APPENDIX 14-1

COOLE GRID TECHNICAL NOTE

Planning and Environmental Consultants

Technical Note

Coole Wind Farm, Co. Westmeath

DOCUMENT DETAILS

Client:	**Coole Wind Farm Ltd**
Project Title:	**Coole Wind Farm, Co. Westmeath**
Project Number:	**200445**
Document Title:	**Coole Grid Connection**
Document File Name:	**Appendix 14-1 – Coole Grid Connection**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Draft	03.02.2021	AL	EC
02	Final	11.03.2021	AL	EC, EOS

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1. TECHNICAL NOTE

1.1 Coole Grid Connection Traffic and Transport Assessment

1.1.1 Purpose of Assessment

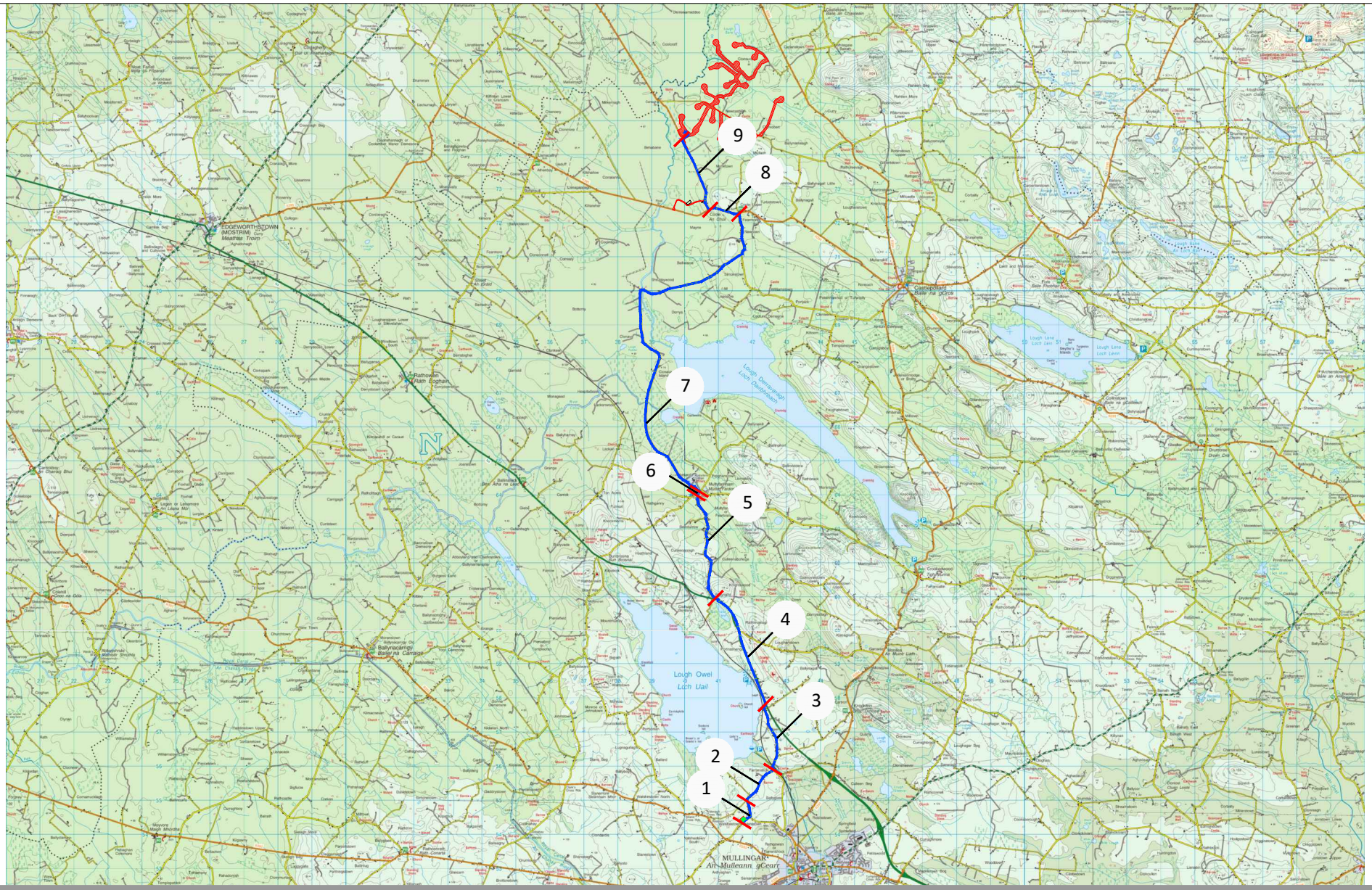
The purpose of this report is to assess the likely effects that will be incurred by local traffic during the construction of grid connection infrastructure between the Proposed Coole Wind Farm and the existing Mullingar electrical substation, as shown in Figure 1.1. The proposed grid connection includes approximately 26km of underground cable that connects the Proposed Coole Wind Farm via the proposed onsite substation to the existing Mullingar substation where upgrade works are proposed. A full description of the Proposed Development is provided in Chapter 4 of this EIAR.

1.1.1.1 Statement of Authority

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

1.1.1.2 Guidance and Legislation

This assessment has been completed in accordance with the guidance set out in Chapter 1 of this EIAR. The assessment uses standard terminology to describe the likely significant effects associated with the proposed development. Further information on the classification of effects used in this assessment is presented in Section 1.7.2 in Chapter 1 of this EIAR.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 1.1 Cable route - link sections for traffic assessment

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd		SCALE: NTS
PROJECT NO: 4860	DATE: 16.03.21		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

1.1.2 Method of Assessment

Where relevant the report adopts the guidance for such assessments set out by Transport Infrastructure Ireland (TII), in the document 'Guidelines for Traffic and Transport Assessments, May 2014'.

Outside the extents of the Proposed Coole Wind Farm site and the grounds of the substation at Irishtown it is proposed that the operation of all construction machinery, all trench excavation and the setting of the cable itself, will take place within the curtilage of the public road. The main effects to existing traffic due to the construction of the proposed grid connection will take the form of;

- Increased journey time - due to delays at road works and, in some cases, time spent undertaking local diversions on sections of the route with temporary road closures, and,
- Increased travel distance as a result of local diversions.

There will also be minor increases in traffic volumes on the route as a result of transporting materials and construction staff to/from the section of route being constructed.

Details with regards the method of construction for the proposed cable route are provided in Chapter 4 of this EIAR.

1.1.3 Receiving Environment

1.1.3.1 Road network for Grid Connection

The proposed cable route that will connect the Proposed Coole Wind Farm to the existing Mullingar 110 kV Substation is shown in Figure 1.1 with the various sections of the route described as follows;

Section 1 – L-1801 (length = 1.0km) For this section of the L-1801, from the access to the Mullingar Substation to Lough Owel Village, it is considered that the road is wide enough to retain one lane of traffic flow at the same time as the construction of the cable is being undertaken. There are no water crossings on this section.

Plate 1.1 Section 1, L-1801 close to Mullingar Substation access.

Section 2 – L-5703-0 (length = 1.3km) On this section of the cable route between Lough Owel Village and the rail crossing much of the road is too narrow to retain traffic flow during the construction stage. For the purpose of this assessment it is assumed that the section of road where the cable connection is being constructed will be closed to all traffic. There are no water crossings at on this section.

Plate 1.2 Section 2, Narrow section of L-5703-0 close to Mullingar Substation access.

Section 3 – L-1773 (length = 2.2km) This section of the route crosses the railway line and travels north to connect into the N4. This section of the L-1773 has sufficient width to provide for one live lane of traffic while the cable route is being constructed. There is one significant water crossing on this route, including the crossing of the railway line, which will require the road to be closed for a short period. It is noted the railway traffic will not be impacted using the proposed crossing methodology.

Plate 1.3 Section 3, L-1773 leading to the N4.

Section 4 – N4 (length = 3.0km) This section of the N4 has narrow verges, 3 traffic lanes (one lane in each direction and a right turn lane) and for the purpose of this assessment it is assumed that 2-way traffic flow will be maintained during the construction of the cable route. It is noted that the cable route will be set in one of the verges and will require to cross the N4, although if done in stages, it is assumed that 2-way flow will be maintained during this procedure also. There is one water crossing on this section of the route.

Plate 1.4 Section 4, L-1773 / N4 junction.

Plate 1.5 Section 4, Looking north along the N4.

Plate 1.6 Section 4, Looking south along the N4 at junction with L-1819.

Section 5 – L-1819 (length = 3.1km) For this section of the route that travels north from the N4 to the village of Multyfarnham, it is considered that the road is wide enough to retain one lane of traffic flow at the same time as the construction of the cable is being undertaken. There is one water crossing on this section of the route.

Plate 1.7 Section 5, Looking north along the L-1819.

Section 6 – L-1820 (length = 0.2km) This short section of the route is on the main street in Multyfarnham, and a crossing of the main street in the village will be required at this location. The road is wide enough to retain one lane of traffic flow at the same time as the construction of the cable route is being undertaken. There are no water crossings at this location.

Plate 1.8 Section 6, Looking east along Multyfarnham Main Street.

Section 7 – L-1826 (length = 11.2km) On this relatively long section of the route which travels north from the village of Multyfarnham to the R395 in Coole, the road has sufficient width to retain one lane

of traffic flow at the same time as the construction of the cable is being undertaken. There are however 12 water crossings along this section, 2 of which will require short term closures during construction.

Plate 1.9 Section 7, Looking north in Multyfarnham along L-1826.

Plate 1.10 Section 7, Looking north along L-1826.

Plate 1.11 Section 7, Looking north on L-1826 over river crossing.

Section 8 – R395 (length = 1.1km) This section of the route runs westbound in Coole to the junction with the R396 that leads to the site. It is considered that the R395 is wide enough to retain one lane of traffic flow while the construction of the cable route is being undertaken. The cable route will require to cross the R395 on this section, although it is assumed that one traffic lane will be retained during the construction of the crossing. There are no water crossings at this location.

Plate 1.12 Section 8, Looking south along L-1826 at junction with R395.

Plate 1.13 Section 8, Looking west along R395.

Section 9 – R396 (length = 2.9km) This section of the route heads northbound from Coole to the access of the Coole Wind Farm site. The R397 has sufficient width to retain one lane of traffic flow at the same time as the construction of the cable route is being undertaken. There is one water crossing on this stretch of road that will require the road to be closed temporarily during its construction.

Plate 1.14 Section 9, Looking north along R396.

1.1.3.2 Background Traffic Flows

Short period link traffic counts were undertaken on each section of the proposed cable route, with the exception of Section 4 on the N4 for which there is a continuous count retained by TII. The counts were undertaken for one hour at each location between the hours of 10:00 to 13:00 on Wednesday 4th December, 2019, with the link flows and hour of observation for each link shown in Table 1.1.

A continuous traffic counter is maintained by TII on the N4 just to the east of Mullingar. This information was used to determine all-day background traffic volumes along that particular section of the proposed grid connection.

For each of the count locations the observed hourly flow was factored to an all-day count using the flow profile determined from the N4 data, as shown in Table 1.1. For example, the daily traffic flow is determine to be 19.3 times the flow observed during the hour of 10:00 to 11:00 and 17.6 times the flow observed between 11:00 and 12:00.

Based on the above, all day flows in December on the proposed cable route, with the exception of the N4, are estimated to range from 444 vehicles per days on the local L-1801 adjacent to the Mullingar substation access, to 2,239 vehicles per day on the L-1773 just to the south of the N4.

Table 1.1 Observed flow in one hour, all day factor, Average all day flows, year 2019, December (2-way vehicles).

Link number	Description	Observed flow in one hour	Hour	All day factor	All day flow 2019 December
1	L-1801	23	10:00 - 11:00	19.3	444

2	L-5703-0	23	10:00 - 11:00	19.3	444
3	L-1773	116	10:00 - 11:00	19.3	2,239
4	N4	NA	NA	NA	NA
5	L-1819	27	11:00 - 12:00	17.6	475
6	L-1820	81	11:00 - 12:00	17.6	1,426
7	L-1826	35	11:00 - 12:00	17.6	616
8	R395	98	12:00 - 13:00	15.9	1,558
9	R396	51	12:00 - 13:00	15.9	811

The same TII data for the N4 was used in order to determine the monthly variations in traffic volumes throughout the year. From the data it was established that the average monthly traffic flow in 2019 was 8.7% higher than those recorded for the month of December when the traffic counts were undertaken. The December 2019 traffic counts were therefore increased by 8.7% to establish 2019 seasonally adjusted traffic flows, as set out in Table 1.2. It is noted that the year 2019 average annual daily traffic flow for the N4 extracted from the TII data is included and is 18,864 vehicles per day.

The TII data used from the N4 traffic count is included as Appendix 1.1 to this Technical Note.

Table 1.2 Observed flows, December 2019 and seasonally adjusted 2019 (vehicles).

Link number	Description	All day flow 2019 December	All day flow 2019 seasonally adjusted
1	L-1801	444	483
2	L-5703-0	444	483
3	L-1773	2,239	2,434
4	N4	NA	18,864
5	L-1819	475	517
6	L-1820	1,426	1,550
7	L-1826	616	670
8	R395	1,558	1,694
9	R396	811	881

1.1.3.3 Construction Year Background Traffic Volumes

For the purpose of this assessment it is assumed that the construction of the cable connection will be undertaken in the year 2025. Revised guidelines for forecasting annual growth in traffic volumes were produced by TII in May 2019, as set out by county in the Project Appraisal Guidelines (Unit 5.3). The annual growth rates for light vehicles for County Westmeath, and factors for the years relevant to this study, are shown in Tables 1.3 and 1.4, with traffic volumes forecast to increase during the period from 2019 (the observed traffic count year) to 2025 (the assumed construction year) by 10.0%, assuming a medium growth scenario. Year 2019 and 2025 all day traffic flows on the study area network are compared in Table 1.5.

It is noted that while the assumed construction year of 2025 may vary slightly, this will not alter the forecast outcomes and effects presented in this assessment.

Table 1.3 TII Traffic growth rates, cars and lgvs (County Westmeath).

Year	Lights - Annual factor			Lights - Cumulative index		
	Low	Medium	High	Low	Medium	High
2019	1.0145	1.0161	1.0194	1.000	1.000	1.000
2020	1.0145	1.0161	1.0194	1.015	1.016	1.019
2021	1.0145	1.0161	1.0194	1.029	1.032	1.039
2022	1.0145	1.0161	1.0194	1.044	1.049	1.059
2023	1.0145	1.0161	1.0194	1.059	1.066	1.080
2024	1.0145	1.0161	1.0194	1.075	1.083	1.101
2025	1.0145	1.0161	1.0194	1.090	1.101	1.122

Table 1.4 TII derived growth rates.

Period	Factor		
	low	Medium	High
2019- 2025	1.09	1.10	1.12

Table 1.5 Observed flows 2019 traffic flows and forecast construction year 2025 flows (vehicles).

Link number	Description	All day flow 2019 seasonally adjusted	All day flow 2025
1	L-1801	483	531
2	L-5703-0	483	531

3	L-1773	2,434	2,677
4	N4	18,864	20,750
5	L-1819	517	568
6	L-1820	1,550	1,705
7	L-1826	670	735
8	R395	1,694	1,863
9	R396	881	970

1.1.4 Construction Generated Traffic

Additional traffic will be generated during the construction of the proposed cable route, by both staff being transported to / from the location of the construction, and by materials being transported to / from the construction site.

It is forecast that up to 10 staff members will be employed at each works location. Due to the constricted work area it is anticipated that staff will be transported to the area of activity each day by shared car/van, generating 3 x 2-way car/van trips per day at each works location.

Other traffic movements to/ from the site will be as follows;

- Delivery of one excavator, one truck and other plant as required to the site. Some of these will not be new trips each day as they may be left on site overnight to commence work the following day.
- Approximately 15 truck movements per day to each works area to both remove excavated material and deliver appropriate infill material. A small number of truck movements will be required to deliver cable route components (ducting, membranes, etc) to site. These will be infrequent and will be evenly spread out along the route.

A small number of vehicle movements will be required to deliver electrical components to the existing substation near Mullingar to facilitate the connection.

Based on the above, a total of approximately 20 vehicle trips, or 40 vehicle movements would be generated to and from the area of activity on any given day.

1.1.5 Likely and Significant Impacts and Associated Mitigation Measures

1.1.5.1 'Do-Nothing' Scenario

If the construction of the proposed grid connection does not proceed, the Proposed Development would not be constructed as it would not be viable without the grid connection. The potential to reduce Co. Westmeath and indeed Ireland's dependence on fossil fuels would be lost. With respect to traffic effects, if the proposed cable connection is not constructed, there would be no traffic related impacts on the roads where the grid connection route is proposed.

1.1.5.2 Construction Phase Impacts

1.1.5.2.1 *Pre-Mitigation Impacts*

Types of impact considered

Impact to traffic is considered under the following headings;

- Impacts of additional traffic generated along the grid connection route due to construction traffic delivering to cable route and substations,
- Impacts to traffic on the cable route due to excavation and cable laying,
- Impact to traffic on the cable route due to crossing water courses.

The assessment was undertaken based on the grid connection route split into the sections shown in Figure 1.1.

Impacts of additional generated traffic

Background traffic volumes, additional traffic flows that will be generated during the construction of the cable connection and the percentage increase forecast on each section of the cable route are shown in Table 1.6. The figures show that a maximum increase of 7.5% in traffic volumes are forecast on the sections of the route that are currently lightly trafficked while the increase on the N4 is forecast to be a maximum of 0.2%

Table 1.6 Forecast construction year flows, construction generated traffic flows and % increase, construction year 2025 flows (vehicles).

Link number	Description	Background traffic flows Year 2025	Construction generated	With construction traffic flows Year 2025	% increase
1	L-1801	531	40	571	7.5%
2	L-5703-0	531	40	571	7.5%
3	L-1773	2,677	40	2,717	1.5%
4	N4	20,750	40	20,790	0.2%
5	L-1819	568	40	608	7.0%
6	L-1820	1,705	40	1,745	2.3%
7	L-1826	735	40	777	5.4%
8	R395	1,863	40	1,903	2.1%
9	R396	970	40	1,010	4.1%

Impacts on background traffic due to grid connection route construction

An estimate of the delay and additional distance travelled by local traffic due to all works associated with ground excavation and duct laying along the route is set out in Table 1 of Appendix 1.2, which was based on the following;

- Based on desk top assessment, a preliminary estimate of the likely traffic management measure (TMM) required for each section was made. The measures will be either a localised closure (Section 2 on the L-5703-0), or a one-way "stop and go" on sections of the route considered wide enough to accommodate both the construction works and one lane of live traffic. For Section 4, which is on the N4 and is 3 lanes wide (including right turn lane), it is assumed that the works will be undertaken with 2-way traffic flow maintained.
- An estimate of the duration of the construction on each section based on an assumption that approximately 150m will be completed each day by one team. In the proposed event that work is undertaken by 2 teams consecutively, the length of route covered each day would increase to approximately 300m.
- An estimate of the daily traffic flow on each section.
- Estimates of the average delay incurred to each vehicle. In the case of a "closure" due to cable laying on Section 2 it is estimated that each vehicle on average will be required to make a 1.4km detour (which translates to 101 seconds @ 50 kph).
- Estimates of delays for the "stop and go" arrangement assumes that an average of 10 seconds will apply (based on 150 m taking 30 secs to travel, plus an additional 10 seconds clearance, with 50 % of traffic having no delay as they arrive on a green signal aspect, with the average delay incurred by those required to stop being 20 seconds).

Similar assumptions were applied to the impact on the cable route during construction works associated with the 16 water courses along the route. There are 5 methods of crossing water courses as detailed in Chapter 4 of this EIAR. The type, number along the route, and the time taken to construct each are summarised as follows;

Option 1 – Crossing over culverts – 8 locations on route, with each location taking approximately 1-2 days.

Option 2 – Crossing under piped culverts – 3 locations on route, with each location taking approximately 1-2 days.

Option 3 – Flatbed formation over culverts – 1 location on route, taking approximately 2-3 days.

Option 4 – Outside of bridge decking – 0 on route (but may be used following detailed design), taking approximately 1-2 days.

Options 5– Directional drilling – 4 locations on route, with each location taking 9. It is assumed a road closure is required at these locations for 9 days.

It is noted that for water crossings type 5 it is assumed that the road will be closed for the duration of the construction. For these short term closures the following additional detours were estimated; Section 3 = 1.4km or 101secs, Section 7 = 1.9 km or 135 seconds and Section 9 = 3.6km or 258 seconds. These detours were estimated based on the likely alternative routes that diverted traffic would use.

The effects associated with water courses are set out in Tables 2a to 2f of Appendix 1.2, with the total impact incurred by traffic travelling on the route set out in Table 3 of Appendix 1.2. The assessment presented is based on the worst-case scenario for each crossing. For crossing types: 1 to 3, which are estimated to take between 1 and 2 days, 2 days is assumed; for crossing type 4, which is estimated to take between 2 and 3 days, 3 days is assumed; and in instances where different crossing options, as described in Chapter 4 of this EIAR, are provided, the more time consuming option was selected.

The main points to note from the Tables are as follows;

Construction of the cable on the public road network will take one construction team working at one location approximately 225 working days to complete. This duration will reduce to approximately 113 working days, or less than 6 months, if work is undertaken on the cable route on the public road network at 2 locations simultaneously, as is proposed,

- While the majority of trips will experience an additional average delay of 10 seconds a maximum increase in journey time of 5 minutes will be experienced by traffic on the R396 during construction traversing a watercourse.
- In terms of distance travelled, while the majority of trips will not experience any diversion, a maximum diversion of 3.6 kms will be experience by traffic on the R396 during construction traversing a watercourse.
- During the 113 working days, where work is undertaken at 2 locations simultaneously, a total of 210.764 trips (assuming traffic on the N4 will not be impacted) on the route will experience an impact, resulting in a total of 2,370 additional vehicle hours spent travelling on the network, and 96,289 vehicle kms travelled on the network during the construction period. For vehicles affected during the construction period this will result in an average delay of 41 seconds and an average detour of 460 metres.

Overall Pre-Mitigation Impacts

During the construction period of the proposed grid connection route the effects on the road network along the proposed grid connection route will be negative in terms of increased traffic volumes due to construction traffic and delays / detours incurred to general traffic. The effects will be temporary, and will range in terms of severity from negligible (on the N4) to slight on most of the route, to moderate at the following locations;

- Section 2, L-5703, for approximately 9 days when road will be closed due to duct laying,
- Section 3, L-1773, for approximately 9 days when the road will be closed due to construction of 1 water crossings,
- Section 7, L-1826, for approximately 14 days when road will be closed due to construction of 2 water crossings,
- Section 9, R396, for approximately 7 days when road will be closed due to construction of 2 water crossings.

While the construction generated traffic will be noticeable on the local highway network, the impact due to increased traffic volumes will be negative, temporary and slight.

1.1.5.2.2 *Proposed Mitigation Measures*

A detailed Traffic Management Plan (TMP), incorporating all the mitigation measures set out in the Outline TMP, included as Appendix 1.3, will be prepared by the appointed contractor which will provide details in respect of traffic management agreed with the roads authority and An Garda Síochána prior to construction works commencing on site.

1.1.5.3 Residual Impacts

Slight increases in traffic delays will be incurred along the grid connection route resulting in a slight / medium, temporary impact on local traffic, and potentially on local businesses.

1.1.5.3.1 *Significance of Effects*

Based on the assessment above there will be no significant effects.

1.1.5.4 Operational Phase Impacts

There will be no potential effects on traffic during the operational phase of the grid connection route because all required works will be completed during the construction phase unless required for maintenance at substations or in the event of a fault occurring.

On completion of the proposed underground cabling works, the road corridors in which the works are to be undertaken will be fully reinstated, leaving no visible above-ground evidence of the proposed works that have the potential to give rise to any operational phase effects. The reinstatement planed for the public road corridor will be agreed with Westmeath County Council prior to any works taking place.

1.1.5.5 Decommissioning Phase

The grid connection route will become a permanent part of the electricity transmission network, and therefore the requirement for decommissioning is not foreseen. The potential for effects on traffic will therefore not arise.

1.1.5.6 Conclusion

The assessment presented demonstrates that the traffic effects resulting from the construction of the cable route and substations will last approximately 6 months along the public road if construction is undertaken by two crews at different locations simultaneously.

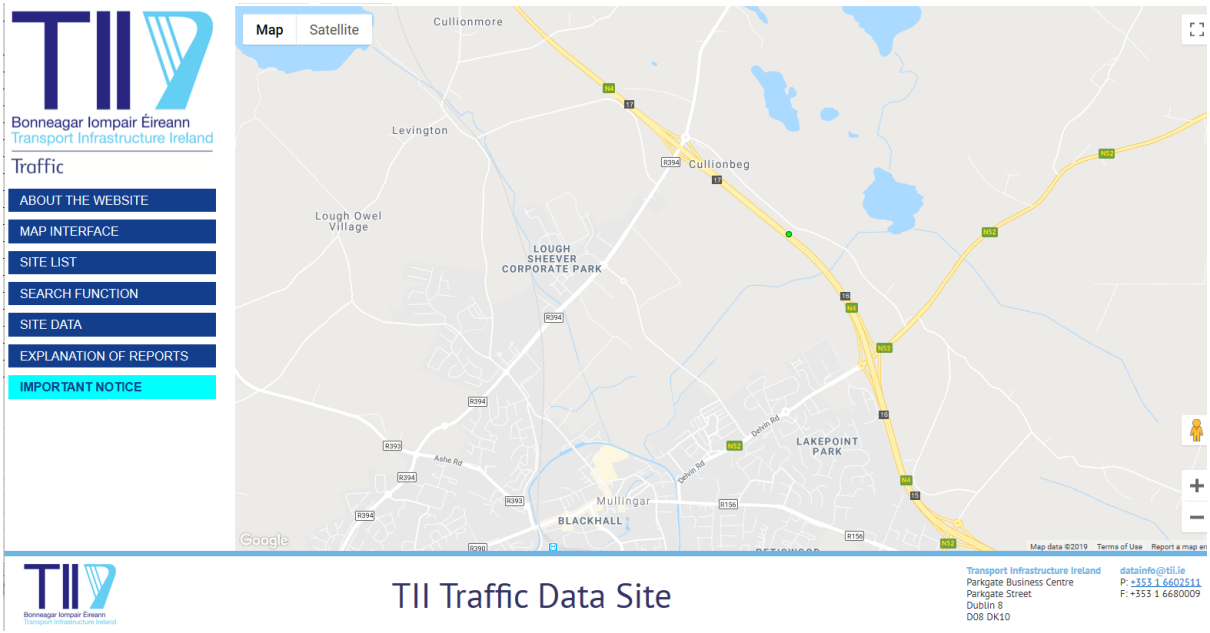
The work associated with the proposed grid connection route will be transient and will impact on isolated sections of the road network at any one time, with the impacts forecast to be slight at most locations, and moderate at those locations requiring short period road closures.

A comprehensive set of traffic management measures will be put in place during the construction period in order to minimise impacts to general traffic flow on the proposed route.

APPENDIX 1-1

TRAFFINOMICS LTD – TRAFFIC COUNT

Appendix 1.1 TII Traffic Count Data, N4, Mullingar Bypass



Date	Monday - Friday 12Hr	16Hr	18Hr	24Hr	Monday - Sunday 12Hr	16Hr	18Hr	24Hr
Jan 2018	14369	17064	17533	18282	13555	16142	16612	17297
Feb 2018	15000	17843	18348	19145	14408	17147	17668	18409
Mar 2018	14510	17400	17922	18700	13478	16137	16640	17346
Apr 2018	15873	19084	19685	20560	15131	18247	18846	19648
May 2018	16439	19881	20542	21485	15726	19028	19699	20591
Jun 2018	16644	20138	20844	21811	15967	19325	20044	20977
Jul 2018	15996	19368	20050	20994	15511	18837	19543	20431
Aug 2018	16455	19935	20598	21487	15850	19228	19910	20756
Sep 2018	16048	19322	19885	20783	15327	18517	19088	19922
Oct 2018	15849	19039	19612	20489	15158	18175	18739	19556
Nov 2018	15898	18986	19532	20415	15197	18105	18653	19462
Dec 2018	14675	17328	17847	18609	14278	16823	17336	18066

Site Name: TMU M04 070.0 E Site ID: 000000020044 Grid: 245156255
Mullingar Bypass, Co. Westmeath

Setup: N4 20044 ▾ | Precision: Normal ▾ | Exclude data: None ▾

	Eastbound 1	Eastbound 2	Westbound 2	Westbound 1	Total
00:00	48	6	6	81	142
01:00	29	3	4	63	100
02:00	26	3	2	47	78
03:00	38	4	1	36	80
04:00	60	9	1	32	102
05:00	175	66	3	62	306
06:00	278	154	13	124	569
07:00	332	169	61	318	880
08:00	441	206	98	446	1191
09:00	394	160	77	410	1041
10:00	377	144	82	401	1004
11:00	405	159	100	436	1101
12:00	440	185	117	474	1216
13:00	454	192	133	505	1284
14:00	454	192	146	530	1322
15:00	462	203	167	548	1379
16:00	500	224	201	590	1515
17:00	508	237	239	644	1627
18:00	431	193	200	585	1409
19:00	335	132	136	477	1080
20:00	284	101	76	352	813
21:00	204	64	39	244	551
22:00	132	35	21	176	364
23:00	80	16	10	119	225
07-19	5198	2263	1620	5887	14968
06-22	6298	2714	1884	7085	17981
06-24	6510	2764	1915	7380	18570
00-24	6887	2856	1933	7702	19378
am Peak	08:00	08:00	11:00	08:00	08:00
Peak Volume	441	206	100	446	1191
pm Peak	17:00	17:00	17:00	17:00	17:00
Peak Volume	508	237	239	644	1627

APPENDIX 1.2

TRANSPORT INFRASTRUCTURE IRELAND – TRAFFIC DATA

Appendix 1.2

Table 1 Traffic impact due to trench excavation and cable laying

								Time			Distance		
Section	**Description**	**Road type**	**Length (kms)**	**Main Road TMM**	**Duration in days (based on 150m / day)**	**Daily flow impacted**	**Trips impacted**	**Ave delay per vehicle (secs)**	**Total delay veh hours / day**	**Total delay veh hours in total**	**Ave detour per vehicle (kms)**	**Total detour veh kms / day**	**Total detour veh kms in total**
1	L-1801	2-way	1	one-way stop and go	6.7	531	3,538	10	1.5	10	0.0	0	0
2	L-5703-0	single track	1.3	Closure	8.7	531	4,600	101	14.9	129	1.4	743	6,440
3	L-1773	2-way	2.2	one-way stop and go	14.7	2,677	39,262	10	7.4	109	0.0	0	0
4	N4	2-way	3	Construction in hard shouldrer	20.0	20,750	415,008	0	0.0	0	0.0	0	0
5	L-1819	2-way	3.1	one-way stop and go	20.7	568	11,743	10	1.6	33	0.0	0	0
6	L-1820	2-way	0.2	one-way stop and go	1.3	1,705	2,273	10	4.7	6	0.0	0	0
7	L-1826	2-way	11.2	one-way stop and go	74.7	737	54,996	10	2.0	153	0.0	0	0
8	R395	2-way	1.1	one-way stop and go	7.3	1,863	13,663	10	5.2	38	0.0	0	0
9	R396	2-way	2.9	one-way stop and go	19.3	970	18,745	10	2.7	52	0.0	0	0
Total			26		173.3	30,331	563,828			529			6,440

Appendix 1.2

Table 2a Traffic impact due to crossing watercourses - type 1

								Time			Distance		
Section	**Description**	**Road type**	**Watercourses**	**Main Road TMM**	**Duration in days (2 days / location)**	**Assumed daily flow impacted**	**Trips impacted**	**Ave delay per vehicle (secs)**	**Total delay veh hours / day**	**Total delay veh hours in total**	**Ave detour per vehicle (kms)**	**Total detour veh kms / day**	**Total detour veh kms in total**
1	L-1801	2-way	0	one-way stop and go	0.0	531	0	0	0.0	0	0.0	0	0
2	L-5703-0	single track	0	Closure	0.0	531	0	0	0.0	0	1.4	743	0
3	L-1773	2-way	0	one-way stop and go	0.0	2,677	0	0	0.0	0	0.0	0	0
4	N4	2-way	0	Construction in hard shouldrer	0.0	20,750	0	0	0.0	0	0.0	0	0
5	L-1819	2-way	0	one-way stop and go	0.0	568	0	0	0.0	0	0.0	0	0
6	L-1820	2-way	0	one-way stop and go	0.0	1,705	0	0	0.0	0	0.0	0	0
7	L-1826	2-way	8	one-way stop and go	16.0	737	11,785	10	2.0	33	0.0	0	0
8	R395	2-way	0	one-way stop and go	0.0	1,863	0	0	0.0	0	0.0	0	0
9	R396	2-way	0	one-way stop and go	0.0	970	0	0	0.0	0	0.0	0	0
Total			8		16.0	30,331	11,785			33			0

Appendix 1.2

Table 2b Traffic impact due to crossing watercourses - type 2

								Time			Distance		
Section	**Description**	**Road type**	**Watercourses**	**Main Road TMM**	**Duration in days (2 days / location)**	**Assumed daily flow impacted**	**Trips impacted**	**Ave delay per vehicle (secs)**	**Total delay veh hours / day**	**Total delay veh hours in total**	**Ave detour per vehicle (kms)**	**Total detour veh kms / day**	**Total detour veh kms in total**
1	L-1801	2-way	0	one-way stop and go	0.0	531	0	0	0.0	0	0.0	0	0
2	L-5703-0	single track	0	Closure	0.0	531	0	0	0.0	0	1.4	743	0
3	L-1773	2-way	0	one-way stop and go	0.0	2,677	0	0	0.0	0	0.0	0	0
4	N4	2-way	1	Construction in hard shouldrer	2.0	20,750	41,501	0	0.0	0	0.0	0	0
5	L-1819	2-way	0	one-way stop and go	0.0	568	0	0	0.0	0	0.0	0	0
6	L-1820	2-way	0	one-way stop and go	0.0	1,705	0	0	0.0	0	0.0	0	0
7	L-1826	2-way	2	one-way stop and go	4.0	737	2,946	10	2.0	8	0.0	0	0
8	R395	2-way	0	one-way stop and go	0.0	1,863	0	0	0.0	0	0.0	0	0
9	R396	2-way	0	one-way stop and go	0.0	970	0	0	0.0	0	0.0	0	0
Total			3		6.0	30,331	44,447			8			0

Appendix 1.2

Table 2c Traffic impact due to crossing watercourses - type 3

								Time			Distance		
Section	**Description**	**Road type**	**Watercourses**	**Main Road TMM**	**Duration in days (2 days / location)**	**Assumed daily flow impacted**	**Trips impacted**	**Ave delay per vehicle (secs)**	**Total delay veh hours / day**	**Total delay veh hours in total**	**Ave detour per vehicle (kms)**	**Total detour veh kms / day**	**Total detour veh kms in total**
1	L-1801	2-way	0	one-way stop and go	0.0	531	0	0	0.0	0	0.0	0	0
2	L-5703-0	single track	0	Closure	0.0	531	0	0	0.0	0	1.4	743	0
3	L-1773	2-way	0	one-way stop and go	0.0	2,677	0	0	0.0	0	0.0	0	0
4	N4	2-way	0	Construction in hard shouldrer	0.0	20,750	0	0	0.0	0	0.0	0	0
5	L-1819	2-way	1	one-way stop and go	2.0	568	1,136	10	1.6	3	0.0	0	0
6	L-1820	2-way	0	one-way stop and go	0.0	1,705	0	0	0.0	0	0.0	0	0
7	L-1826	2-way	0	one-way stop and go	0.0	737	0	0	0.0	0	0.0	0	0
8	R395	2-way	0	one-way stop and go	0.0	1,863	0	0	0.0	0	0.0	0	0
9	R396	2-way	0	one-way stop and go	0.0	970	0	0	0.0	0	0.0	0	0
Total			1		2.0	30,331	1,136			3			0

Appendix 1.2

Table 2d Traffic impact due to crossing watercourses - type 4

								Time			Distance		
Section	**Description**	**Road type**	**Watercourses**	**Main Road TMM**	**Duration in days (9 days / location)**	**Assumed daily flow impacted**	**Trips impacted**	**Ave delay per vehicle (secs)**	**Total delay veh hours / day**	**Total delay veh hours in total**	**Ave detour per vehicle (kms)**	**Total detour veh kms / day**	**Total detour veh kms in total**
1	L-1801	2-way	0	NA	0.0	531	0	0	0.0	0	0.0	0	0
2	L-5703-0	single track	0	NA	0.0	531	0	0	0.0	0	0.0	0	0
3	L-1773	2-way	0	NA	0.0	2,677	0	0	0.0	0	0.0	0	0
4	N4	2-way	0	NA	0.0	20,750	0	0	0.0	0	0.0	0	0
5	L-1819	2-way	0	NA	0.0	568	0	0	0.0	0	0.0	0	0
6	L-1820	2-way	0	NA	0.0	1,705	0	0	0.0	0	0.0	0	0
7	L-1826	2-way	0	NA	0.0	737	0	0	0.0	0	0.0	0	0
8	R395	2-way	0	NA	0.0	1,863	0	0	0.0	0	0.0	0	0
9	R396	2-way	0	NA	0.0	970	0	0	0.0	0	0.0	0	0
Total			0		0.0	30,331	0			0			0

Appendix 1.2

Table 2e Traffic impact due to crossing watercourses - type 5

								Time			Distance		
Section	**Description**	**Road type**	**Watercourses**	**Main Road TMM**	**Duration in days (9 days / location)**	**Assumed daily flow impacted**	**Trips impacted**	**Ave delay per vehicle (secs)**	**Total delay veh hours / day**	**Total delay veh hours in total**	**Ave detour per vehicle (kms)**	**Total detour veh kms / day**	**Total detour veh kms in total**
1	L-1801	2-way	0	NA	0.0	531	0	0	0.0	0	0.0	0	0
2	L-5703-0	single track	0	NA	0.0	531	0	0	0.0	0	1.4	743	0
3	L-1773	2-way	1	Closure	9.0	2,677	24,092	101	75.0	675	1.4	3,748	33,729
4	N4	2-way	0	NA	0.0	20,750	0	0	0.0	0	0.0	0	0
5	L-1819	2-way	0	NA	0.0	568	0	0	0.0	0	0.0	0	0
6	L-1820	2-way	0	NA	0.0	1,705	0	0	0.0	0	0.0	0	0
7	L-1826	2-way	2	Closure	18.0	737	13,258	135	27.5	496	1.9	1,377	24,792
8	R395	2-way	0	NA	0.0	1,863	0	0	0.0	0	0.0	0	0
9	R396	2-way	1	Closure	9.0	970	8,726	258	69.6	627	3.6	3,481	31,328
Total			4		36.0	30,331	37,350			1,797			89,849

Appendix 1.2

Table 2f Traffic impact due to crossing watercourses (all)

								Time			Distance		
Section	**Description**	**Road type**	**Watercourses**	**Main Road TMM**	**Duration in days**	**Assumed daily flow impacted**	**Trips impacted**	**Ave delay per vehicle (secs)**	**Total delay veh hours / day**	**Total delay veh hours in total**	**Ave detour per vehicle (kms)**	**Total detour veh kms / day**	**Total detour veh kms in total**
1	L-1801	2-way	0		0	531	0	NA	NA	0	NA	NA	0
2	L-5703-0	single track	0		0	531	0	NA	NA	0	NA	NA	0
3	L-1773	2-way	1		9	2,677	24092	NA	NA	675	NA	NA	33729
4	N4	2-way	1		2	20,750	41501	NA	NA	0	NA	NA	0
5	L-1819	2-way	1		2	568	1136	NA	NA	3	NA	NA	0
6	L-1820	2-way	0		0	1,705	0	NA	NA	0	NA	NA	0
7	L-1826	2-way	12		38	737	27989	NA	NA	537	NA	NA	24792
8	R395	2-way	0		0	1,863	0	NA	NA	0	NA	NA	0
9	R396	2-way	1		9	970	8726	NA	NA	627	NA	NA	31328
Total			16		60.0	30,331	94,719			1,841			89,849

Appendix 1.2

Table 3 Traffic impact due to trench excavation and cable laying + water courses

								Time			Distance		
Section	**Description**	**Road type**	**Watercourses**	**Main Road TMM**	**Duration in days**	**Assumed daily flow impacted**	**Trips impacted**	**Ave delay per vehicle (secs)**	**Total delay veh hours / day**	**Total delay veh hours in total**	**Ave detour per vehicle (kms)**	**Total detour veh kms / day**	**Total detour veh kms in total**
1	L-1801	2-way	0		6.7	531	3,538	NA	NA	10	NA	NA	0
2	L-5703-0	single track	0		8.7	2,677	4,600	NA	NA	129	NA	NA	6,440
3	L-1773	2-way	1		23.7	20,750	63,354	NA	NA	784	NA	NA	33,729
4	N4	2-way	1		22.0	568	456,509	NA	NA	0	NA	NA	0
5	L-1819	2-way	1		22.7	1,705	12,879	NA	NA	36	NA	NA	0
6	L-1820	2-way	0		1.3	737	2,273	NA	NA	6	NA	NA	0
7	L-1826	2-way	12		112.7	1,863	82,985	NA	NA	690	NA	NA	24,792
8	R395	2-way	0		7.3	970	13,663	NA	NA	38	NA	NA	0
9	R396	2-way	1		28.3	30,331	27,472	NA	NA	679	NA	NA	31,328
Total			16		233.3		667,273			2,370			96,289

APPENDIX 1.3

COOLE GRID - CONSTRUCTION TRAFFIC MANAGEMENT PLAN

12.1 Appendix 1.3

12.2 Construction Traffic Management Plan - Installation of the grid connection cable

12.2.1 Introduction

The Construction Traffic Management Plan can only be finalised when a contractor has been appointed to carry out and schedule the works. It is also appropriate that the Project Supervisor Construction Stage when appointed, along with the suppliers shall have an input in the preparation and review of the Traffic Management Plan. The plan will therefore be reviewed and updated by the appointed contractor prior to the commencement of construction

12.2.2 Construction Phases

The construction phase of the proposed grid connection cable will take a maximum of 12 months although this may be reduced to approximately 6 months if construction takes place at 2 locations concurrently, as is proposed. The installation of the cable route will take place at the same time as the construction of the Coole Wind Farm site works, which is estimated to take up to 18 months.

12.2.3 Grid Connection Permits

The proposed grid connection route will require a Road Opening Licence (ROL) prior to the commencement of any grid connection works on the public road. The ROL will require a detailed traffic management plan for the grid connection cabling works which will set out any proposed road closures, diversions, signage etc. The final details of such a traffic management plan cannot be determined without the input of the appointed contractor.

The proposed grid connection route will traverse an Irish Rail level crossing in the townlands of Farranistick and Culleen More. Any such works on properties of Córas Iompair Éireann (CIE) who are authority for such properties requires a license agreement to be put in place between the developer and CIE. This license can only be agreed and signed a maximum of one year prior to the undertaking of any works at CIE properties as CIE put a one year expiry on all such agreements to allow for amendments to any of the conditions should the standards change.

12.2.4 Detailed Traffic Management Plan

A detailed Traffic Management Plan (TMP), incorporating all the mitigation measures set out in the Outline TMP will be prepared by the appointed contractor which will provide details in respect of the traffic management agreed with the roads authority and An Garda Síochána prior to construction works commencing on site. The detailed TMP will include the following:

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

Delivery Programme – a programme of deliveries will be submitted to Westmeath County Council in advance of deliveries of material to the cable route and substation sites. Liaison with the relevant local authorities, Transport Infrastructure Ireland (TII) and Eurolink Motorway

Operations Ltd will be carried out where required regarding requirements such as delivery timetabling.

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

A Pre and Post Construction Condition Survey – A pre-condition survey of roads associated with the proposed development will be carried out immediately prior to construction commencement to record an accurate condition of the road at the time. A post construction survey will be carried out after works are completed to ensure that any remediation works are carried out to a satisfactory standard. Where required the timing of these surveys will be agreed with the local authority. All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.

Liaison with the relevant local authority - Liaison with the relevant local authority including the roads sections of local authorities that the cable route traverses. Once the surveys have been carried out and "prior to commencement" status of the relevant roads established, (and in compliance with the provisions of the CEMP), the Roads section will be informed of the name and contact number of the Project Supervisor of the construction stage as well as the Site Environmental Manager.

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

Travel plan for construction workers – While the assessment above has assumed the worst case that construction workers will drive to the site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of routes to / from the site and identification of an area for parking.

Temporary traffic management and signs – As part of the traffic management measures required along the cable route during construction temporary traffic signs will be put in place at the location where works are being undertaken on any particular day. All measures will be in accordance with the *"Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works"* (DoT now DoTT&S) and "Guidance for the Control and Management of Traffic at Roadworks" (DoTT&S). A member of construction staff (flagman) will be present at each construction site location along the route. As set out in Section 14.1 of the EIAR it is envisaged that the traffic management measures required along the route will be one of the following;

- Temporary road closure – It is proposed that this will be required on Section 2 (L-5703-0).
- Retention of 2-way flow with work undertaken in hard shoulder/3rd lane – The will apply to Section 4 (N4) where there is sufficient carriageway width to provided 2 live traffic lanes, one in each direction, and one lane for construction.
- One way stop and go – It is proposed that this method of traffic control will be adopted at all remaining sections during the construction of the cable connection.

Details for each location will be provided by the contractor for agreement with Westmeath County Council prior to the construction of the cable route. **Additional measures** - Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including wheel washing facilities on site and sweeping / cleaning of local roads as required.

Re-instatement works - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers. A roads conditions survey (and any other analyses required by the Roads Section of the Council) would be undertaken immediately prior to construction commencement of the project to assess the condition of the road network at that time and to agree any required works with the local authority. Such a survey would be repeated immediately after completion of the construction phase of the project in order to ensure that any reinstatement works were carried out to a satisfactory standard as required by the local authority.

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

Diversions and road closures – reasonable access to residences, farms and businesses will 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 works taking place. 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.

Trench Reinstatement - Trenches on public roads, once backfilled, will be temporarily reinstated to the satisfaction of the roads authority. Following temporary reinstatement of trenches sections of public roads along which the cable route travels will receive a surface overlay subject to agreement with the roads authority. The roads conditions survey, which will be undertaken immediately prior to construction commencement of the project, will ensure that any roads along the trench routes are not left in a degraded condition. The repetition of the survey immediately after completion of the construction phase of the project will ensure that any reinstatement works were carried out to a satisfactory standard.