction material storage yard, located in the townland of Monaltyduff and Monaltybane, Carrickmacross, County Monaghan will be used to store materials for distribution to the individual sites. Higher volumes of traffic are anticipated at this location prior to their dispersion across the road network leading to individual sites (refer to Chapter 7, **Volume 3B** of the EIS).

13.4 EXISTING ENVIRONMENT

13.4.1 Existing Road Infrastructure

26 Figures 13.1 – 13.4, **Volume 3C Figures** of the EIS, indicate the roads which will potentially be impacted by the proposed development.

27 Traffic surveys were carried out on the surrounding road network in order to determine background traffic flows on the haul routes that will be used by construction traffic. These counts consisted of Automatic Traffic Counters that were in place for a week. The surveys were carried out by Nationwide Data Collection Ltd. in October 2013 at 103 locations. These

locations are indicated in Figures 13.5 – 13.8, **Volume 3C Figures** of the EIS. A further three counts were carried out in January 2014 adjacent to the entrance to the construction material storage yard for use in junction analysis at the junctions near to the entrance of this yard.

28 In addition to the counts referred to above, some traffic counter data was taken from publicly available traffic counter data located on the National Roads Authority website (www.nra.ie).

29 Traffic flows fluctuate seasonally, however, based on permanent traffic counter data available from the National Roads Authority website (www.nra.ie) this seasonal fluctuation can be determined. Thus, based on the flows measured at the counter located on the N2 to the south of Ardee (N02 – 15) during 2010, flows in October are higher than those normally experienced throughout the rest of the year. To account for this, baseline flows have been multiplied by a factor of 0.94. While this will result in the measured flows reducing, the lower flows represent a worse case when presenting the percentage increase of traffic flows due to the proposed development. For the three counts carried out in January 2014, the same NRA counter was referenced. Flows were found to be 20% lower in January. As the flows on these three junctions are being used in junction analysis, presenting the worst case involves the factoring up of these flows by this percentage.

30 It is anticipated that, in the event that planning approval is granted, construction of the overall proposed development will commence in 2016 and last for approximately three years. Again, it should be noted that, given the linear nature of the proposed development, no part of the proposed line will experience construction for any extended time period. To account for the predicted growth of background traffic on the road network during the period between the date the surveys were carried out on and the date construction is expected to commence, growth rates have been applied to the background traffic flows. The rates applied have been taken from the NRA Project Appraisal Guidelines and are as follows:

- Meath and Monaghan Counters - 1.040; and
- Cavan Counters – 1.051.

31 The above growth factors have been derived using the high growth rates appropriate to each county and represent two years growth to bring the measured flows to those expected in 2015. While the construction period will commence in 2016 and continue into 2017 and 2018, it is not certain which towers will be constructed within each year and using 2015 figures will result in higher percentage increases when comparing the predicted flows to existing flows.

32 Details of the roads, including daily traffic flows where available, that may be impacted upon are provided in **Tables 13.1 – 13.3**.

Table 13.1: Potentially Impacted National Roads

Road Number	AADT[38]	HGV%[39]
N2	8106	10.1%

Table 13.2: Potentially Impacted Regional Roads

Road Number	AADT	HGV%
R162	1593	14.6%
R165	2807	15.7%
R178	2367	14.5%
R179	4050	12.1%
R180	1623	17.5%
R181	1214	19.5%
R183	2841	9.9%
R184	1185	18.2%

Table 13.3: Potentially Impacted Local Roads

Road Number	AADT	HGV%
Old N2	6786	11.0%
L-3532-0	955	8.7%
L-3533-0	86	8.0%
L-3525-0	292	5.7%
L-7557-0	124	8.7%
L-7555-0	122	8.9%
LT49033	N/A	N/A
LT49032	N/A	N/A
LP04903	N/A	N/A
LS08903	N/A	N/A
LT49051	N/A	N/A
L-49041	N/A	N/A
L-8912	80	17.1%
L-4020	210	23.7%
L-8010	99	36.6%
L-8011	179	9.8%
L-40121	47	12.5%

[38] Average Annual Daily Traffic (AADT).
[39] Heavy Goods Vehicle (HGV) Percentage.

Road Number	AADT	HGV%
L-40052	71	27.4%
L-40312	22	4.5%
L-4004	112	13.0%
L-4011	91	10.8%
L-4042	459	12.4%
L-4010	78	17.5%
L-40103	8	0
Unknown Road(from R181)L-40441	32	6.3%
L-08201	N/A	N/A
L-4210	538	8.0%
L-3201	133	11.8%
L-7211	143	6.2%
L-7200	78	8.8%
L-3403	492	8.7%
L-7430	60	3.3%
L-7411	178	11.0%
L-31031	60	3.3%
L-34211	86	9.1%
L-3420	621	23.5%
L-7421	161	13.9%
L-3510	236	10.8%
L-03520	238	14.0%
L-75031	98	20.0%
L7503	65	9.1%
L-4700	952	0.8%
L-4700 – N2 Link Road	340	2.6%

33 While it is likely that each road referred to in **Tables 13.1 – 13.3**, will be utilised at some stage during the construction phase, the use of the local roads will be minimised with the use of national and regional routes being prioritised due to their standard generally being higher.

34 Materials used in the construction of the proposed development, such as steel and concrete, are likely to be sourced from manufacturers that are not situated within the immediate vicinity of the proposed development. It is proposed that a construction material storage yard will be located at a site situated to the south-east of Carrickmacross and that construction traffic will emanate from this site, towards its destination.

35 Vehicles departing from the construction material storage yard will join the N2 from the L4700, turning north towards Carrickmacross or south towards Ardee, depending on the destination of the materials being delivered. Thereafter construction traffic will migrate onto national and regional roads as necessary. The use of local roads will be minimised as much as possible, particularly to avoid or minimise the encountering of narrow road widths, poorly maintained visibility and unsuitable bearing capacities. Haul routes have been identified, as shown in Figures 13.9 – 13.13, **Volume 3C Figures** of the EIS, which indicate this hierarchical approach.

36 As the national and regional roads will be most used by the proposed development, a brief description of each is included in the following paragraphs.

37 The N2 is a national primary road linking Dublin to the Border with Northern Ireland in Monaghan. The cross section of this road varies between two lane dual carriageway, type 3 dual carriageway and single carriageway, the details of which can be found in the NRA TD27 Cross Section and Headroom.

38 A section of the old N2 which has been re-designated as a regional road is also likely to be used. This road has a carriageway width which varies between approximately 6 and 7m. The road is generally straight with adequate forward visibility.

39 The R162 is a regional road linking Navan to Shercock via Kingscourt. The section which construction traffic related to the proposed line route will use, has a carriageway width of approximately 7m. In general this road is subject to a speed limit of generally 80km/h; however, this is reduced in places. Forward visibility along the road is generally adequate to accommodate these speeds.

40 The R165 is a regional road linking the N2 and the N3, passing through Kingscourt and Baileborough. This road has an approximate carriageway width of between 6 and 7m. This road has several sharp bends which limits forward visibility in places.

41 The R178 is a regional road linking Shercock to Dundalk. This road has an approximate carriageway width of between 6 and 7m. This road has several tight bends along the portion that will be used by construction traffic for the proposed line route and the specified forward visibility for the road's speed limit is not available in places.

42 The R179 is a regional road linking Kingscourt to the Border via Carrickmacross. This road has several tight bends along the portion that will be used by construction traffic for the proposed line route and the specified forward visibility for the road's speed limit is not available in places.

43 The R180 is a regional road linking Castleblayney to Ballybay. This road has an approximate carriageway width of between 6 and 7m. Within the section of road where the construction phase traffic is likely to use the road, it is generally straight with adequate forward visibility.

44 The R181 is a regional road linking Shercock to the Border via Castleblayney. This road has a cross section of approximately 7m. This road has several sharp bends which limits forward visibility in places.

45 The R183 is a regional road linking Clones to the N2 near Castleblayney. This road has an approximate carriageway width of between 6 and 7m. This road has several tight bends along the portion that will be used by construction traffic for the line route and the specified forward visibility for the road's speed limit is not available in places.

46 The R184 is a regional road linking Ballybay to the N2. This road has an approximate carriageway width of 6m. Within the section of road construction phase traffic is likely to use, the road is generally straight with adequate forward visibility.

13.4.2 Road Safety

47 A search of the accident statistics has been carried out using the Road Safety Authority's website. **Table 13.4** identifies the number of serious and fatal accidents that have been recorded on the sections of road (in the period between 2005 and 2012) that are likely to be used during the construction phase of the proposed development. This is the most up to date information currently available.

Table 13.4: Road Accidents Along Proposed Haul Routes 2005 – 2012

Road Number	No. of Serious Accidents	No. of Fatal Accidents
R184	0	1
LS07502	0	1
LP03510	1	0
Old N2	3	0
R183	2	1
R181	5	0
R178	3	0
R179	3	1
R162	2	1
R165	1	0
L-3534-0	1	0
N2	6	7
N52	4	1

13.4.3 Site Access

48 The proposed development in the CMSA has a total of 134 towers which will require access for construction. In addition to tower locations, access will be required to associated stringing and general working areas. There are a total of 117 temporary accesses required from the public road network to construct the proposed line. The majority of these will be accessed using existing field gates or laneways. Figures 13.14 – 13.17, **Volume 3C Figures** of the EIS, show the proposed temporary access route locations.

49 It is proposed that a site to the south-east of Carrickmacross will be used as a construction material storage yard. This yard is located to the west of the N2 and is accessed by the L4700. The existing access into the storage yard is located adjacent to a junction on the public road network and has restricted visibility. As such, it is proposed to construct a new entrance onto the L4700 further south of the existing entrance. A speed survey along the L4700 indicated that 85th percentile speeds along the road are 70km/h. A visibility splay of 160m from a 3m set back is achievable to the left and 120m from a 3m setback is achievable to the right.

50 Staff shall access each site location via a vehicle pooling system to be put in place between the temporary construction material storage yard and each site location. Parking at each site location will not be permitted for non-construction related traffic.

13.5 POTENTIAL IMPACTS

51 Due to the length and relative remoteness of this transmission line, the principal form of transport used in the construction of the proposed development is by road. This allows flexibility not achievable by other modes of transport, such as rail.

52 The construction of each tower will necessitate the use of several different types of road vehicles. The vehicles directly involved in the works include crane(s), excavators, dump trucks, 4x4s, tractor and trailers and concrete delivery vehicles. For further details of the vehicles being used for the construction of this development, refer to Chapter 7, **Volume 3B** of the EIS. Vehicles not directly involved in construction activities but involved in the construction phase will be vehicles used by site personnel travelling to and from the site.

53 In general the vehicles listed above will be the only road vehicles used during the construction phase. In some locations tree felling / lopping will need to take place in order to construct the transmission line or to provide a corridor with sufficient clearance to avoid conflict between trees and the line route. Tree felling will require the use of specific vehicles for this purpose (refer to **Chapter 6** of this volume of the EIS).

13.5.1 Do Nothing

54 Should this proposed development not be constructed, traffic and road conditions on the public road network would remain similar to the existing situation barring unforeseen circumstances.

13.5.2 Construction Phase

13.5.2.1 Traffic Generation at Tower Sites

55 A detailed breakdown of the volumes of traffic expected to be generated by the construction of the development is presented in **Appendix 13.3, Volume 3C Appendices** of the EIS. This has been prepared based on the construction methodology of towers. The volumes of traffic expected to be generated by each tower is summarised in **Table 13.5** for Light Vehicle (LV) and Heavy Goods Vehicles (HGV). The best case presented below assumes that materials excavated at tower sites will remain on site, being deposited within the same landholding. The worst case assumes that a suitable location was unable to be found on the site and materials excavated are removed from site for disposal at an appropriate facility.

Table 13.5: Tower Traffic Generation

Tower Type	Movements Generated				Peak Daily Movements Generated	
	Best Case		Worst Case		Best Case	Worst Case
	LV	HGV	LV	HGV		
Intermediate Tower	108	46	108	56	17	17
Transposition Tower[40]	108	46	108	56	17	17
Angle Tower	122	142	122	218	27	46

56 The expected traffic generated by each tower has been prepared based on the estimates described above and these are presented in **Appendix 13.1, Volume 3C Appendices** of the EIS.

13.5.2.2 Traffic Generation at Construction Material Storage Yard

57 The construction of the temporary construction material storage yard has the potential to generate traffic associated with the construction of the yard. The envisaged traffic generated during the construction of the yard will equate to 45 no. vehicular movements to and from the

[40] The Traffic generation associated with the construction of a transposition intermediate tower is deemed to be of similar scale to a single circuit intermediate tower. As such, the traffic generation values listed for intermediate towers can be deemed to apply to both single circuit and transposition intermediate structures.

proposed site per day. It is considered that there will not be any likely significant effects as a result of the construction of the yard when compared to the operational traffic volumes during the construction of the proposed line route.

58 As the construction material storage yard is going to be serving the entire development in the CMSA and the MSA, this will be a focal point for traffic. For the purposes of this evaluation, it is assumed that seven construction teams will be employed to work on different sections of the overall proposed linear scheme, which is broken down into three teams working on the Cavan Monaghan section and four teams working on the Meath section.

59 The worst case for traffic generation at the storage yard would be if each of the seven teams were constructing angle towers at the same time and each were in process of constructing the foundations (the peak flows at angle towers occur during pouring of foundations). As excavated materials would be sent straight to disposal and would not go to the construction material storage yard, the best case figures can be used when estimating the generation at the yard. The best case would result in an expected 189 vehicles delivering materials to tower sites and returning empty. A further 189 movements would be expected to maintain the required levels of materials at the yard resulting in a total of 378 daily movements at the storage yard.

60 Using the haul routes identified will result in three of the construction teams travelling north along the N2 towards Carrickmacross and three travelling south towards Ardee. The remaining team would be split between travelling north and travelling south on the N2 depending on the location of the construction site they were destined for. The origin of materials for delivery to the construction material storage yard is not certain at this stage and would likely vary dependent on the material and the availability of supply. For the purposes of this evaluation it is assumed that deliveries will be split evenly between the north and south.

61 Traffic leaving the storage yard will turn right onto the L4700 and then turn right again at the junction between the L4700 and the Link Road. Traffic will then travel to the N2 where it is distributed as described above. This results in an estimated 378 additional vehicles on the L4700 and the Link Road (189 arrivals and 189 departures). Applying a worst case to the N2 would see 108 vehicles turning north from the Link Road onto the N2 and 108 vehicles turning south. Arrivals to the site would result in 108 vehicles turning off the N2 onto the Link Road from the south and 108 vehicles from the north.

13.5.2.3 Guarding

62 Guarding will be required at locations where the line route passes over roads, rivers and other OHL. The volume of traffic generated at each guarding location is expected to be one to two vehicles per day over a five day period. The erection of guarding will result in the requirement for temporary road closures such that the netting can be erected safely. The exact duration of

each road closure will be determined at the construction phase however it should generally only be approximately one to two hours for local roads. More extensive closures may be required at larger crossings, however these closures should be a day at worst.

13.5.2.4 Impact on Road Network

63 Based on the estimated traffic generation presented in the above sections the percentage increase in traffic on the roads to be used during the construction phase of the development are presented in **Table 13.6**.

Table 13.6: Impact on Road Network

Road Number	AADT	Peak Daily Increase		Percentage Peak Increase	
		Best Case	Worst Case	Best Case	Worst Case
N2 North of Storage Yard	8106	432	432	5.3%	5.3%
N2 South of Storage Yard	8106	432	432	5.3%	5.3%
R162	1593	54	92	3.4%	5.8%
R165	2807	54	92	1.9%	3.3%
R178	2367	54	92	2.3%	3.9%
R179	4050	54	92	1.3%	2.3%
R180	1623	27	46	1.7%	2.8%
R181	1214	27	46	2.2%	3.8%
R183	2841	27	46	1.0%	1.6%
R184	1185	27	46	2.3%	3.9%
Old N2	6786	27	46	0.4%	0.7%
L-3532-0	955	17	17	1.7%	1.7%
L-3533-0	86	17	17	19.8%	19.8%
L-3525-0	292	17	17	5.8%	5.8%
L-7557-0	124	27	46	21.8%	37.1%
L-7555-0	122	17	17	13.9%	13.9%
LT49033	N/A	27	46	N/A	N/A
LT49032	N/A	17	17	N/A	N/A
LP04903	N/A	27	46	N/A	N/A
LS08903	N/A	27	46	N/A	N/A
LT49051	N/A	27	46	N/A	N/A
L-49041	N/A	17	17	N/A	N/A
L-8912	80	17	17	21.3%	21.3%
L-4020	210	27	46	12.9%	21.9%
L-8010	99	27	46	27.3%	46.5%
L-8011	179	27	46	15.1%	25.7%
L-40121	47	23	23	48.9%	48.9%

Road Number	AADT	Peak Daily Increase		Percentage Peak Increase	
		Best Case	Worst Case	Best Case	Worst Case
L-40052	71	27	46	38%	64.8%
L-40312	22	27	46	122.7%	209.1%
L-4004	112	27	46	24.1%	41.1%
L-4011	91	27	46	29.7%	50.5%
L-4042	459	27	46	5.9%	10%
L-4010	78	17	17	21.8%	21.8%
L-40103	8	27	46	337.5%	575%
L-40441	32	17	17	53.1%	53.1%
L-8201	N/A	27	46	N/A	N/A
L-4210	538	27	46	5%	8.6%
L-3201	133	27	46	20.3%	34.6%
L-7211	143	27	46	18.9%	32.2%
L-7200	78	17	17	21.8%	21.8%
L-3403	492	27	46	5.5%	9.3%
L-7430	60	17	17	28.3%	28.3%
L-7411	178	27	46	15.2%	25.8%
L-31031	60	17	17	28.3%	28.3%
L-34211	86	27	46	31.4%	53.5%
L-3420	621	27	46	4.3%	7.4%
L-7421	161	17	17	10.5%	10.5%
L-3510	236	27	46	11.4%	19.5%
L-3520	238	27	46	11.3%	19.3%
L-75031	98	27	46	27.6%	46.9%
L7503	65	27	46	41.5%	70.8%
L-4700	952	378	378	39.7%	39.7%
L-4700 – N2 Link Road	340	378	378	111.1%	111.1%

64 As can be seen from the table above, traffic on the road network will increase for the duration of the construction phase. While some of the percentage increases are quite high, this is generally reflective of the low number of vehicles generally using these roads. Furthermore, the figures above present the peak additional flow along each road. These peak flows would only be occurring for short durations, typically during the laying of foundations which will take approximately five days. From a capacity perspective, the road network will be able to cater for the flows predicted.

65 The most significant increase in flows will be seen on the L4700, the Link Road and the N2. This is due to the location of the construction material storage yard. The increase in flow on the L4700 is approximately 39.7% and the Link Road 111.1% of the existing flows, however, it

should be borne in mind that this represents a worst case scenario and that it would be unlikely that such an increase will actually occur. Furthermore, should this worst case happen, it would only be for a very short duration. For the majority of the three year construction period, flows at the compound will fluctuate around a figure of approximately 50% of the flows presented in the worst case.

66 Due to the significant levels of flows predicted at the proposed construction material storage yard, junction assessments have been carried out at the proposed entrance to the storage yard from the L4700, the priority T junction between the L4700 and the road linking it to the N2 and the priority T Junction between the N2 and the road linking the N2 to the L4700. These junction assessments have been carried out using the Transport Research Laboratory (TRL) computer program, PICADY, a widely accepted tool used for the analysis of priority junctions.

67 The performance of these junctions have been analysed for the critical AM and PM peak hours (which have been identified as 08:00 - 09:00 in the AM and 17:00 - 18:00 in the PM, on the Link Road, 08:00 - 09:00 in the AM and 16:00 - 17:00 in the PM, on the N2 and 09:00 - 10:00 in the AM and 15:00 - 16:00 in the PM, on the L4700) surveyed traffic and projected to 2015.

68 The key parameters examined in the results of the junction analysis are the Ratio of Flow to Capacity Value (RFC value – desirable value should be no greater than 0.85 for PICADY – values over 1.00 indicate the approach arm is over capacity), the maximum queue length on any approach to the junction and the average delay for each vehicle passing through the junction during the modelled period.

69 PICADY requires the following input data:

- Basic modelling parameters (usually peak hour traffic counts synthesised over a 90 minute model period);
- Geometric parameters (including lane numbers & widths, visibility, storage provision etc.); and
- Traffic demand data (usually peak hour origin/destination table with composition of heavy goods vehicles input).

70 The traffic generation estimate presented in **Section 13.5.2.2** is that used for this analysis. Those figures were presented as daily flows. An eight hour working day has been assumed to convert these flows into hourly figures.

71 The results of this PICADY analysis are presented in **Tables 13.7, 13.8** and **13.9**. The origin / destination traffic demand tables for all the different scenarios tested for the analysed junctions are provided in **Appendix 13.4** and **13.5, Volume 3C Appendices** of the EIS.

Table 13.7: Construction Material Storage Yard Junction Analysis Results

PICADY Results: Construction Material Storage Yard AM & PM Peak Hours							
Year & Time	Arm A – L4700 North		Arm B – Compound		Arm C – L4700 South		Average Delay (min/veh)
	RFC Value	Max Queue Length	RFC Value	Max Queue Length	RFC Value	Max Queue Length	
Existing AM	-	-	0.000	0.0	0.000	0.0	0.00
Existing PM	-	-	0.000	0.0	0.000	0.0	0.00
2015 AM	-	-	0.185	0.22	0.000	0.0	0.07
2015 PM	-	-	0.186	0.23	0.000	0.0	0.06

Table 13.8: L4700 and Link Road Junction Analysis Results

PICADY Results: L4700 and Link Road AM & PM Peak Hours							
Year & Time	Arm A – L4700 North		Arm B – Link Road		Arm C – L4700 South		Average Delay (min/veh)
	RFC Value	Max Queue Length	RFC Value	Max Queue Length	RFC Value	Max Queue Length	
Existing AM	-	-	0.015	0.02	0.018	0.02	0.03
Existing PM	-	-	0.032	0.03	0.012	0.01	0.03
2015 AM	-	-	0.160	0.19	0.173	0.21	0.13
2015 PM	-	-	0.177	0.21	0.167	0.20	0.12

Table 13.9: N2 and Link Road Junction Analysis Results

PICADY Results: N2 and Link Road AM & PM Peak Hours							
Year & Time	Arm A – N2 South		Arm B – Link Road		Arm C – N2 North		Average Delay (min/veh)
	RFC Value	Max Queue Length	RFC Value	Max Queue Length	RFC Value	Max Queue Length	
Existing AM	-	-	0.024	0.02	0.007	0.01	0.01
Existing PM	-	-	0.013	0.01	0.011	0.01	0.00
2015 AM	-	-	0.153	0.18	0.083	0.09	0.03

PICADY Results: N2 and Link Road AM & PM Peak Hours							
2015 PM	-	-	0.158	0.19	0.093	0.10	0.03

72 As can be seen from **Table 13.7**, the entrance to the proposed construction material storage yard will operate below capacity during the construction phase.

73 Heavy vehicles will be used to construct the transmission line. Local and minor roads are particularly sensitive to the increase in heavy vehicles as these roads are typically not designed to accommodate large numbers of these types of vehicles. The potential for impacts to the pavement tower, verges, boundary treatments etc. are all increased as is disturbance caused to the local community in relation to noise, vibration, dust and air quality impacts (refer to **Chapters 9** and **10** of this volume of the EIS).

13.5.3 Operational Phase

74 Minimal traffic volumes will be generated by the proposed development during the operational phase of the development as electricity lines are not manned. An annual inspection is carried out of the line however this is typically done by air, thus generating no traffic. A more detailed inspection is carried out every eightyears whereupon each tower on the line is visited. This will result in one to two vehicles travelling to each landholding along the route to facilitate this inspection. Thereafter, no further traffic would be generated except in exceptional circumstances, such as a fault occurring.

13.5.4 Decommissioning

75 The proposed development will become a permanent part of the transmission infrastructure. The expected lifespan of the development is in the region of 50 to 80 years. This will be achieved by routine maintenance and replacement of hardware as required. There are no plans for the decommissioning of the OHL. In the event that part of, or the entire proposed infrastructure is to be decommissioned, all towers, equipment and material to be decommissioned will be removed off site and the land reinstated. Impacts would be expected to be less than during the construction phase and would be of short term duration.

13.6 MITIGATION MEASURES

13.6.1 Construction Phase

76 It shall be a requirement of the contractor appointed to construct the proposed development to prepare a detailed *Construction Traffic Management Plan* prior to the commencement of

construction operations. As noted above, a detailed outline of the construction traffic management plan is included at Appendix 7.2, **Volume 3B Appendices** of the EIS. All relevant mitigation measures set out in the EIS are included in the outline TMP and will be incorporated into the final TMP.

13.6.1.1 Construction Programme

77 Prior to the commencement of the construction phase, a construction programme shall be developed that shall seek to maintain traffic levels at an average level throughout the construction phase, avoiding high peaks that would be caused by scheduling multiple teams to be constructing angle towers simultaneously for example.

78 The construction programme shall be developed in consultation with the appropriate local authorities, specifically taking into account potential road repair works that are included in the local authority's road works schedule. One of the key aims of this programme would be to enable any road works being carried out by the local authority to be undertaken following the presence of construction traffic on the road.

13.6.1.2 Road Condition Monitoring

79 The extent of the heavy vehicle traffic movements and the nature of the payload may create problems of:

- Fugitive losses from wheels, trailers or tailgates; and
- Localised areas of subgrade and wearing surface failure.

80 Loads of materials leaving each site will be assessed and covered if considered necessary to minimise potential dust impact during transportation. The transportation contractor shall take all reasonable measures while transporting waste or any other materials likely to cause fugitive loses from a vehicle during transportation to and from site. The roads forming part of the haul routes will be monitored visually throughout the construction period and a truck mounted vacuum mechanical sweeper will be assigned to roads along the haul route as required.

81 In conjunction with the appropriate local authority, additional inspection and review of the roads forming the haul routes will be undertaken one month prior to the construction phase to record the condition of these roads at that particular time. As a minimum this survey shall comprise review of video footage taken at that time, which shall confirm the condition of the road corridor immediately prior to commencement of construction. This shall include video footage of the road wearing course, the appearance and condition of boundary treatments and the condition of

any overhead services that will be crossed. Visual inspections and photographic surveys will be undertaken of bridges and culverts that are along the haul roads.

82 Where requested by the local authority, pavement condition surveys will also be carried along roads forming part of the haul route. These will record the baseline structural condition of the roads being surveyed immediately prior to construction.

83 Ongoing visual inspections and monitoring of the haul roads will be undertaken throughout the construction period to ensure any damage caused by construction traffic is recorded and that the relevant local authority is notified. Arrangements will be made to repair any such damage to an appropriate standard in a timely manner such that any disruption is minimised.

84 Upon completion of the construction phase, the surveys carried out at pre-construction phase will be repeated. The pre-construction phase surveys will be used as a baseline to use as a comparison with these post construction surveys. Damage identified as being attributable to construction traffic associated with the proposed development will be repaired to an appropriate standard.

13.6.1.3 Road Closures

85 It is not envisaged that road closures will be required for tower construction. It is acknowledged that some of the roads that will be used for the construction of towers are narrow, however, there are generally opportunities for vehicles to pass. Where required, traffic management measures, such as temporary traffic lights or flagmen, will be deployed on roads. This is consistent with normal good practice traffic management during construction of any project where public road access is required.

86 Temporary road closures will be required during the erection and removal of guarding at road crossings the most notable of which is the M3 Motorway. These road closures will generally be short in duration and the appropriate measures and time for closing each road shall be agreed with the local authorities and any other appropriate stakeholders (refer to Chapter 7, **Volume 3B** of the EIS).

13.6.1.4 Communication

87 Close communication between the relevant local authorities and An Garda Síochána will be maintained throughout the construction phase. This will include the submission of proposed traffic management measures for comment and approval, updates on the condition of the road network and updates on the construction programme. Information on local events that could conflict with traffic management measures and construction traffic will be sought such that alternative measures can be implemented to avoid such conflicts.

88 The local community will be informed of proposed traffic management measures in advance of their implementation. This will be done by posting advertisements in the local newspapers and by delivering leaflets to houses in the affected areas. Contact details will be provided such that residents can seek further information and provide any additional knowledge, such as dates of local events that could impact on traffic management measures that have been put in place.

13.6.1.5 Site Entrances

89 In accordance with Chapter 8 of the Department of the Environment's *Traffic Signs Manual,* road signs will be erected to provide warning of the temporary access locations to construction site's entrance as well as for any operations requiring the provision of warning signs. Signage shall be erected one week prior to the commencement of operations on site.

90 The majority of access / egress to proposed sites shall be facilitated from the local road networks. To mitigate against possible restrictions in visibility requirements, it is proposed that the principal contractor shall use a safe system of permanent flag men for the control of traffic during all access / egress operations at each site location.

13.6.1.6 Emergency Response Management

91 It is important that, notwithstanding materials haulage traffic, emergency services can gain ready access to any household along the haul route and gain emergency access to each tower construction site and the construction material storage yard. Priority usage of the haul route and priority access to and from the site will be given to emergency services. Emergency Services in Counties Monaghan and Cavan will be provided with contact details of the contractors personnel responsible for the management of construction traffic. On being notified of an incident, communication will be made to drivers that an incident has occurred and instructions will be provided to them on how to proceed.

13.6.2 Operation Phase

92 Due to the minimal levels of traffic that will be generated by the proposed development during the operational phase, no mitigation measures are proposed for this phase of the development.

13.7 RESIDUAL IMPACTS

93 The temporary nature of the construction phase coupled with the mitigation measures proposed will result in minimal residual impact due to the construction phase of the development in terms of traffic and transport.

94 The residual impact due to the operational phase of the development will be minimal as a result of the minimal volumes of traffic that will be generated during this phase of the development.

13.8 INTERRELATIONSHIPS BETWEEN ENVIRONMENTAL FACTORS

95 In addition to the impact on the road network, road vehicles also have an associated impact on other environmental factors such as air pollution, dust generation, noise and vibration. During the operational phase this will be minimal due to the low volumes of traffic that will be generated, however, during the construction phase these impacts, although temporary in nature, will prove more significant. These impacts are evaluated in other chapters of this volume of the EIS and this chapter should, therefore, be read in conjunction with **Chapters 9** and **10** of this volume of the EIS.

96 Traffic also has the potential to impact on several other environmental factors depending on circumstances. This likelihood for such impacts would increase when vehicles leave the public road network. These potential impacts traffic may indirectly cause are as follows:

- **Chapter 3** - Human Beings – Land Use and Soils, Geology and Hyrdogeology – Due to the compaction of soil caused by vehicles driving across farmland;
- **Chapter 6** - Flora and Fauna due to the removal of vegetation at access locations to accommodate vehicular access to construction sites;
- **Chapter 8** - Water quality due to potential fuel or fluid leaks reaching groundwater;
- **Chapter 9** - Noise & Vibration - In terms of traffic, during both the operational and the construction phase, the noise and vibration impacts will be predominantly associated with the road traffic impacts. No significant noise and vibration impacts are predicted.
- **Chapter 11** - Landscape due to the placing of temporary rubber matting or aluminium road panels; and
- **Chapter 14** - Cultural heritage due to potential damage due to vibrations caused by heavy vehicles operating near cultural heritage sites.

97 This chapter should, therefore, also be read in conjunction with **Chapters 3, 6, 7, 8**, **11** and **14** of this volume of the EIS.

13.9 CONCLUSIONS

98 The operation phase of the proposed development will generate minimal volumes of traffic. The construction phase of the development will generate significant, albeit temporary, volumes of

traffic because the primary means of transporting materials and labour to / from site will be via the existing public road network.

99 Due to the nature of the proposed development, during the construction phase the proposed development will consist of multiple discrete construction sites. Access to the individual sites will generally be achieved via existing field accesses and existing internal tracks where available. A total of 117 temporary accesses are required from the public road network to construct the proposed line.

100 Despite the scale of the proposed development, the volumes of vehicles required to attend each individual construction location along the length of the linear development will be relatively low and this traffic will be spread out over several weeks, which is the duration it will take to construct individual towers. Due to the length of the proposed line, traffic will be dispersed over a large area during the construction phase, notwithstanding the fact that construction will occur in any one location for a relatively short duration.

101 It is proposed that a construction material storage yard, located to the south-east of Carrickmacross, County Monaghan will be used to store materials for distribution to the individual construction sites. Higher volumes of traffic are anticipated at this location as vehicles will be concentrated in this location prior to dispersing to individual sites.

102 Heavy vehicles will be used to construct the transmission line. Local and minor roads are particularly sensitive to the increase in heavy vehicles as these roads are typically not designed to accommodate large numbers of these types of vehicles. The potential for impacts to the pavement structure, verges, boundary treatments etc. are all increased as is disturbance caused to the local community in relation to noise, vibration, dust and air quality impacts.

103 A *Construction Traffic Management Plan* shall be prepared prior to the commencement of construction operations. The objective of this plan will be to minimise the impact caused by the construction phase of the proposed development. In circumstances where all mitigation measures identified in this EIS and contained in the outline construction traffic management plan are implemented, the residual impact caused by the construction phase of the proposed development will be minimal.