14. MATERIAL ASSETS

Material Assets are defined in the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022) *'*as '*built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure'.* They may be either of human or natural origin. The cultural assets of Archaeology and Cultural Heritage are addressed in Chapter 13 of this Environmental Impact Assessment Report (EIAR). Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are addressed in Chapter 8: Land, Soils and Geology, Chapter 9: Water, and Chapter 10: Air and Climate. Tourism and amenity resources, which are also considered material assets, are addressed in Chapter 5 on Population and Human Health. The Population and Human Health chapter also addresses existing land-uses (economic assets), including forestry and agriculture.

This chapter of the EIAR addresses the likely significant effects of the Proposed Development on transportation infrastructure (Section 14.1 Traffic and Transport), on Telecommunications and Aviation (Section 14.2) and Other Material Assets (Section 14.3), which are economic assets of human origin. Waste Management is also considered within the EPA 2022 Guidelines as part of Material Assets. EPA Waste Management pertaining to the construction, operation and decommissioning of the Proposed Development is summarised in Section 4.3.4.6 of Chapter 4 of the EIAR. Traffic volumes generated by the removal of waste from the Proposed Development to fully authorised waste facilities, is considered in Section 14.1 below.

This chapter of the EIAR has been prepared in accordance with the requirements of the EIA legislation and guidance outlined in Chapter 1: Introduction.

14.1 Traffic and Transport

14.1.1 Introduction

14.1.1.1 Background and Objectives

The purpose of this section is to assess the effects on roads and traffic and transport of the traffic movements that will be generated during the construction, operational and decommissioning phase of the Proposed Development.

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Development', 'the Site', 'Wind Farm Site' and 'Grid Connection'.

A full description of the Proposed Development, including construction phasing details, is provided in Chapter 4 of this EIAR. For developments of this nature, the construction phase is the critical period with respect to the traffic effects experienced on the surrounding road network in terms of the additional traffic volumes that will be generated on the road network, and the geometric requirements of the abnormally large loads associated with the wind turbine components. The requirements of the additional traffic and abnormal loads generated during the construction stage were assessed for the external highway network that will provide access to the Site. Locations where remedial measures are required to accommodate the abnormal loads are identified.

The magnitude of the increase in traffic volumes experienced on the surrounding network is identified during the various construction stages of the Proposed Development. A preliminary traffic management plan is also provided in Sections 14.1.7, 14.1.8 and 14.1.11.6 aimed at minimising the traffic impact on the local highway network. Refer also to the Construction and Environmental Management Plan (CEMP), Appendix 4-2 of this EIAR, for the Traffic Management Plan.

14.1.1.2 Statement of Authority

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

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

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

14.1.1.3 Guidance on Assessment of Effects

This section of the EIAR has been completed in accordance with the EIA guidance set out in Chapter 1. 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 of this EIAR.

14.1.1.4 Scoping and Consultation

Transport Infrastructure Ireland

Transport Infrastructure Ireland (TII) responded to Scoping on the 23rd September 2021 and 18th February 2022 in which it provided a list of recommendations to be followed when preparing the EIAR. All relevant TII guidelines and policies have been taken into account in the preparation of this assessment, including the following;

- PE-PDV-02045, Transport Assessment Guidelines, Transport Infrastructure Ireland, May 2014
- PE-PAG-02017, Project Appraisal Guidelines, Unit 5.3, Travel Demand Projections, Transport Infrastructure Ireland, May 2019
- DN-GEO-03060, Geometric Design of junctions, Transport Infrastructure Ireland, April 2017
- TII Automatic Traffic Count Data (on the M6)

Department of Transport

A scoping request was issued to The Department of Transport on the 6th August 2021 via email. No response was received. A follow up scoping request was issued via email on 7th February 2022. No response was received.

Westmeath County Council

A pre planning meeting was held with Westmeath Co. Council on the 16th June 2022 at which representatives from MKO, Umma More Ltd. Ltd and the Council Planning and Engineering Department were in attendance. At the meetings, the proposed haul route, and main site entrances were outlined by MKO and Umma More Ltd. Issues raised by Westmeath County Council in respect to the proposals were considered in the design of the Proposed Development.

Offaly County Council

MKO wrote to Offaly County Council on the 14th of April 2022 seeking a pre-application meeting with regards the Grid Connection underground electrical cabling route which is proposed within the public highway network in the county. The Planning Section of Offaly County Council wrote to MKO on the 6th of July 2022 and the response pertained to the potential impact for cables in the road network. No other feedback or any meetings were held with the County Council.

14.1.1.5 Methodology and Section Structure

The report adopts the guidance for such assessments set out by Transport Infrastructure Ireland, or TII, in the document number PE-PDV-02045 *'Traffic and Transport Assessment Guidelines, May 2014'*.

The geometric requirements of the transporter vehicles were assessed using AutoCAD and Autotrack.

The Traffic and Transport Section of the EIAR is set out as follows:

- A review of the existing and future transport infrastructure in the vicinity of the Proposed Development, including the proposed haul route, an assessment of 2022 traffic flows and traffic forecasts during an assumed construction year of 2028 (Section 14.1.2 Receiving Environment and 14.1.3 – Existing Traffic Volumes),
- A description of the nature of the Proposed Development and the traffic volumes that it will generate during the different construction stages and when it is operational (Section 14.1.4 – Proposed Development Traffic Generation),
- A description of the abnormally large loads and vehicles that will require access to the site (Section 14.1.5 Construction Traffic Vehicles),
- A review of the effects of Proposed Development generated traffic on links and junctions during construction and when the facility is operational (Section 14.1.6 – Traffic Effects During Construction and Operation),
- A review of the effects of the Proposed Development on the public road network along he underground electrical cabling route (Section 14.1.7 Effect on Network of Grid Connection)
- A description of traffic management measures of large deliveries (Section 14.1.8 traffic Management of Large Deliveries)
- A geometric assessment of the routes and their capacity to accommodate the abnormal loads associated with the Proposed Development (Section 14.1.9 – Abnormal Load Route Assessment),
- An assessment of the provision for sustainable modes of travel (in this case primarily with respect to the transport of construction staff) (Section 14.1.10 – Provision for Sustainable Modes of Travel),

- A description of potential significant effects on Roads and Traffic (Section 14.1.11 – Likely and Significant Effect and Associated Mitigation Measures).

14.1.2 Receiving Environment

14.1.2.1 Site Location and Proposed Access Arrangements

The Wind Farm Site is located approximately 2 kilometres southwest of Ballymore, Co. Westmeath, 6.6 kilometres to the north of Moate, Co Westmeath and 12.2 kilometres northeast of Athlone, Co. Westmeath. It is proposed to access the Wind Farm Site via an existing access track off the L5363 Local road to the northwest of the site. The site is served by a number of existing agricultural roads and tracks.

The Grid Connection includes for the proposed onsite 110kV substation within the Wind Farm Site and associated underground 110kV cabling connecting to the existing Thornsberry 110kV substation in the townland of Derrynagall or Ballydaly, County Offaly. The underground electrical cabling route, measuring approximately 31 km in length, is primarily located within the public road corridor.

The Proposed Development is shown in the context of the national and local highway networks in Figures 14-1a, and the Wind Farm Site is shown within the context of national and local highway networks in further detail in Figure 14-1b.

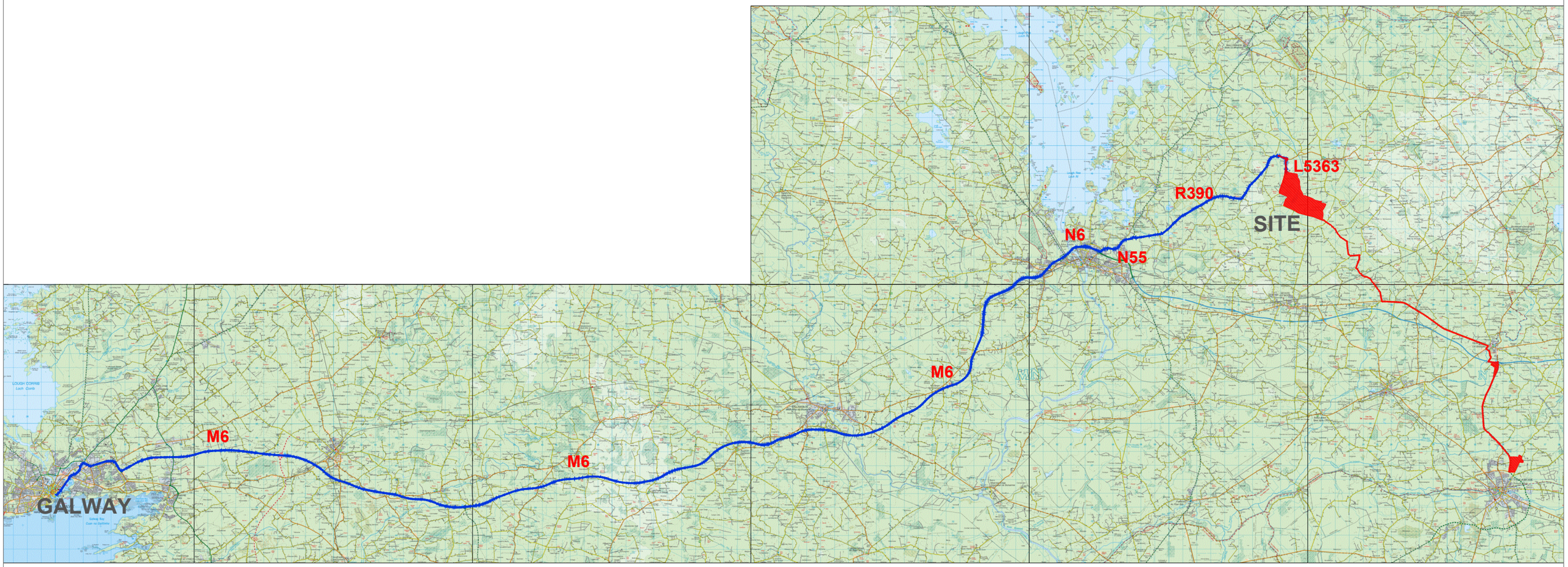
For the purpose of construction and operational traffic there is 1 point of access proposed to serve the Proposed Development site which is via an existing agricultural access located off the Local L5363. It is proposed that the existing access will be upgraded on a temporary basis to accommodate all construction related traffic, with an improved access implemented on a permanent basis to provide for maintenance traffic.

14.1.2.2 Proposed Abnormal Load Delivery Route

The proposed port of entry for the large wind turbine components is Galway Harbour in Galway City. The proposed turbine delivery route from Galway Port is shown in Figure 14-1a with the proposed turbine delivery route shown from the M6 motorway and exit from N6 national road in Athlone to the Wind Farm Site in Figure 14-1b. The proposed turbine delivery route is as follows;

- Galway Harbour through Galway city to the N6.
- From the N6 in Galway City the turbine delivery route heads eastbound for 85km to the M6 motorway before becoming the N6 national road in Athlone.
- The turbine delivery route then exits the N6 national road via the eastbound slip road off the N6 at Junction 10, turning left onto the N55 at an existing signalised junction.
- The turbine delivery route then travels north-east on the N55 for 2.7km passing through the existing N55 / R916 Cornamaddy Roundabout.
- The turbine delivery route then turns right off the N55 onto the R396 at an existing priority junction before travelling north east on the R390 for 13.5 km.
- At this point the turbine delivery route heads due south on the local L5363 for approximately 1km to the location of the proposed access junction, which is located on the eastern side of the road.

An assessment of the turning requirements of the abnormally large loads transporting the turbine components was undertaken at the various pinch points along the route from the N6 to the site entrance as identified in Figure 14-2a, an assessment was also undertaken at the key locations on Galway City and is set out in Figure 14-2b. The swept path assessment undertaken for these locations is discussed in Section 14.1.9.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 14-1a Site location and turbine delivery route (from Galway Harbour)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd		SCALE: NTS
PROJECT NO: 9290	DATE: 08.02.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

KEY

Turbine haul route

Other HGV delivery route

N55

R390

L5363

SITE

N6

M6

ATHLONE
Baile Átha Luain

Lough Ree
Loch Ri

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 14-1b Site location and delivery routes (local)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd		SCALE: NTS
PROJECT NO: 9290	DATE: 08.02.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

KEY

- **Turbine haul route**
- **Other HGV delivery route**
- **Locations for autotrack assessment**

1 2 3 4 5 6 7 SITE

N55 N6 M6 R390 L5363

Lough Ree / Loch Ri

ATHLONE / Baile Átha Luain

NOTES:

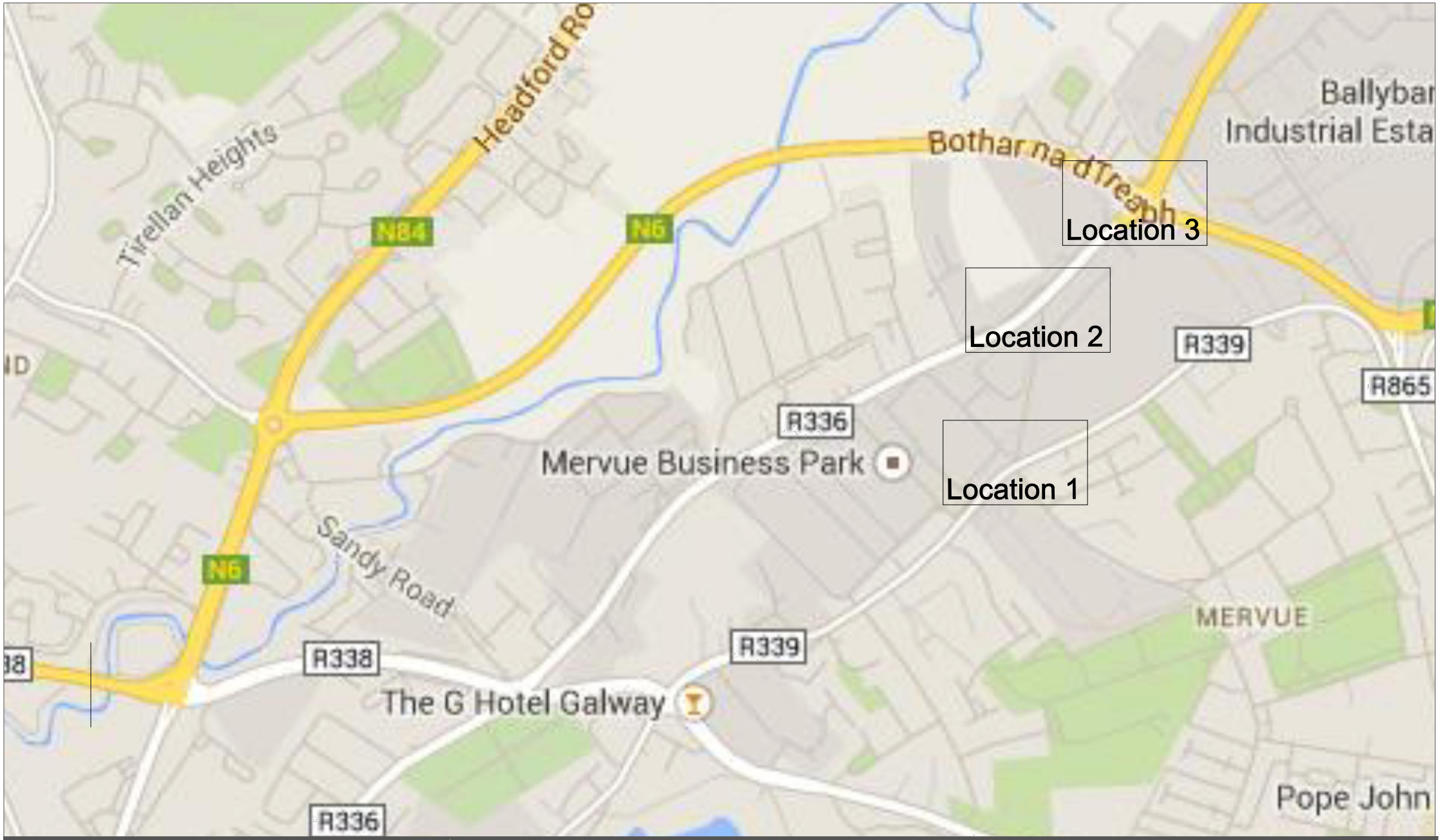
PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 14-2a Route assessment location plan

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	NTS
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 14-2b Galway City autotrack assessment locations

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	NTS
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

14.1.2.3 Proposed Construction Traffic Haul Route

In order to facilitate the construction of the Proposed Development, the majority of all rock and hardcore material that will be required during the construction will be sourced from local, appropriately authorised quarries. Potential quarries for the supply of stone and concrete are listed in Section 4.4.2.1 in Chapter 4 of this EIAR, and are located in Athlone, Glasson, Tullamore and Ballinagore. The potential routes for general construction materials for the purposes of this assessment, is as per the access routes considered for the turbine plant traffic with the additional following routes, which are shown in Figure 14-1b;

- M6 from the east,
- N55 from the south, and,
- The R390 from the east.

14.1.2.4 'Do-Nothing' Scenario

If the Proposed Development does not proceed there will be no additional traffic generated or works carried out on the road network and therefore no effects with respect to traffic.

14.1.3 Existing Traffic Volumes

Traffic volumes are discussed in terms of either vehicle numbers, or Passenger Car equivalent Units (PCUs), where each vehicle is expressed in terms of its demand on the network relative to the equivalent number of cars. For example, an articulated HGV was given a factor of 2.4 passenger car units (as per TII Project Appraisal Guidelines for National Roads Unit 5.2), while one of the extended HGVs transporting the large turbine components was assigned a value of 10.

14.1.3.1 Background Traffic Flows

The 8 locations included in the link flow assessment and for which base year 2022 traffic count data was collated are shown in Figure 14-2c. The locations included in the assessment are as follows,

- Link 1 – N6 to the west of Athlone (between junctions 10 and 11),
- Link 2 – M6 to the east of Athlone (between junctions 7 and 8),
- Link 3 – N55 just south of the turn off onto the R390,
- Link 4 – N55 just to the north of the turn off onto the R390,
- Link 5 – R390 just east of the N55,
- Link 6 – R390 just west of the turn-off onto the L5363 towards the Wind Farm Site,
- Link 7 – R390 just east of the turn-off onto the L5363 towards the Wind Farm Site,
- Link 8 – The L5363 towards the Wind Farm Site.

Two sources of data were used to provide all day traffic flows for the links included in the assessment, asset out in Table 14-1. For links 1 and 2 on the N6 and M6 respectively, data obtained from automatic traffic counters maintained by Transport Infrastructure Ireland (TII) has been used. For the remaining 6 links, all day traffic counts were undertaken at the N55 / R390 and R390 / L5363 junctions in order to provide 2-way links flows and junction turning count data. These traffic counts were undertaken by Traffinomics Ltd on June 9th 2022. All base year Traffic count data is included as Appendix 14-1

The all-day traffic flows observed for the base year 2022 are shown in terms of vehicle numbers in Table 14-2. As would be expected the figures show that there is a considerable range in existing traffic volumes on the proposed turbine delivery route and construction traffic routes, ranging from 36,100 vehicles per day on the N6 to the west of Athlone, to 12,560 vehicles per day of the N55 north of Athlone, reducing to 1,660 heading east on the R390, down to 240 vehicles per day on the L5363 heading towards the Wind Farm Site.

KEY

- Turbine haul route
- Other HGV delivery route
- Link count locations

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 14-2c Link count locations

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd		SCALE: NTS
PROJECT NO: 9290	DATE: 08.02.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Table 14-1 Count locations and data source

Link	Data source
1 – N6 west of N55	TII ATC site
2 – M6 east of N55	TII ATC site
3 – N55 south of R390	Classified count
4 – N55 north of R390	Classified count
5 – R390 east of N55	Classified count
6 – R390 west of L5363	Classified count
7 – R390 east of L5363	Classified count
8 – L5363 toward site	Classified count

Table 14-2 All day traffic flows by location, year 2022 (2-way vehicles)

Link	2022
1 – N6 west of N55	36,102
2 – M6 east of N55	22,004
3 – N55 south of R390	12,562
4 – N55 north of R390	9,722
5 – R390 east of N55	3,328
6 – R390 west of L5363	1,659
7 – R390 east of L5363	1,658
8 – L5363 toward site	239

14.1.3.2 Background Traffic Volumes for the Assumed Construction Year 2028

This section describes the process adopted to produce background traffic forecasts for an assumed construction year of 2028.

Revised guidelines for forecasting annual growth in traffic volumes were produced by TII in October 2021, as set out by count in the Project Appraisal Guidelines (Unit 5.3 – Travel Demand Projections).

The annual growth rates for light vehicles for County Westmeath and factors for the years relevant to this study are shown in Tables 14-3 and 14-4. Based on TII growth rates it is estimated that traffic volumes will increase by 10.1% during the period from 2022, when the base traffic data was collected, and the year 2028, when the construction of the Proposed Development is forecast to take place. Year 2022 and 2028 all day traffic flows are on the study area network are compared in Table 14-5. It should be noted that while the assumed construction year of 2028 may vary slightly, this will not alter the forecast outcomes and effects presented in this section of the EIAR. This is due to the annual growth rate for background traffic being just 1.61% (as shown in Table 14-3 as 1.0161) and the traffic volumes generated by the Proposed Development will remain unchanged regardless of construction year, as presented subsequently in Section 14.1.4.

TII traffic count data recorded at the TII count sites on the M6 and N6, together with the classified traffic counts undertaken for the purpose of this assessment, were also used to determine the existing percentage of HGVs on the proposed delivery routes. The observed percentage of HGVs are show in Table 14-6 and range from a minimum of 4.1% observed on Link 5 on the R390, to a maximum of 12.5% observed on the L5363 leading towards the Wind Farm Site.

Table 14-3 TII traffic growth forecasts, growth per annum and cumulative, County Westmeath

Year	Lights – Annual Factor			Lights – Cumulative Factor		
	Low	Medium	High	Low	Medium	High
2022	1.0145	1.0161	1.0194	1.000	1.000	1.000
2023	1.0145	1.0161	1.0194	1.015	1.016	1.019
2024	1.0145	1.0161	1.0194	1.029	1.032	1.039
2025	1.0145	1.0161	1.0194	1.044	1.049	1.059
2026	1.0145	1.0161	1.0194	1.059	1.066	1.080
2027	1.0145	1.0161	1.0194	1.075	1.083	1.101
2028	1.0145	1.0161	1.0194	1.090	1.101	1.122

Table 14-4 TII traffic growth rates by growth scenario

Period	New Factors		
	Low	Medium	High
2022 – 2028	1.090	1.101	1.122

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

Link	2022	2028
1 – N6 west of N55	36,102	39,748
2 – M6 east of N55	22,004	24,226

3 – N55 south of R390)	12,562	13,831
4 – N55 north of R390	9,722	10,704
5 – R390 east of N55	3,328	3,664
6 – R390 west of L5363	1,659	1,827
7 – R390 east of L5363	1,658	1,825
8 – L5363 toward site	239	263

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

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / lgvs	HGVs	Cars / lgvs	Total
1 – N6 west of N55	39,748	5.4%	2,146	37,602	5,151	37,602	42,753
2 – M6 east of N55	24,226	6.8%	1,647	22,579	3,954	22,579	26,533
3 – N55 south of R390)	13,831	5.8%	802	13,029	1,925	13,029	14,954
4 – N55 north of R390	10,704	6.2%	664	10,040	1,593	10,040	11,633
5 – R390 east of N55	3,664	4.1%	150	3,514	361	3,514	3,874
6 – R390 west of L5363	1,827	5.6%	102	1,724	245	1,724	1,970
7 – R390 east of L5363	1,825	6.4%	117	1,709	280	1,709	1,989
8 – L5363 toward Wind Farm Site	263	12.5%	33	230	79	230	309

14.1.4 Proposed Development and Traffic Generation

14.1.4.1 Development Trip Generation – During Construction

For the purpose of assessing the effects of traffic generated during the construction of the Proposed Development, the construction phase is considered in two stages.

- Stage 1 – Wind Farm Site preparation, groundworks, tree felling, construction of temporary construction compounds, turbine foundations, met mast foundations, onsite substation, internal electrical cabling, and Grid Connection underground electrical cabling route laying,
- Stage 2 – Wind turbine component delivery and construction.

For the purpose of the traffic impact assessment, projections based on trip generation data collected from other wind farm construction projects regarding the numbers of trips per quantum of material, the number of turbine component parts based on 9 turbines, the length of the construction phase and work periods etc. were made to inform the assessment. These projections allow for assessment using the precautionary principle but should not be inferred as prescriptive limitations to the construction phase. There are numerous variables which can affect a construction project programme, including weather. The construction phase of the Proposed Development will be carried out in accordance with the CEMP, included as Appendix 4-2 of this EIAR, which will be agreed, where required, with the relevant Local Authority.

The construction phase of the Proposed Development is expected to last approximately 18 to 24 months The traffic generation estimates set out in the following paragraphs is based on a total construction period of 18-24 months. The shortest potential construction phase duration of 18 months was assumed for the purpose of this assessment in order to test a precautionary scenario. The shortest construction period will give rise to higher volumes of construction traffic using the public road network at any one time. For assessment purposes a standard 255 working days per annum was adopted equating to 383 working days for over an 18-month construction period.

14.1.4.1.1 *Stage 1 – Site Preparation and Groundworks including Cable Laying*

For assessment purposes, this stage of the Proposed Development construction, which includes the Proposed Development site preparation and ground works and cable laying elements, is assumed to last between 16 to 17 month (350 days). The total numbers of deliveries made to the Site during that period are shown in Table 14-7. It is estimated that a total of 10,484 deliveries by truck or standard articulated HGVs will be made to the Site during this period.

During this construction phase there will be two distinct types of days with respect to trip generation. A total of 9 days will be used to pour the 9 concrete wind turbine foundations. Foundations will likely be poured one per day, with circa 107 concrete loads required for each turbine delivered to the Wind Farm Site over a 12-hour period, resulting in 9 HGV trips to and from the Wind Farm Site per hour.

On the remaining 341 working days for this stage other general materials will be delivered to the Wind Farm Site.

The estimated additional daily traffic generated on the road network during these days are shown in Tables 14-8 and 14-9.

The figures show that on the 9 days that concrete will be delivered to the Wind Farm Site, an additional 512 two-way PCUs will be added to the network (comprising 107 two-way HGV trips with 2.4 PCUs per movement), as shown in Table 14-8. Similarly, on the 341 days when other materials will be delivered to the Wind Farm Site, traffic volumes on the local network will increase by an average of 134 PCUs, as set out in Table 14-9.

Table 14-7 Trip generation - Stage 1 - Site preparation and groundworks – total loads

Material	Total no. Truck Loads	Truck type
Concrete	960	Trucks
Delivery of plant	35	Large artic

Fencing & gates	3	Large artic
Compound setup	36	Large artic
Steel	25	Large artic
Ducting and cabling (internal)	264	Large artic
Grid connection underground electrical cable laying	3,500	Truck
Tree felling	67	Truck
Crane (to lift steel)	1	Large artic
Road construction	5,070	Truck
Substation	100	Large artic
Cranes for turbines	12	Large artic
Refuelling for plant	186	Large artic
Site maintenance	135	Large artic
Miscellaneous	90	Large artic
Total	**10,484**	

Table 14-8 Trip generation - Stage 1 – Concrete foundation pouring – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Concrete	960	Trucks	2.4	2,304	256.0	512.0
* Estimation based on 9 concrete pouring days						

Table 14-9 Trip generation - Stage 1 – Site preparation and groundworks – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Delivery of plant	35	Large artic	2.4	84.0	0.25	0.49

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Fencing & gates	3	Large artic	2.4	7.2	0.02	0.04
Compound setup	36	Large artic	2.4	86.4	0.25	0.51
Steel	25	Large artic	2.4	60.0	0.18	0.35
Ducting and cabling (internal)	264	Large artic	2.4	633.6	1.86	3.72
Grid connection cable laying	3500	Large artic	2.4	8400.0	24.63	49.27
Tree felling	67	Truck	2.4	160.8	0.47	0.94
Crane (to lift steel)	1	Large artic	2.4	2.4	0.01	0.01
Road construction	5070	Truck	2.4	12168.0	35.68	71.37
Substation	100	Large artic	2.4	240.0	0.70	1.41
Cranes for turbines	12	Large artic	2.4	28.8	0.08	0.17
Refuelling for plant	186	Large artic	2.4	446.4	1.31	2.62
Site maintenance	135	Large artic	2.4	324.0	0.95	1.90
Miscellaneous	90	Large artic	2.4	216.0	0.63	1.27
Total	9524			22857.6	67.03	134.1

* Estimation based on ground work period of 350 working days

14.1.4.1.2 *Stage 2 – Turbine Construction*

During the turbine construction stage, including delivery and assembly, there will be deliveries to the Wind Farm Site made by abnormally large vehicles, referred to in this section as *extended artics*, transporting the component parts of the turbines (nacelles, blades and towers). There will be deliveries made by standard large HGVs, transporting cables, tools and smaller component parts. The types of load and associated numbers of trips made to the Wind Farm Site during the turbine construction period are shown in Table 14-10, which summarises that a total of 72 trips will be made to and from the Wind Farm Site by extended artics, with a further 36 trips made by standard large articulated HGVs.

Table 14-10 Trip generation - Stage 2 – Wind turbine plant – total loads

Material	Units	Quantity per Unit	Total Quantity	Quantity per Truck	Total Truck Loads	Truck type
Nacelle	9	1	9	1	9	Extended Artic
Blades	9	3	27	1	27	Extended Artic
Towers	9	4	36	1	36	Extended Artic
Sub total					***72***	
Transformer	9	1	9	1	9	Large Artic
Drive train and blade hub	9	1	9	1	9	Large Artic
Base and other deliveries	9	2	18	1	18	Large Artic
Sub total					***36***	
Total					**108**	

For the purposes of this assessment, it is assumed that the turbine delivery element will progress at the rate of 3 extended artic trips made by convoy to the Wind Farm Site on 5 days per week, which is a common delivery frequency for large turbine components from the port of entry to the Wind Farm Site. This will result in this stage taking 24 days spread over a 5 week period with all deliveries made during the night. The actual trip number will be determined following consultations with An Garda Síochána. On a further two days per week, lasting for approximately 5 weeks, the remaining equipment required during this phase will be delivered to the Wind Farm Site. The additional traffic movements for these two types of days are summarised in Tables 14-11 and 14-12. In Table 14-11 a PCU equivalent value of 10 was allocated to each extended artic movement, resulting in an additional 60 PCUs on the study network on these 24 days, while an additional 19.2 PCUs are forecast to be on the network on 9 other days, as shown in Table 14-12, during the turbine construction phase.

Table 14-11 Trip generation - Stage 2 – Wind turbine plant, extended artics – total movements and volumes per delivery day

Material	Units	Truck Type	PCU Value	Total PCUs	2-way PCUs/ day
Nacelle	1	Extended Artic	10	10.0	20.0

Material	Units	Truck Type	PCU Value	Total PCUs	2-way PCUs/ day
Blades	3	Extended Artic	10	30.0	60.0
Towers	4	Extended Artic	10	40.0	80.0
Total per turbine	8			80.0	160.0
Total per delivery day	3			30.0	60.0
*Estimation based on 3 abnormal sized loads being delivered per night on 5 days per week (total 72 loads will take 24 nights spread over 5 weeks)					

Table 14-12 Trip generation - Stage 2 - Wind turbine plant, standard artic HGVs - total movements and volumes per delivery day

Material	Quantity per Unit	PCU Value	2-way PCUs / day
Transformer	1	2.4	4.8
Drive train and blade hub	1	2.4	4.8
Base & other deliveries	2	2.4	9.6
Total	4		19.2
*Estimation based on equipment for 2 turbines being moved per week spread over 2 days			

Construction Employee Traffic

It is estimated that up to 70 staff members will be employed on the Wind Farm Site at any one time during the Site preparation and groundworks stage of construction, reducing to a maximum of 45 staff at any one time during the turbine construction stage. Construction employee traffic for the Grid Connection is dealt with in Section 14.1.7 below. If a precautionary scenario is assumed that all staff will travel to / from the site by car, at an average of 2 persons per car, then a total of 70 PCU movements (each trip is two way) will be added to the network during the groundworks stage (Stage 1) of the Proposed Development, reducing to 45 PCU trips during the turbine construction stage (Stage 2).

Development Trip Generation – During Operation

It is estimated that the wind farm will be unmanned once operational and will be remotely monitored. The only traffic associated with the operational phase of the Proposed Development will be from maintenance personnel.

It is estimated that the traffic volumes that will be generated by the Proposed Development once it is operational will be minimal, with an estimated 3 staff employed on the Wind Farm Site. The impact on the network of these trips during the operational stage is discussed in Section 14.1.6.

Development Trip Generation – During Decommissioning

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

14.1.5 Construction Traffic Vehicles

The delivery of turbine components including blades, tower sections and nacelles is a specialist operation owing to the oversized loads involved. As detailed in Section 4.3.1 in Chapter 4 of this EIAR, the turbine model to be installed on the Wind Farm Site will have an overall ground-to-blade tip height of 185 metres; blade rotor diameter of 162 metres and hub height of 104 metres. The turbine blades are the longest turbine component and a blade length of 81 metres has been assessed for the turbine delivery assessment for the Proposed Development.

It is noted that at one location on the turbine delivery route it will be required to raise the rear tip of the blade using a "blade lifter" in order to avoid a bank of trees on the turbine delivery route, this is discussed further in Section 14.1.8. The critical vehicles in terms of size and turning geometry requirements, and used in the detailed route assessment discussed in Section 14.1.8 are the blade transporter, the blade transporter with the blade lifted at the tip and the tower transporter vehicles, with the geometry of each shown in Figures 14-3a and 14-3b for the options for the blade transporters and 14-4 for the tower transporter.

The key dimensions are as follows:

Transport of Blades – Standard articulated HGV with 10m blade overhang at rear (See Figure 14-3a)

Total length	87.5 m
Length of blade	81.0 m
Inner radius	28.0 m

Transport of Blades – Articulated HGV with blade tip lifted to 11m and 15m overhang at rear (See Figure 14-3b)

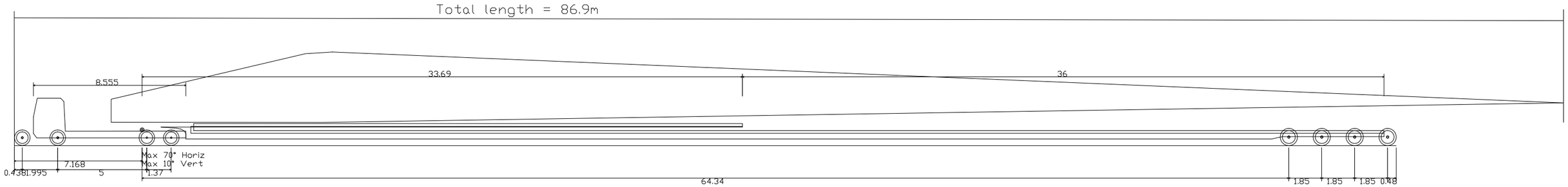
Total length	86.3 m
Length of blade	81.0 m
Inner radius	28.0 m

Transport of Tower – Using low-bed or drop deck trailers (See Figure 14-4)

Total length (with load)	46.7 m
Length of load	29 m
Inner radius	25.0 m

The vehicles used to transport the nacelles will be similar to the tower transporter although will be shorter in length.

All other vehicles requiring access to the site will be standard HGVs or LGVs and will be significantly smaller than the design test vehicles. Standard HGVs and LGVs will navigate the National and Regional Road networks and access the site of the L5363 at the proposed site entrance.



81.0m blade

Overall Length	77.537m
Overall Width	2.550m
Overall Body Height	2.661m
Min Body Ground Clearance	0.375m
Track Width	2.500m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

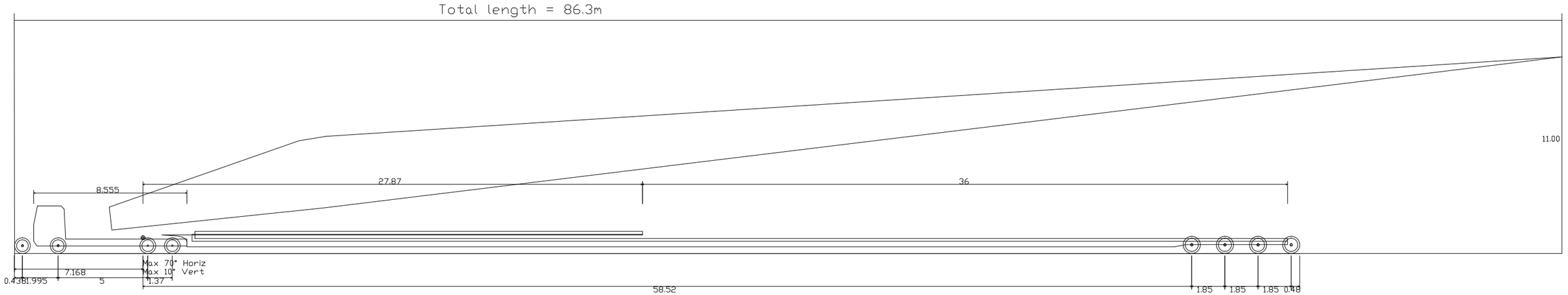
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

FIGURE 14-3a Design blade extended artic profile

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd		SCALE: NTS
PROJECT NO: 9290	DATE: 08.02.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



81.0m blade with lifter and 15m overhang

Overall Length	71.717m
Overall Width	2.550m
Overall Body Height	2.661m
Min Body Ground Clearance	0.375m
Track Width	2.500m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

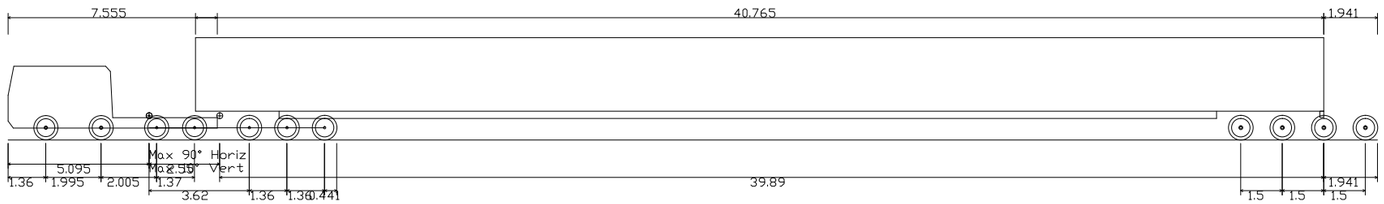
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

FIGURE 14-3b Design blade extended artic profile - With tip lifted to 11m and 15m blade overhang

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd		SCALE: NTS
PROJECT NO: 9290	DATE: 08.02.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



Tower	
Overall Length	49.476m
Overall Width	2.550m
Overall Body Height	3.695m
Min Body Ground Clearance	0.427m
Max Track Width	2.520m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

FIGURE 14-4 Design tower extended artic profile

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd		SCALE: NTS
PROJECT NO: 9290	DATE: 08.02.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

14.1.6 Traffic Effects During Construction, Operation and Decommissioning

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

It should be noted that for the purpose of the assessment all vehicles travelling to and from the site of the Proposed Development have been assumed to do so from the same single direction. The assessment is therefore based on a precautionary scenario, where all traffic generated by the Wind Farm Site travels to/from the Site from on the same route with the maximum increase in traffic volumes assessed on each link shown in Figure 14-2a.

The potential effects of the Grid Connection underground electrical cabling route will have on the public road network is considered in Section 14.1.7 below.

14.1.6.1 Effect on Link Flows – During Construction

Background traffic volumes and Proposed Development generated traffic volumes are shown for the seven typical construction stage scenarios, discussed in Section 14.1.4 and shown in Tables 14-13 to 14-16, with the forecast effects, in terms of the percentage increase in traffic flows in PCUs and the number of days affected, set out in Tables 14-17 to 14-20. As stated previously in this section the actual figures presented in the tables will be subject to change, however, they are considered a robust estimation of likely traffic volumes and effects.

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

During Stage 1 – Wind Turbine Foundation Concrete Pouring

For 9 days when the concrete foundations are poured an additional 582 PCUs will travel to/from the Wind Farm Site. On the delivery route, it is forecast that the increase in traffic volumes on these days will range from +1.4% on the N6 west of Athlone, to +5.0% on the N55 north of the R390, to 15.0% on the R390 leaving Athlone, to 29.5% on the R390 approaching the Wind Farm Site. On the L5363 leading to the Wind Farm Site it is forecast that traffic flows will increase by 188.2% on these 9 days.

During Stage 1 – Site Preparation and Groundworks

On the remaining 341 days when the Wind Farm Site preparation and groundworks and construction of the cable grid connection continues an additional 204 PCUs will travel to/from the Wind Farm Site. It is forecast that the increase in traffic volumes on these days will range from +0.5% on the N6 west of Athlone, to +1.8% on the N55 north of the R390, to +5.3% on the R390 leaving Athlone, to +10.4% on the R390 approaching the Wind Farm Site. On the L5363 leading to the Wind Farm Site it is forecast that traffic flows will increase by 66%.

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

On the 24 days / nights that the abnormal loads carrying the large turbine components travel to the Wind Farm Site, an additional 105 PCUs will travel to/from the Wind Farm Site. It is forecast that the increase in traffic volumes on these days will range from +0.2% on the N6 west of Athlone, to +0.7% on the N55 south of the R390, to +2.7% on the R390 leaving Athlone, to +5.3% on the R390 approaching the Wind Farm Site. On the L5363 leading to the Wind Farm Site it is forecast that traffic flows will increase by 34%.

During Stage 2 – Wind Turbine Construction Stage – Other deliveries using conventional articulated HGVs

For 9 days an additional 64 PCUs will travel to/from the Wind Farm Site. It is forecast that the increase in traffic volumes on these days will range from +0.2% on the N6 west of Athlone, to +0.4% on the N55 south of the R390, to 1.7% on the R390 leaving Athlone, to 3.2% on the R390 approaching the Wind Farm Site. On the L5363 leading to the Wind Farm Site it is forecast that traffic flows will increase by 21%.

Table 14-13 Daily traffic volumes on during concrete pouring - background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N6 west of N55	37,602	5,151	42,753	70	512	582	37,672	5,663	43,335
2 – M6 east of N55	22,579	3,954	26,533	70	512	582	22,649	4,466	27,115
3 – N55 south of R390)	13,029	1,925	14,954	70	512	582	13,099	2,437	15,536
4 – N55 north of R390	10,040	1,593	11,633	70	512	582	10,110	2,105	12,215
5 – R390 east of N55	3,514	361	3,874	70	512	582	3,584	873	4,456
6 – R390 west of L5363	1,724	245	1,970	70	512	582	1,794	757	2,552
7 – R390 east of L5363	1,709	280	1,989	70	512	582	1,779	792	2,571
8 – L5363 toward Wind Farm Site	230	79	309	70	512	582	300	591	891

Table 14-14 Daily Traffic volumes during site preparation and groundworks – background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N6 west of N55	37,602	5,151	42,753	70	134	204	37,672	5,285	42,957
2 – M6 east of N55	22,579	3,954	26,533	70	134	204	22,649	4,088	26,737

3 – N55 south of R390)	13,029	1,925	14,954	70	134	204	13,099	2,059	15,158
4 – N55 north of R390	10,040	1,593	11,633	70	134	204	10,110	1,727	11,837
5 – R390 east of N55	3,514	361	3,874	70	134	204	3,584	495	4,078
6 – R390 west of L5363	1,724	245	1,970	70	134	204	1,794	379	2,174
7 – R390 east of L5363	1,709	280	1,989	70	134	204	1,779	414	2,193
8 – L5363 toward Wind Farm Site	230	79	309	70	134	204	300	213	513

Table 14-15 Daily traffic volumes during turbine construction, extended artics – background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N6 west of N55	37,602	5,151	42,753	45	60	105	37,647	5,211	42,858
2 – M6 east of N55	22,579	3,954	26,533	45	60	105	22,624	4,014	26,638
3 – N55 south of R390)	13,029	1,925	14,954	45	60	105	13,074	1,985	15,059
4 – N55 north of R390	10,040	1,593	11,633	45	60	105	10,085	1,653	11,738
5 – R390 east of N55	3,514	361	3,874	45	60	105	3,559	421	3,979
6 – R390 west of L5363	1,724	245	1,970	45	60	105	1,769	305	2,075
7 – R390 east of L5363	1,709	280	1,989	45	60	105	1,754	340	2,094
8 – L5363 toward Wind Farm Site	230	79	309	45	60	105	275	139	414

Table 14-16 Daily traffic volumes during turbine construction – standard artic HGVs, background, Proposed Development generated and total (PCUs)

Link	Background PCUs			Proposed Development PCUs			Total PCUs (Background + Proposed Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N6 west of N55	37,602	5,151	42,753	45	19	64	37,647	5,170	42,817
2 – M6 east of N55	22,579	3,954	26,533	45	19	64	22,624	3,973	26,597
3 – N55 south of R390)	13,029	1,925	14,954	45	19	64	13,074	1,944	15,018
4 – N55 north of R390	10,040	1,593	11,633	45	19	64	10,085	1,612	11,697
5 – R390 east of N55	3,514	361	3,874	45	19	64	3,559	380	3,938
6 – R390 west of L5363	1,724	245	1,970	45	19	64	1,769	264	2,034
7 – R390 east of L5363	1,709	280	1,989	45	19	64	1,754	299	2,053
8 – L5363 toward Wind Farm Site	230	79	309	45	19	64	275	98	373

Table 14-17 Summary daily effects of Proposed Development traffic - concrete pouring - % increase and number of days

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – N6 west of N55	42,753	582	43,335	1.4%	9
2 – M6 east of N55	26,533	582	27,115	2.2%	9
3 – N55 south of R390)	14,954	582	15,536	3.9%	9
4 – N55 north of R390	11,633	582	12,215	5.0%	9
5 – R390 east of N55	3,874	582	4,456	15.0%	9
6 – R390 west of L5363	1,970	582	2,552	29.5%	9

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
7 – R390 east of L5363	1,989	582	2,571	29.3%	9
8 – L5363 toward Wind Farm Site	309	582	891	188.2%	9

Table 14-18 Summary daily effect of Proposed Development traffic - site preparation and ground works - % increase and number of days

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – N6 west of N55	42,753	204	42,957	0.5%	341
2 – M6 east of N55	26,533	204	26,737	0.8%	341
3 – N55 south of R390)	14,954	204	15,158	1.4%	341
4 – N55 north of R390	11,633	204	11,837	1.8%	341
5 – R390 east of N55	3,874	204	4,078	5.3%	341
6 – R390 west of L5363	1,970	204	2,174	10.4%	341
7 – R390 east of L5363	1,989	204	2,193	10.3%	341
8 – L5363 toward Wind Farm Site	309	204	513	66.0%	341

Table 14-19 Summary daily effect of Proposed Development traffic - turbine construction, extended artics - % increase and number of days

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – N6 west of N55	42,753	105	42,858	0.2%	24
2 – M6 east of N55	26,533	NA	NA	NA	NA
3 – N55 south of R390)	14,954	105	15,059	0.7%	24

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
4 – N55 north of R390	11,633	NA	NA	NA	NA
5 – R390 east of N55	3,874	105	3,979	2.7%	24
6 – R390 west of L5363	1,970	105	2,075	5.3%	24
7 – R390 east of L5363	1,989	NA	NA	NA	NA
8 – L5363 toward Wind Farm Site	309	105	414	34.0%	24

Table 14-20 Summary daily effects of Proposed Development traffic- turbine construction, standard artic HGVs – % increase and number of days

Link	Background	Proposed Development	Total	% increase	Estimated No. of days
1 – N6 west of N55	42,753	64	42,817	0.1%	9
2 – M6 east of N55	26,533	NA	NA	NA	NA
3 – N55 south of R390)	14,954	64	15,018	0.4%	9
4 – N55 north of R390	11,633	NA	NA	NA	NA
5 – R390 east of N55	3,874	64	3,938	1.7%	9
6 – R390 west of L5363	1,970	64	2,034	3.2%	9
7 – R390 east of L5363	1,989	NA	NA	NA	NA
8 – L5363 toward Wind Farm Site	309	64	373	20.7%	9

14.1.6.2 Link Capacity Assessment

An assessment of the impact on link capacity on the delivery route was undertaken for the various construction stages as set out in Tables 14-21 to 14-23 with the capacity of the links on the route options, as shown in Table 14-21, varying from 52,000 vehicles per day on the M6/N6 down to 5,000 vehicles per day for the R390 and L-5226. Capacities are based on road types and widths as set out in the TII

Standards document DN-GEO-03031 Road Link Design, Table 6/1. It is noted that the link capacities adopted from the TII guidelines correspond to a Level of Service D, which the guidelines describe as being the level where

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

Background, or Do-Nothing Scenario traffic flows, are compared to flows forecast for the various construction delivery stages, in Table 14-22, with the percentage capacity reached for each stage shown in Table 14-23.

Based on this assessment, it is forecast that the majority of the delivery route will operate well within link capacity for all stages of the Proposed Development. The exception to this is the N55 north of Athlone which is forecast to operate at 174% of its capacity by the year 2028 for the Do-Nothing Scenario. On the 9 days when the concrete foundations are poured it is forecast that this will increase to 181%, reducing to a maximum of 176% for the remainder of the construction period.

While the N55 is forecast to operate over link capacity by the year 2028 without and with the additional construction traffic generated by the Proposed Development, it is noted that the forecast maximum increase will be 7 percentage points (174% to 181%) which will be temporary, lasting just 9 days. For the remainder of the construction phase a 1% to 2% increase is forecast. It is also noted that, as is discussed further in the following text, the critical junction on the N55 section of the delivery route, the N55 / R390 junction, is forecast to operate well within capacity, both without and with construction traffic in place, in the year 2028.

Table 14-21 Delivery route carriageway widths, link type and link capacity (at Level of Service D)

Link	Width (m)	Link type	Link capacity (Level of Service D)
1 – N6 west of N55	2 x 7.0	M'way 2 + 2	52,000
2 – M6 east of N55	2 x 7.0	M'way 2 + 2	52,000
3 – N55 south of R390	7.0	Type 2 Single	8,600
4 – N55 north of R390	7.0	Type 2 Single	8,600
5 – R390 east of N55	6.0	Type 3 Single	5,000
6 – R390 west of L5363	6.0	Type 3 Single	5,000
7 – R390 east of L5363	6.0	Type 3 Single	5,000
8 – L5363 toward Wind Farm Site	6.0	Type 3 Single	5,000

Table 14-22 Delivery route link capacity and summary of link flows by construction delivery stage

Link	Link capacity (Level of Service D)	Construction delivery stage				
		Background traffic	Concrete pour	Other site works	Turbine plant	Turbine equipment
1 – N6 west of N55	52,000	42,753	43,335	42,957	42,858	42,817
2 – M6 east of N55	52,000	26,533	27,115	26,737	26,638	26,597
3 – N55 south of R390	8,600	14,954	15,536	15,158	15,059	15,018
4 – N55 north of R390	8,600	11,633	12,215	11,837	11,738	11,697
5 – R390 east of N55	5,000	3,874	4,456	4,078	3,979	3,938
6 – R390 west of L5363	5,000	1,970	2,552	2,174	2,075	2,034
7 – R390 east of L5363	5,000	1,989	2,571	2,193	2,094	2,053
8 – L5363 toward Wind Farm Site	5,000	309	891	513	414	373

Table 14-23 Delivery route link capacity and % of link capacity by construction delivery stage

Link	Link capacity (Level of Service D)	Construction delivery stage				
		Background traffic	Concrete pour	Other site works	Turbine plant	Turbine equipment
1 – N6 west of N55	52,000	82%	83%	83%	82%	82%
2 – M6 east of N55	52,000	51%	52%	51%	51%	51%
3 – N55 south of R390	8,600	174%	181%	176%	175%	175%
4 – N55 north of R390	8,600	135%	142%	138%	136%	136%

Link	Link capacity (Level of Service D)	Construction delivery stage				
5 – R390 east of N55	5,000	77%	89%	82%	80%	79%
6 – R390 west of L5363	5,000	39%	51%	43%	41%	41%
7 – R390 east of L5363	5,000	40%	51%	43%	42%	41%
8 – L5363 toward Wind Farm Site	5,000	6%	18%	10%	8%	7%

14.1.6.3 Effect on Link Flows – During Operation

Once the Proposed Development is operational it is estimated that there will be 3 staff members employed on site with a similar number of vehicle trips, that is 3 car/lgv trips to and from the site per day. As stated previously it is likely that the Proposed Development will attract some recreational trips, although it is expected that visitor numbers will be low. It is considered that the traffic impact during this phase will be negligible.

14.1.6.4 Effect on Junctions – During Construction

The capacity of the junction most affected on the delivery route will be the junction between the N55, which is forecast to operate over link capacity, and the R390, which was assessed using the industry standard junction simulation software PICADY, which permits the capacity of any junction to be assessed with respect to existing or forecast traffic movements and volumes for a given time period. The capacity for each movement possible at the junction being assessed is determined from geometric data input into the program with the output used in the assessment as follows:

Queue – This is the average queue forecast for each movement and is useful to ensure that queues will not interfere with adjacent junctions.

Degree of Saturation or Ratio of Flow to Capacity (% Sat or RFC) – As suggested, this offers a measure of the amount of available capacity being utilised for each movement. Ideally each movement should operate at a level of no greater than 85% of capacity.

Delay – Output in minutes, this gives an indication of the forecast average delay during the time period modelled for each movement.

Scenarios Modelled

While other junctions and links on the network will experience an increase in traffic volumes passing through them, as discussed previously and as set out in Table 14-17 to 14-20 above, the greatest effect will be experienced during peak hours when, during peak construction periods, approximately 70 workers (35 cars) will pass through it. It is assumed that deliveries of materials to the Wind Farm Site will take place during the day after the workers have arrived on the Wind Farm Site, and before they leave at the end of the day, and will therefore not occur at the same time.

N55 / R390 Junction Capacity Test Results

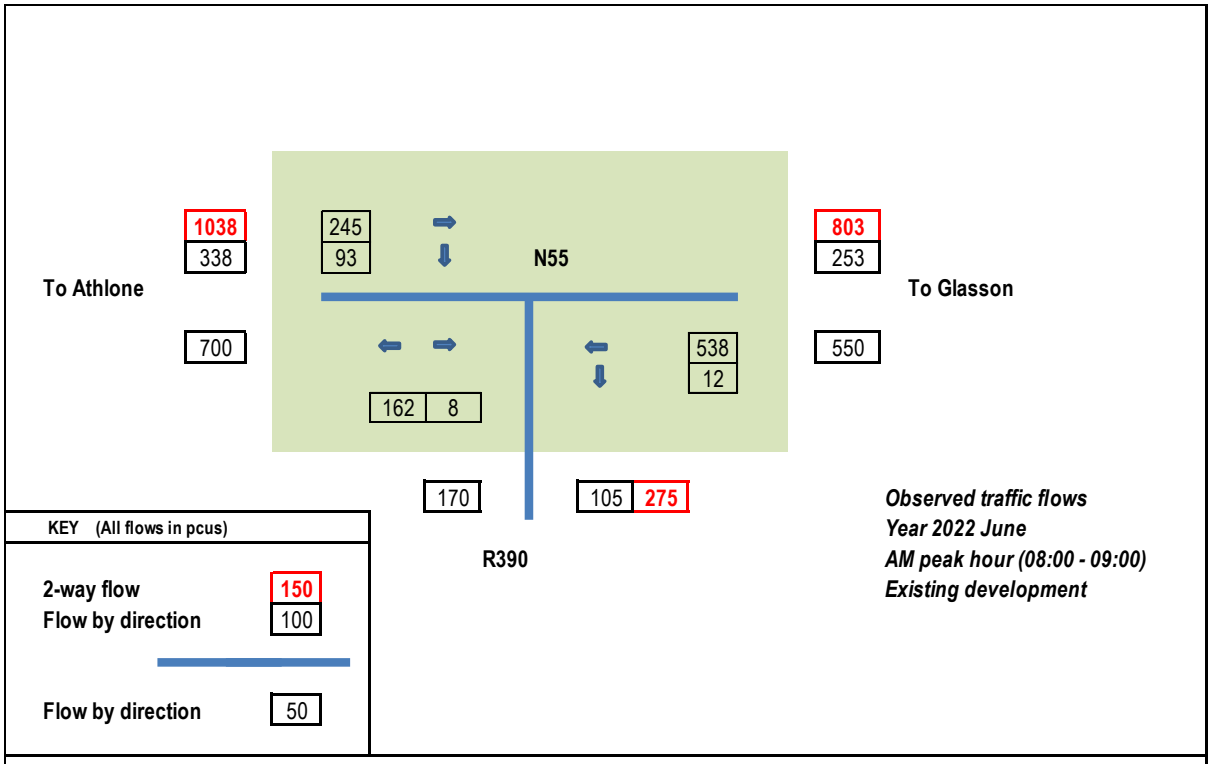
The AM and PM peak hour traffic flows for the base year 2022 and the proposed construction year of 2028 are shown in Figures 14-5a and 14-5b respectively. The additional traffic movements that are forecast to be generated by construction workers are shown in Figure 14-5c, with proposed construction year ear 2028 traffic flows including the additional construction traffic shown in Figure 14-5d. The results of the junction capacity tests are shown in Table 14-24 and show that the additional car trips passing through the junction will have a minor effect on the operation of the junction, increasing the maximum ratio of flow to capacity (RFC) at the junction from 21.5% to 28.5% during the AM peak hour, and from 20.9% to 27.0% for the movement affected during the PM peak hour. The assessment shows that the junction is forecast to operate well within the acceptable limit of 85%. The results of the capacity assessment for the N55 / R390 junction are included in Table 14-24 below.

Table 14-24 Junction capacity test results, N55 / R390 junction, AM and PM peak hours, without and with construction traffic, by time period, year 2028

Period	Location	Without construction traffic			With construction traffic		
AM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From R390 - right turn	3.6%	0.04	0.23	3.7%	0.04	0.23
	From R390 – left turn	34.5%	0.52	0.16	34.6%	0.52	0.16
	From N55 – right turn	21.5%	0.27	0.15	28.5%	0.40	0.16
PM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From R390 - right turn	3.3%	0.03	0.21	4.5%	0.05	0.21
	From R390 – left turn	20.9%	0.26	0.12	27.0%	0.37	0.13
	From N55 – right turn	28.4%	0.39	0.14	28.4%	0.39	0.14

Effect on Junctions – During Operation

As discussed in Section 14.1.6 it is forecast that once operational, the Proposed Development is expected to generate a maximum of 3 car/lgv trips to and from the site per day for maintenance purposes. It is also likely that small numbers of amenity traffic will be attracted to the site. It is therefore concluded that the Proposed Development will have a negligible effect on the local network once constructed.



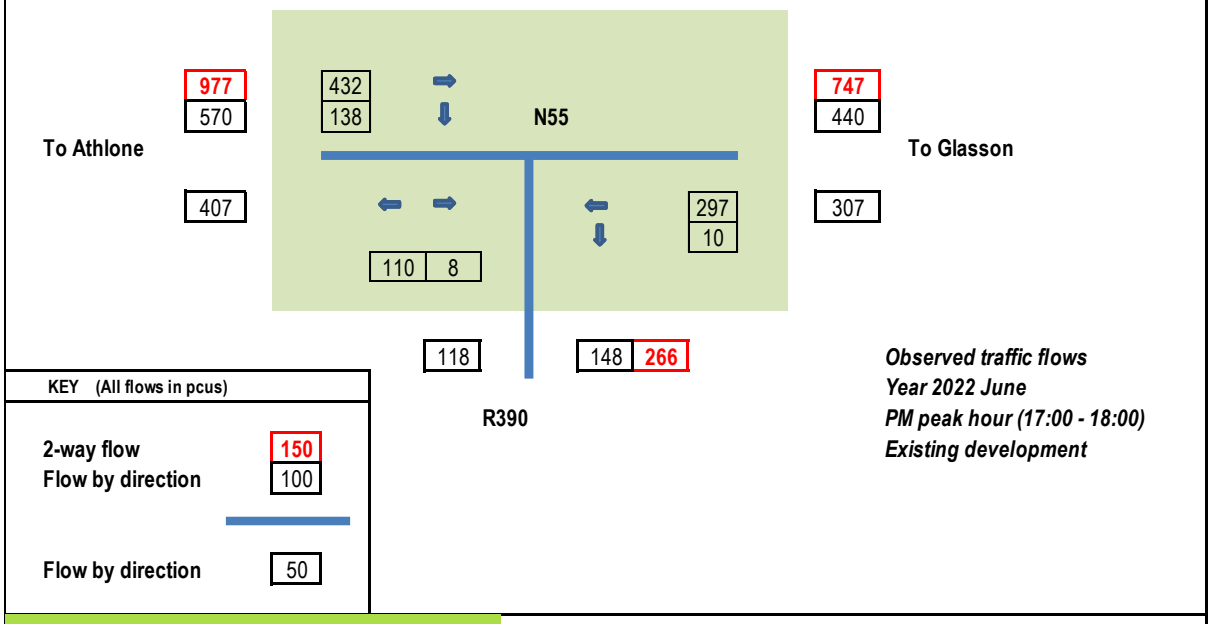


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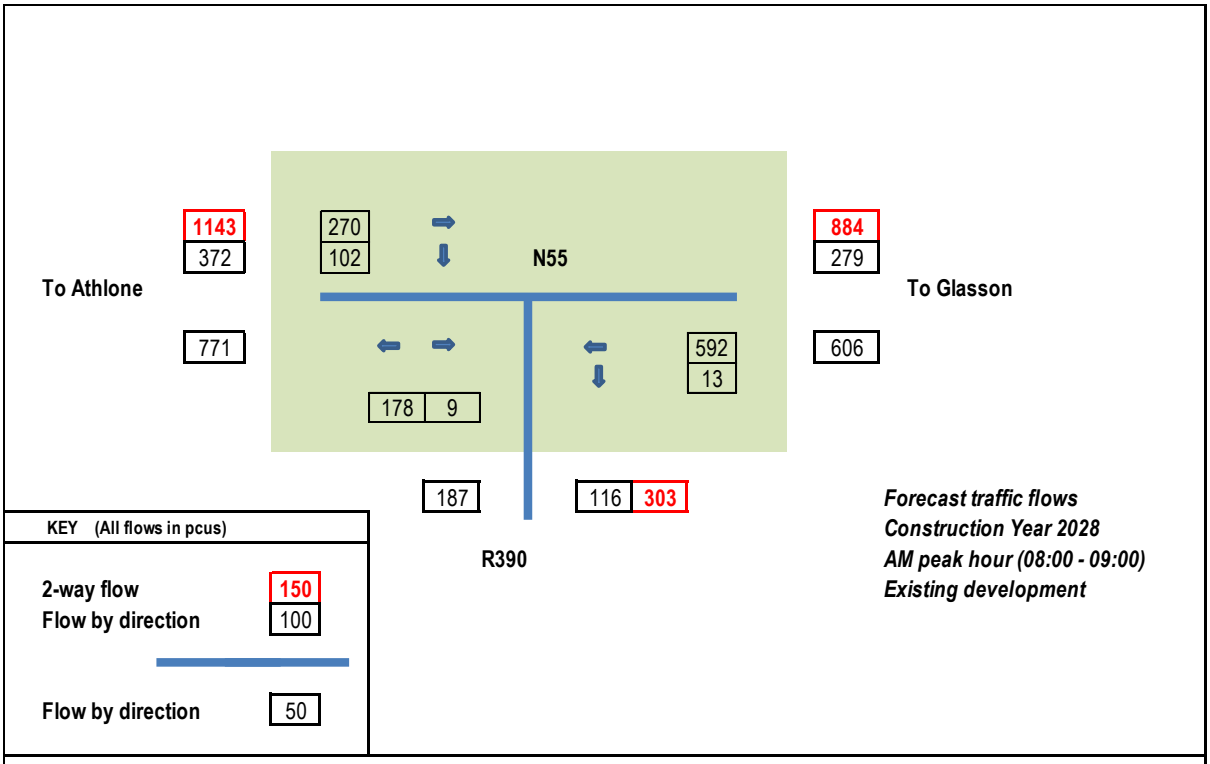
Figure 14.5a Observed traffic flows, AM & PM peak hours, Year 2022



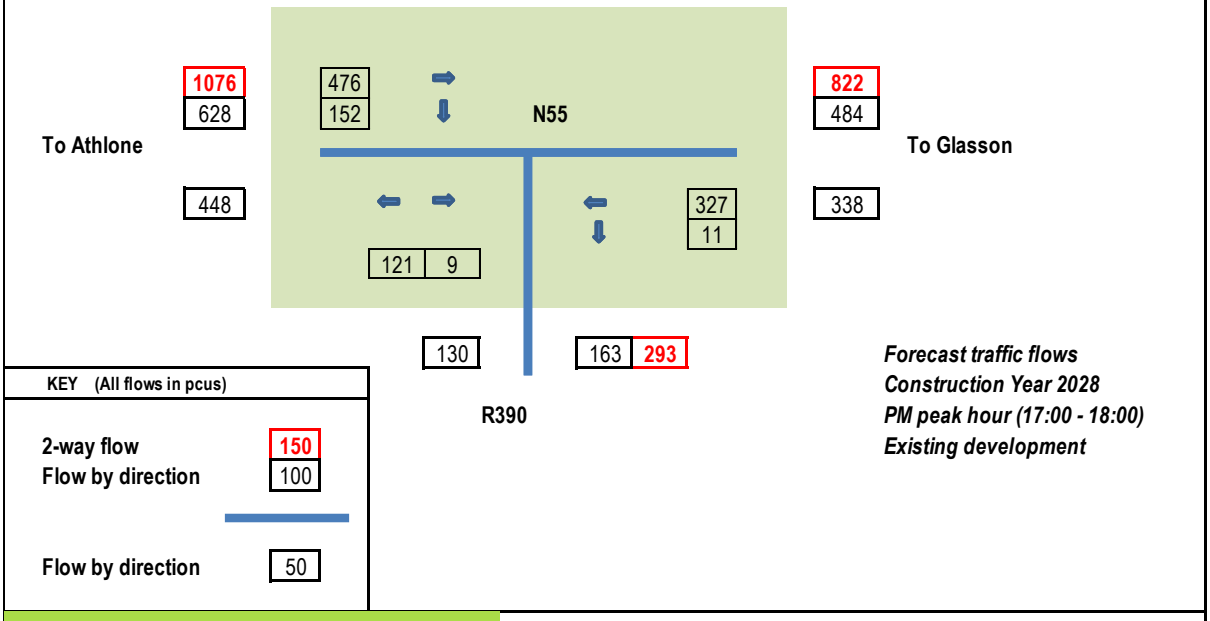


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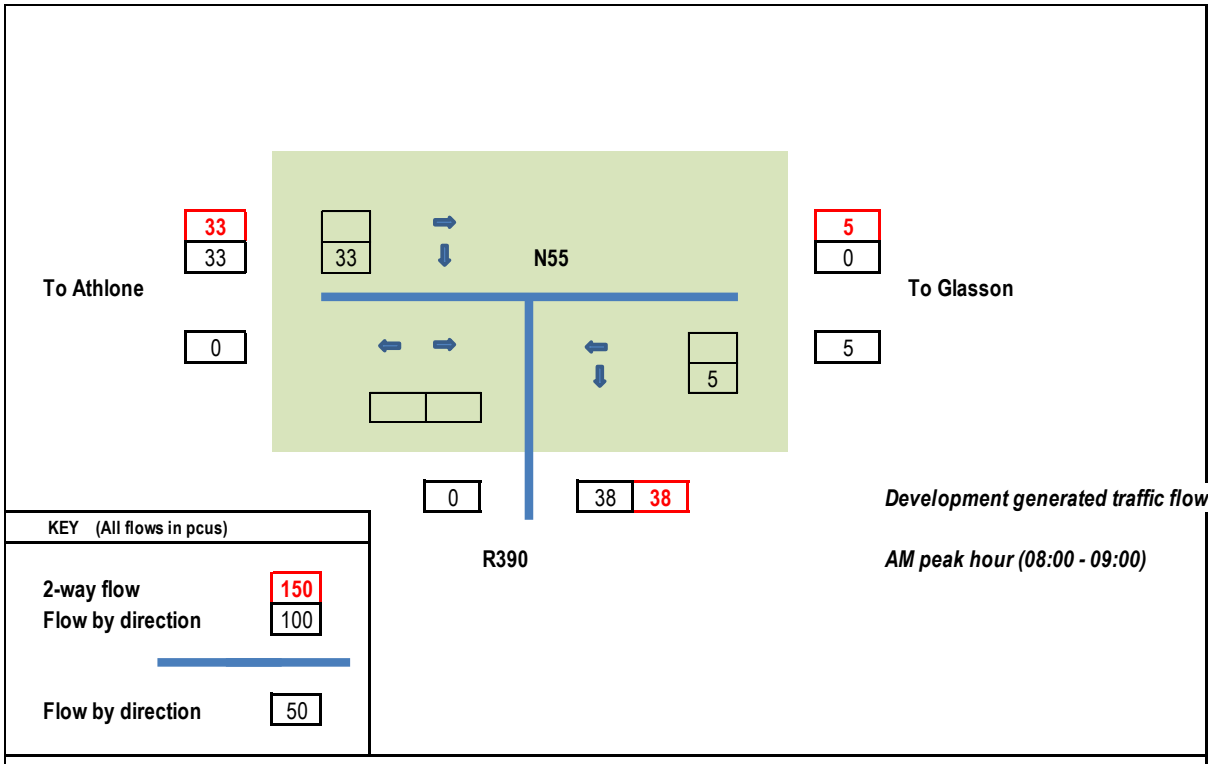
Figure 14.5b Background traffic flows, AM & PM peak hours, year 2028



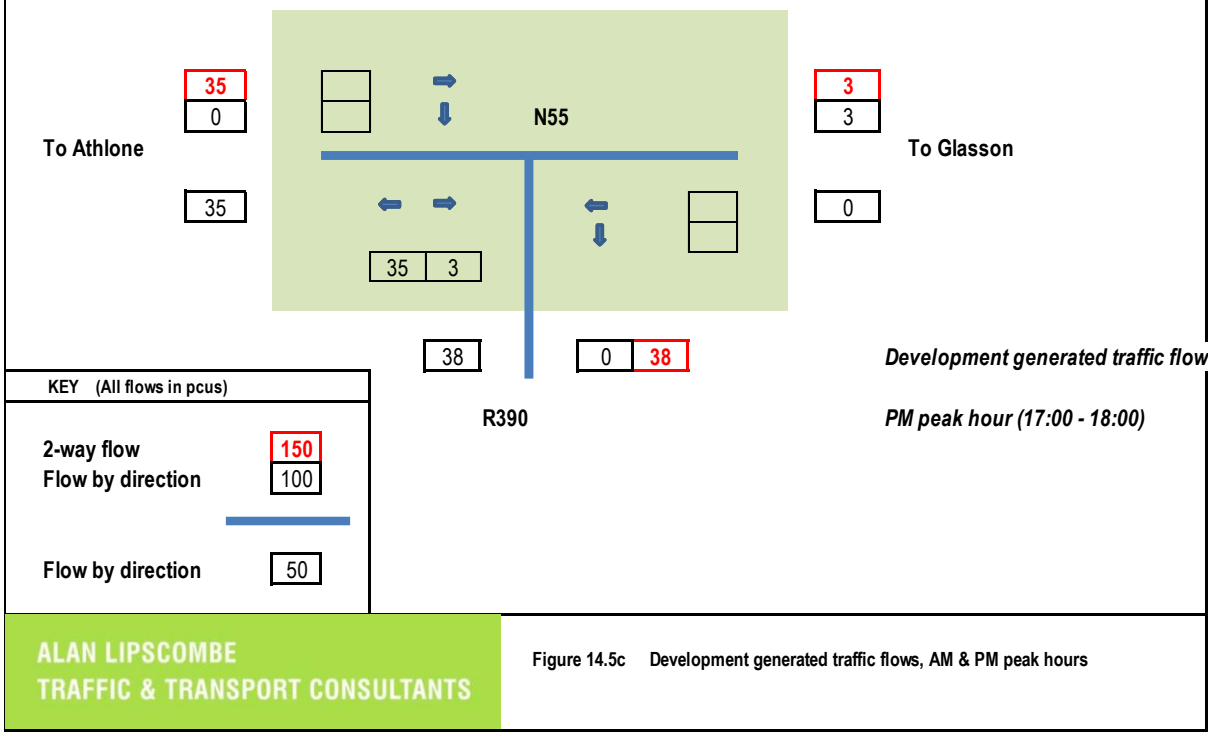


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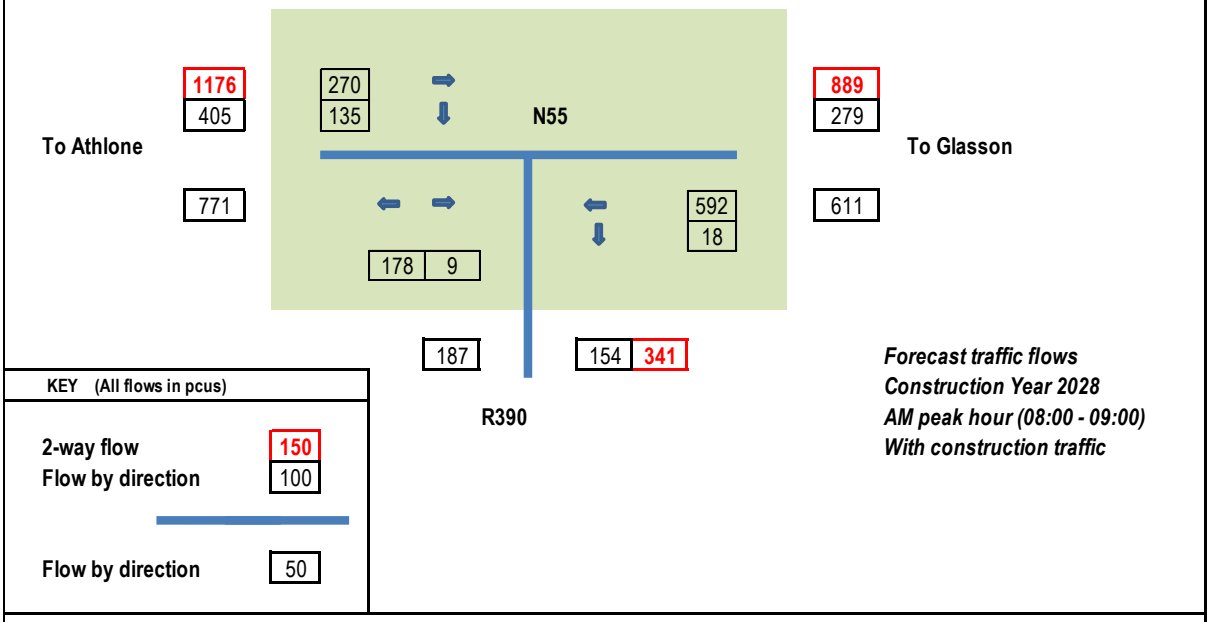
Figure 14.5c Development generated traffic flows, AM & PM peak hours



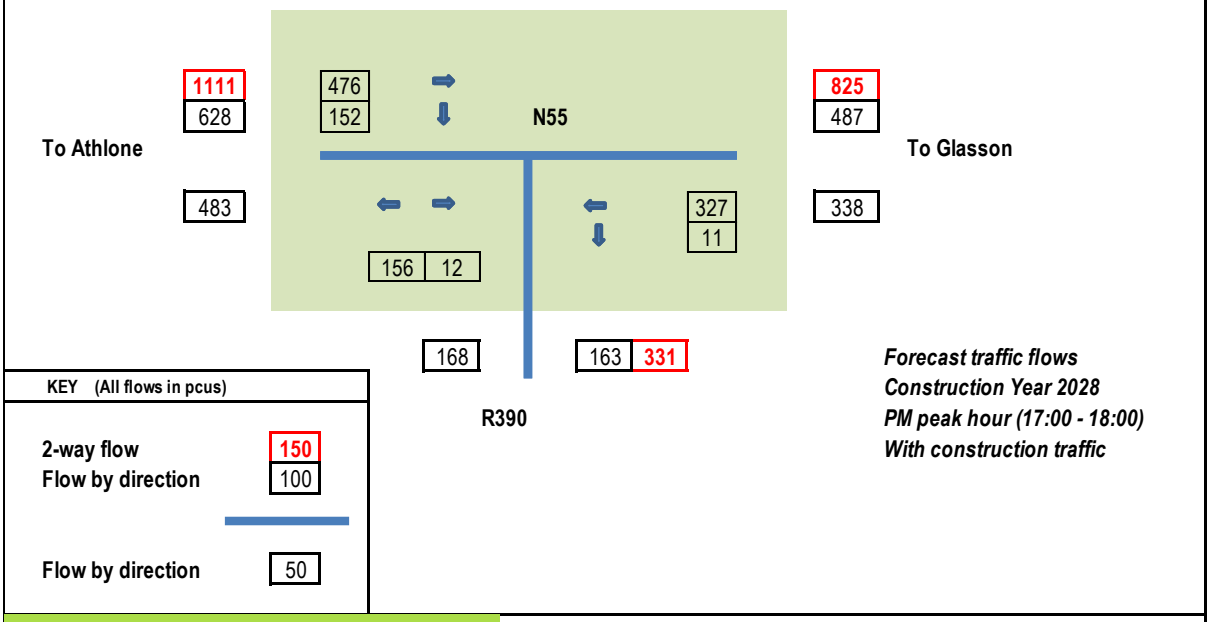


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Figure 14.5d With construction traffic flows, AM & PM peak hours, year 2028

14.1.7 Effect on Network of Grid Connection

A detailed description of the Grid Connection is provided in Section 4.3.2 of this EIAR. It is proposed that the 110kV onsite electrical substation in the townland of Umma More is connected by means of an underground 110kV electricity cable to the existing 110kV Thornsberry substation located in the townland of Derrynagall or Ballydaly, near Tullamore, Co. Offaly. The proposed underground electrical cabling route is approximately 31km in length and is located predominately within the public road corridor.

The proposed underground electrical cabling route is shown in Figure 14-6 and commences at the proposed onsite 110kV substation and runs south for 0.2km within the Wind Farm Site before meeting the local public road, L5336, in the townland of Umma More. The Grid Connection 110kV onsite substation and temporary construction compound are located within the Wind Farm Site and as such, have been considered in Section 14.1.6 above. The Grid Connection underground electrical cabling route located within the road corridor is addressed below.

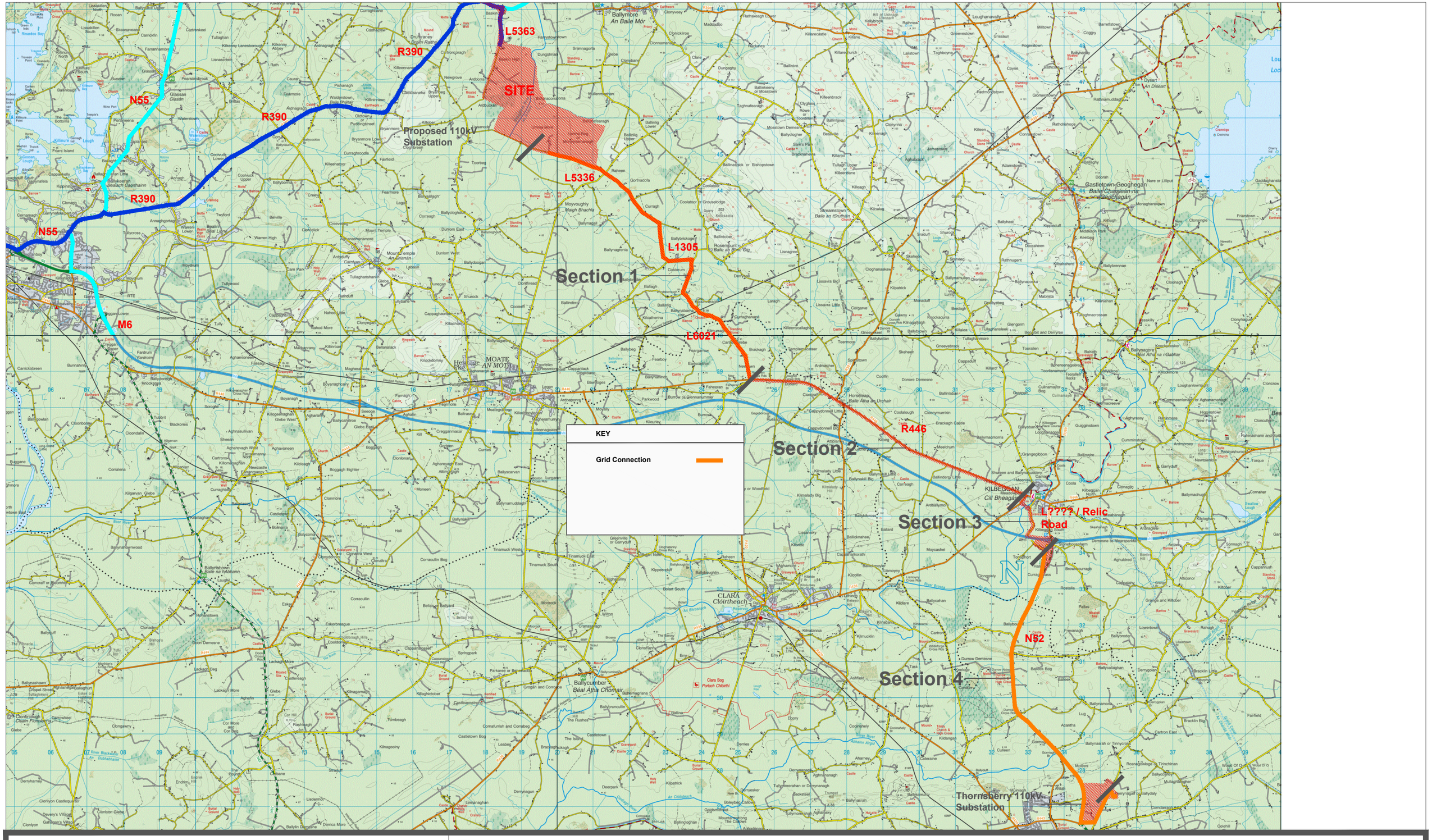
For the extent of the underground electrical cabling route that will impact on the public road network the Grid Connection is considered in the following 4 sections, as indicated in Figure 14-6;

Section 1 – (length 10.4 kms) – The underground electrical cabling route will continue south-east along local roads (L5336, L1305 and L6021) for approx. 10.4km before joining the R446, in the townland of Newtown. For this section of the underground electrical cabling route the carriageway widths of the local roads are narrow (3.0m to 5.0m) and local road closure at the location where the section of the underground electrical cabling route is being constructed will be required. Based on an average rate of 150m of cable being constructed in one day, it is estimated that this section of the underground electrical cabling route will take up to 70 days to complete. The location of the construction will be transient in nature with the extent of the section of road closed kept to a minimum. Local diversions will be put in place during the construction of this section with potential detour routes indicated in Figure 14-7.

Section 2 – (length 8.7 kms) – The underground electrical cabling route then continues east along the R446 for approximately 8.7m to a point where it meets the R436 in the west side of Kilbeggan. The carriageway width of this section of the R446 is typically a 2 way carriageway with hard shoulders (2 x 3.5m lanes, 2 x 2.5m hard shoulders). While there may be the potential to retain 2-way traffic flow during construction of this section of the underground cabling route, at a minimum one-way traffic flow by means of a “stop and go” arrangement will be retained. Construction of this section of the underground electrical cabling route will take approximately 58 days.

Section 3 – (length 2.5kms) – The underground electrical cabling route then travels down the R436 before heading southeast on the local road network to a point where it crosses under the M6 via an existing footpath that joins with the local road to the south of the motorway. From here the underground electrical cabling route heads south east along the local road network for approximately 1km before joining the N52 in the townland of Hallsfarm. While local access will be maintained for all properties on this section of the underground electrical cabling route it is likely that local road closures will be required at the point of construction. Construction of this section of the underground electrical cabling route will take approximately 17 days.

Section 4 – (length 9.7 kms) – The underground electrical cabling route then continues south along the N52 for approximately 8.3kms, turning left to head east at the Ardan roundabout north of Tullamore. The underground electrical cabling route continues east along a local road link road for approximately 0.4kms to join the L1024 Tinnycross Road. The route then heads north on the L1024 for approximately 1.0 kms before turning right to enter the 110kV Thornsberry substation property. The carriageway width along the N52 for this section of the underground electrical cabling route is typically 2 x 3.5m lanes with 2 x 1m hard shoulders and will therefore accommodate the construction of the underground electrical cabling route with 1 lane of traffic retained. A "stop and go" arrangement will be



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Base mapping provided by MKO

Figure 14-6 Grid Connection underground electrical cabling route

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	NTS
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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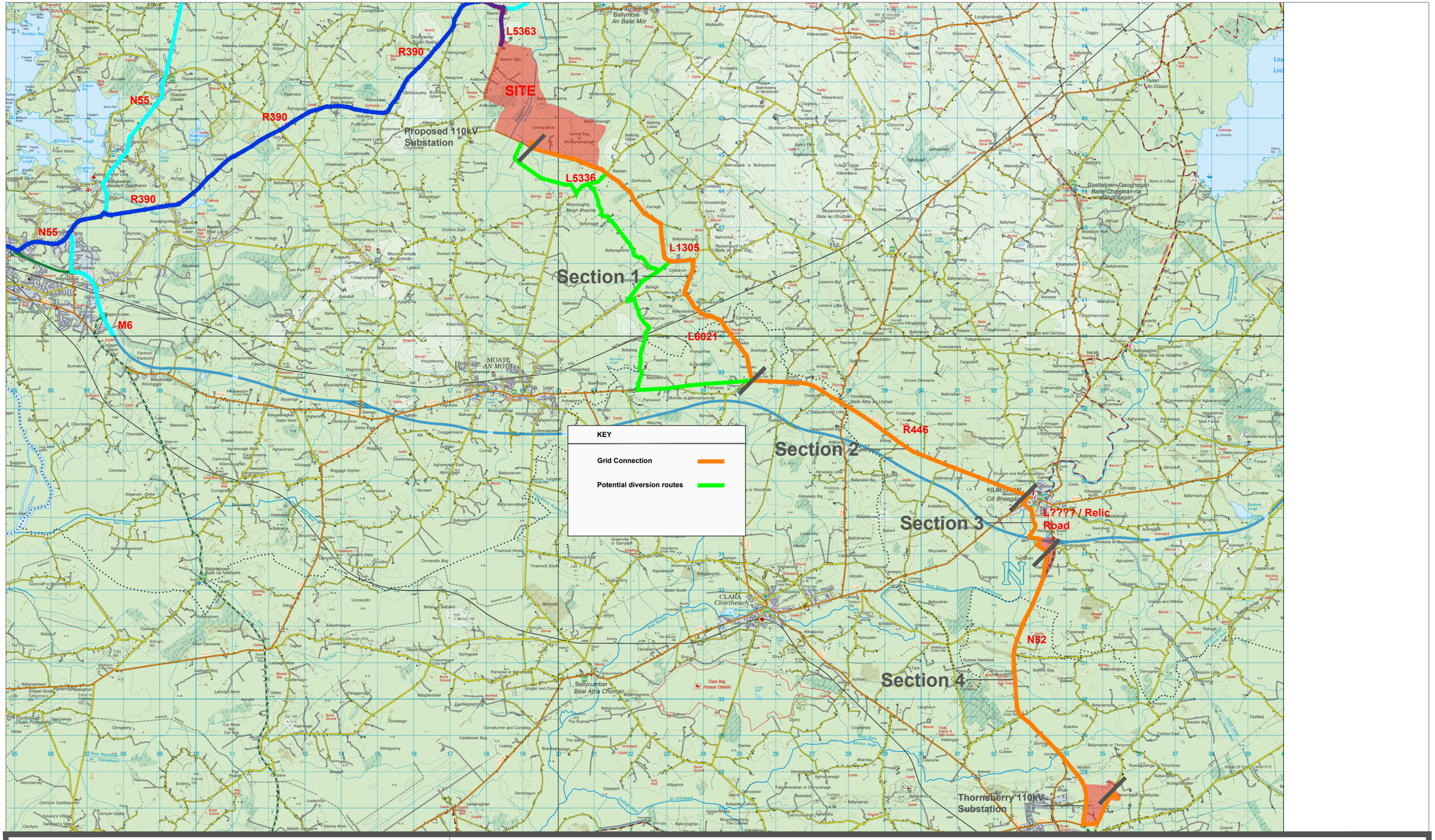

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Base mapping provided by MKO

Figure 14-7 Potential diversion routes for Section 1

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	NTS
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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operated in order to retain 2-way traffic flow at the section where construction is taking place. It is estimated that this section of the underground electrical cabling route will take 45 days to construct with the entire underground electrical cabling route taking a total of 190 days, or 9 months.

With respect to the traffic volumes that will be generated during the construction of the underground electrical cabling route, it is estimated that there will be approximately 14 daily return trips made by a truck transporting materials, and made by a minibus to transport construction staff which would hold approximately 10 staff, to and from the Site. By its nature the impacts of these additional trips on the network will be transient, and will therefore be temporary and slight.

The construction methodology of providing a Grid Connection underground electrical cabling route under and along local road networks is well established and accepted nationwide. There are in excess of 300 wind farms currently operational in Ireland and the majority of these are connected to the national grid via underground cable connections predominantly along the public road networks.

A detailed **Traffic Management Plan (TMP)**, incorporating all the mitigation measures set out in the CEMP included as Appendix 4-2 of this EIAR, will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the roads authority and An Garda Síochána prior to construction works commencing on Site. Illustrations for the traffic arrangements and diversion routes identified for the Grid Connection works are included in Appendix 14-2: Grid Connection Traffic Arrangements and Diversion Routes, and identifies sections along the Grid Connection underground electrical cabling route where there will be road and pedestrian footpath closures, diverted traffic, and Stop/Go or traffic lights.

14.1.8 Traffic Management of Large Deliveries

Traffic management measures are included in Section 14.1.10.6 and include the following:

- Identification of a delivery schedule,
- Details of the alterations required to the infrastructure identified in this report and any other minor alteration identified (hedgerows etc),
- A dry run of the route using vehicles with similar dimensions.

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

In some cases, minor accommodation works are required along the turbine delivery route such as hedge or tree cutting, temporary relocation of powerlines/poles, lampposts, signage and local road widening. Any upgrades to the public road network will be carried out in advance of turbine deliveries and following consultation and agreement with the relevant authorities, if required. It is not anticipated that any sections of the local road network will be closed

Refer also to the Construction and Environmental Management Plan (CEMP), Appendix 4-2 of this EIAR, for the Traffic Management Plan.

14.1.9 Abnormal Load Route Assessment

A route assessment was undertaken covering the proposed turbine delivery route, with the route and assessment locations shown in Figure 14-2a.

The route assessment discussed in this section includes all locations on the proposed turbine delivery route from the Port of Galway in Galway City, as shown in Figure 14-2b, to the proposed Wind Farm Site access junction on the local L5353 Road, as shown in Figure 14-2a.

A swept path analysis was then undertaken using Autotrack in order to establish the locations where the wind turbine transporter vehicles will be accommodated, and the locations where some form of remedial measure may be required.

It is noted that a dry run involving a vehicle adapted to replicate the geometry of the extended transport vehicles will be undertaken over the entire turbine delivery route prior to the construction stage of the Proposed Development.

Locations in Galway City

A swept path analysis was also undertaken for the section of the turbine delivery route in Galway City between the Galway Harbour and the N6 national route. The locations included are shown in Figure 14-2b and are as follows;

- Galway City Location 1 – R339 signalised junction at Thermo King,
- Galway City Location 2 – R336 Tuam Road junction at Trappers Inn, and,
- N17 / N6 Bothar na dTreabh junction.

A swept path analysis was undertaken using Autotrack for the blade and tower transporter vehicles, as shown in Figures 14-8 to 14-13. The figures show that while traffic lights and street furniture will require to be removed during the delivery of the large plant, the assessment indicates that the large turbine delivery vehicles will be accommodated at these locations.

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Base mapping provided by MKO

Figure 14-8 Galway City Location 1 - R339 signalised junction (Thermo King), blade extended artic (81.0m blade)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:2000
PROJECT NO:	9290	DATE: 08.02.23	DRAWN BY: AL

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Figure 14-9 Galway City Location 1 - R339 signalised junction (Thermo King), tower extended artic

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO:	9290	DATE: 08.02.23	DRAWN BY: AL

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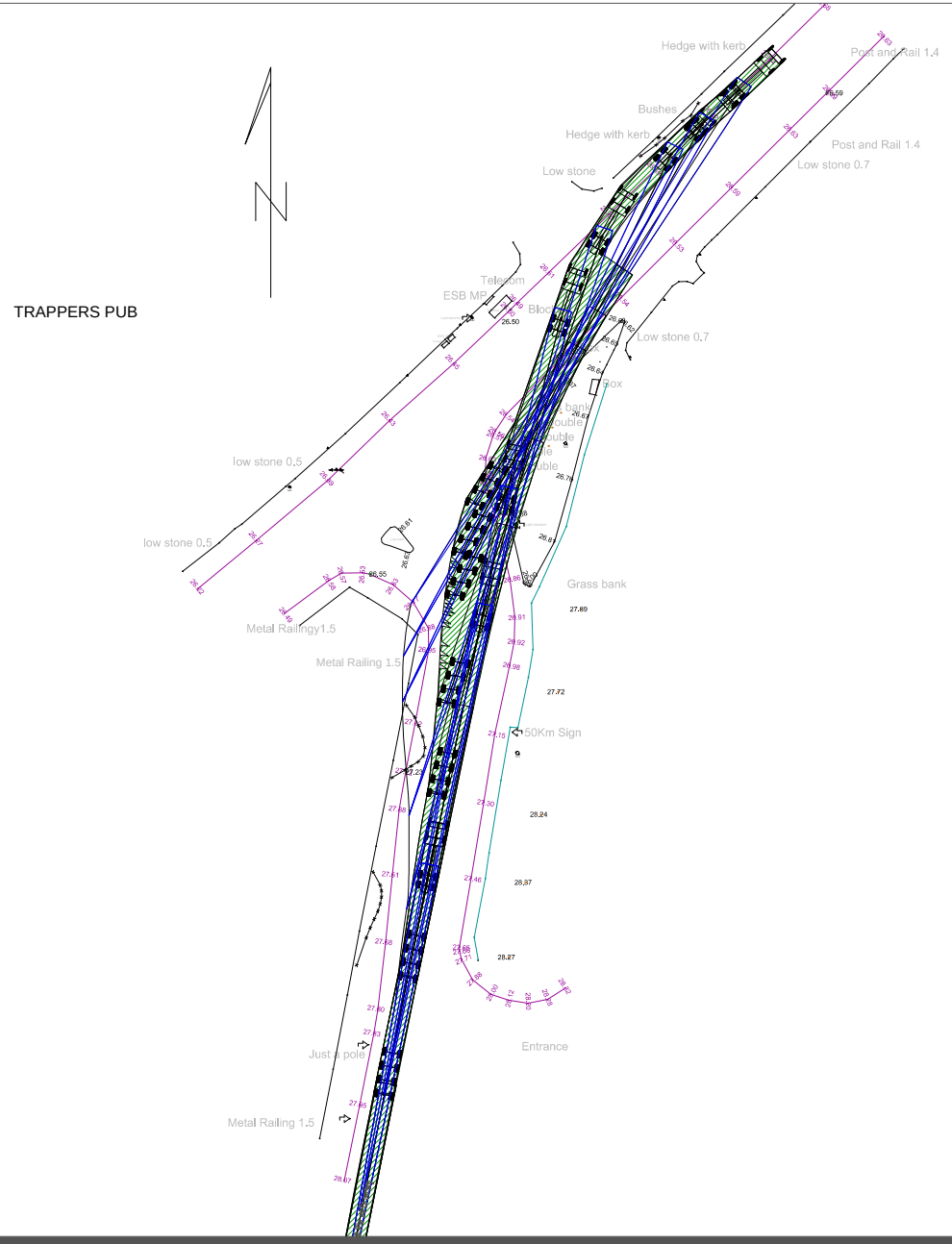

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Base mapping provided by MKO

Figure 14-10 Galway City Location 2 - R336 Tuam Road junction (Trappers Inn), blade extended artic (81.0m blade)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:2000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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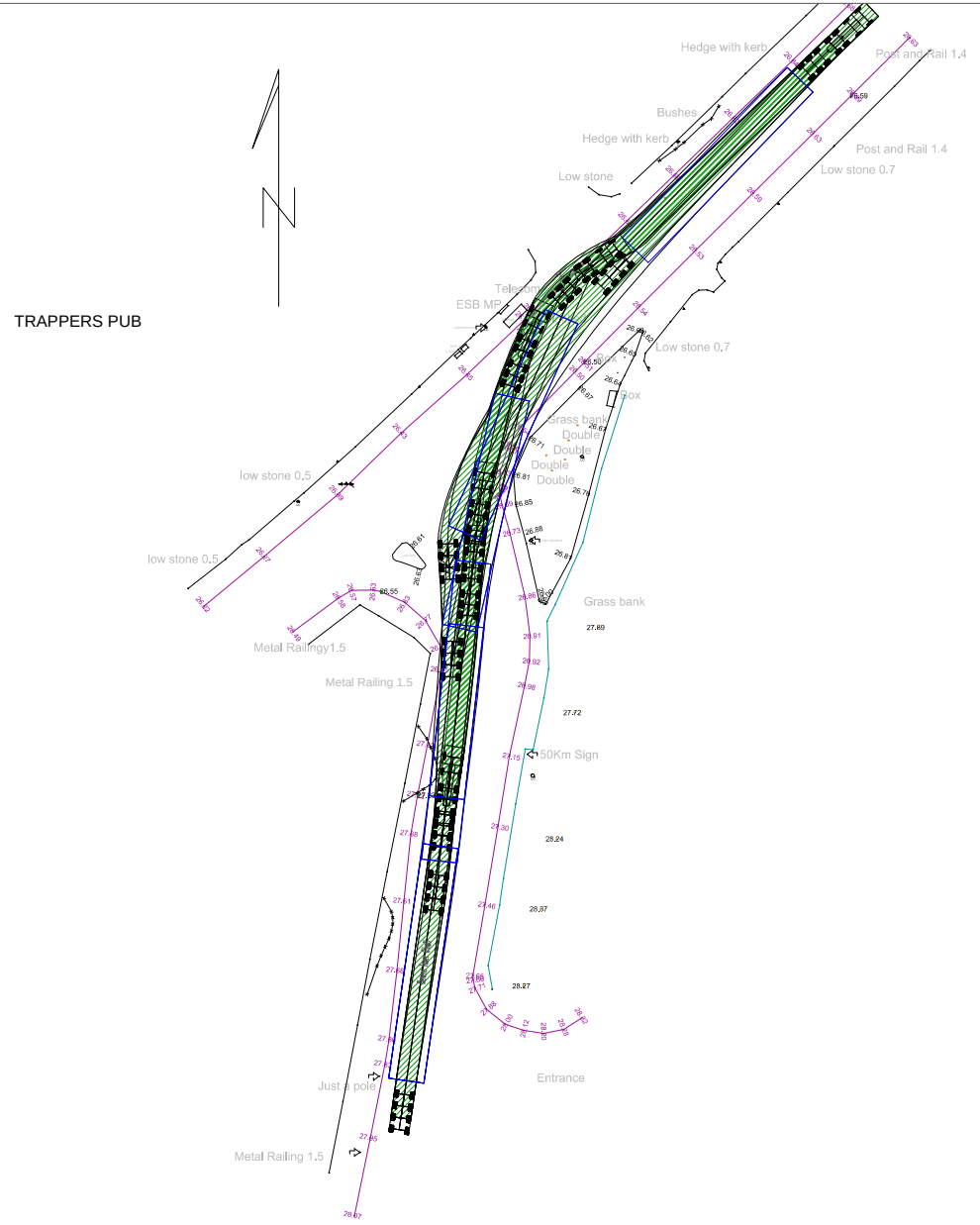

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Base mapping provided by MKO

Figure 14-11 Galway City Location 2 - R336 Tuam Road junction (Trappers Inn), tower extended artic

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO:	9290	DATE: 08.02.23	DRAWN BY: AL

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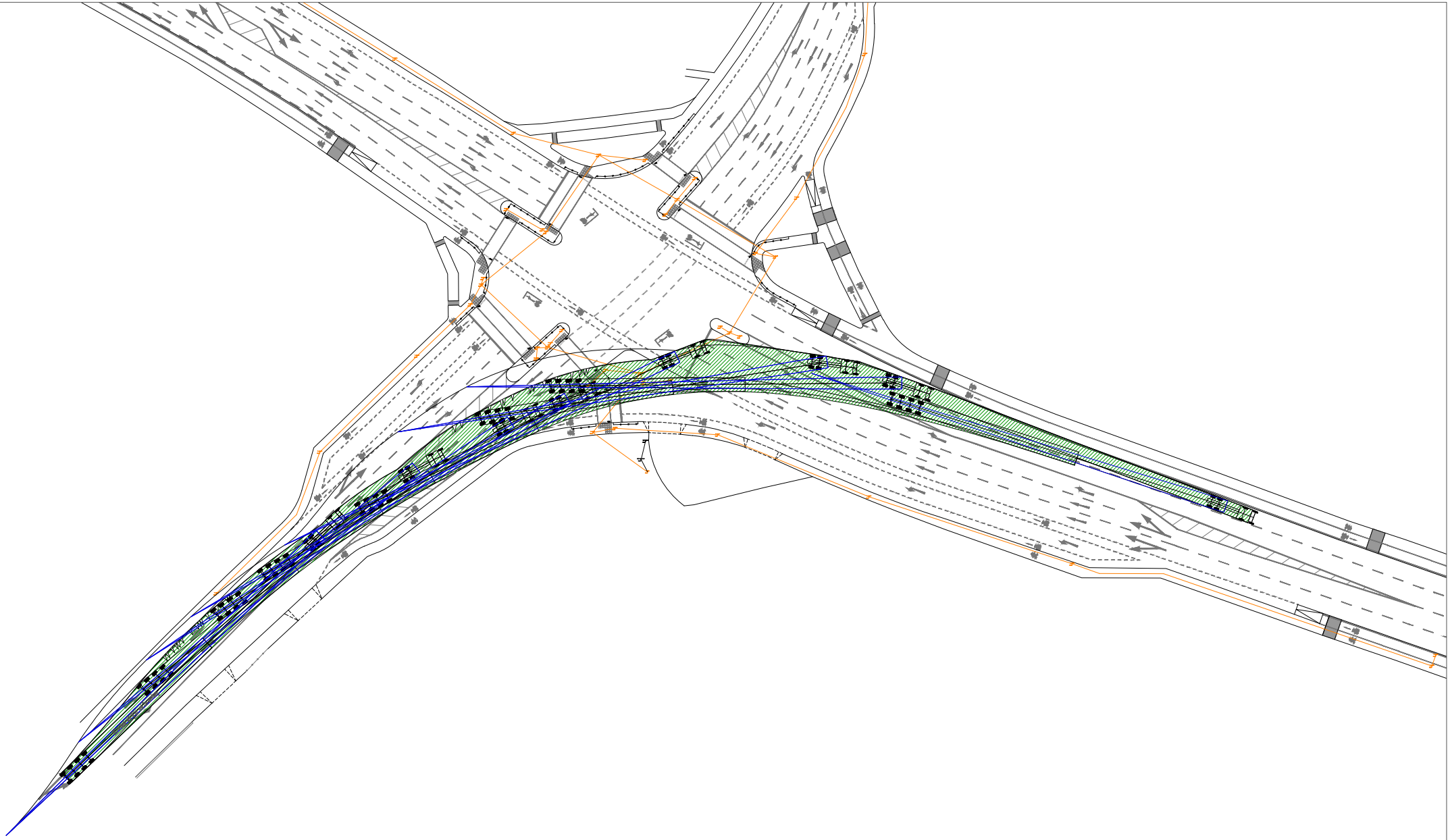

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Base mapping provided by MKO

Figure 14-12 Galway City Location 3 - N17 / N6 Bothar na dTreabh junction, blade extended artic (81.0m blade)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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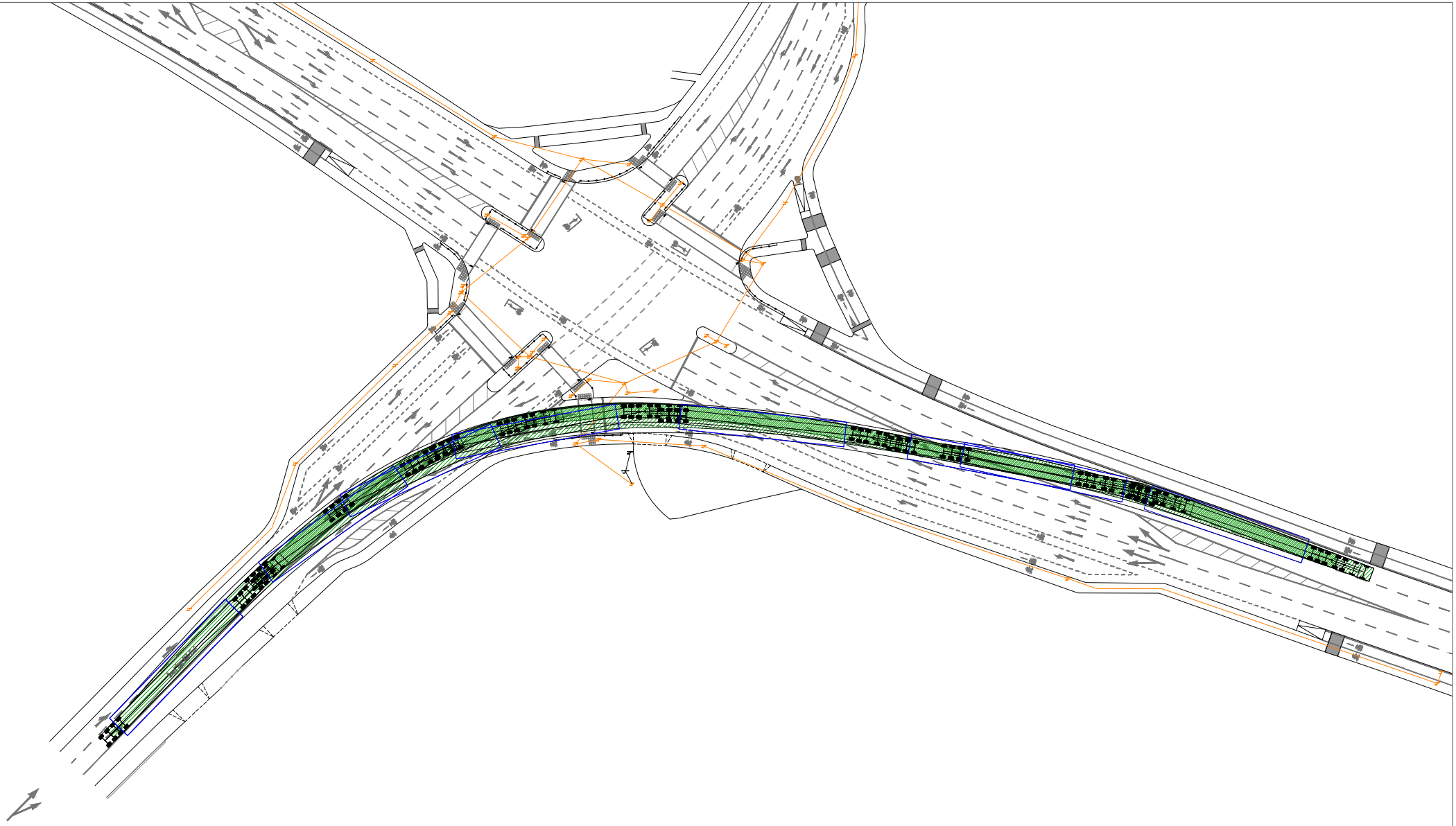

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Base mapping provided by MKO

Figure 14-13 Galway City Location 3 - N17 / N6 Bothar na dTreabh junction, tower extended artic

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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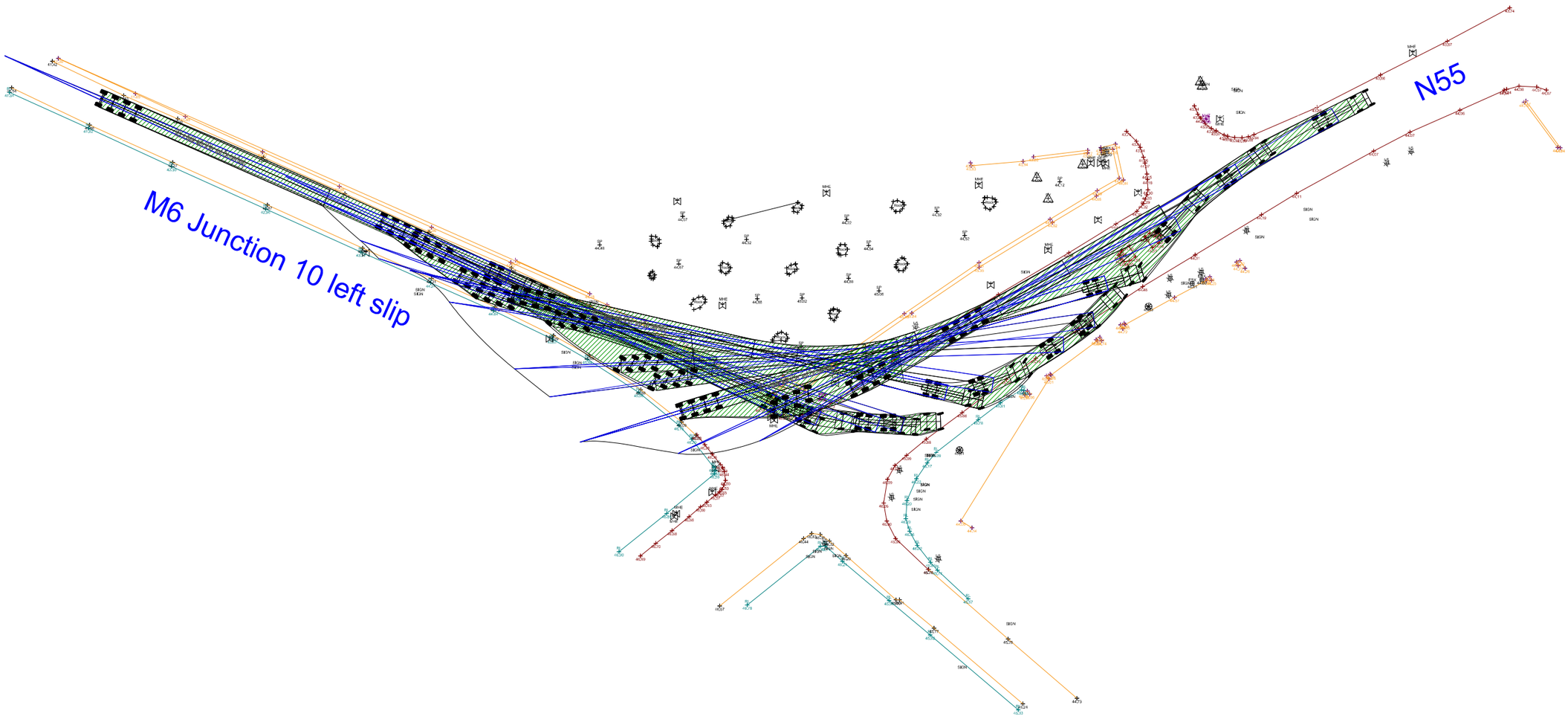
Location 1 – M6 junction 10 left slip / N55 junction in Athlone

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 14-14 and 14-15 respectively. In addition to the relatively tight geometry at this location an additional constraint is presented by a line of mature trees that runs along the southern side of the M6 Slip Road. For this purpose it is proposed that the blade is transported using a blade lifter system which may be used to lift the rear of the blade clear of obstacles up to a height of 11m. The swept path shown in Figure 14-6 is based on this method of transportation. The figure shows that while the geometry is relatively tight, the assessment indicates that the blade transporter will be accommodated at this location. In addition Figure 14-15 shows that the tower transporter will be comfortably accommodated.



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Base mapping provided by MKO

Figure 14-14 Location 1 - M6 junction 10 left slip / N55 junction in Athlone, blade extended artic (81.0m bladelifter)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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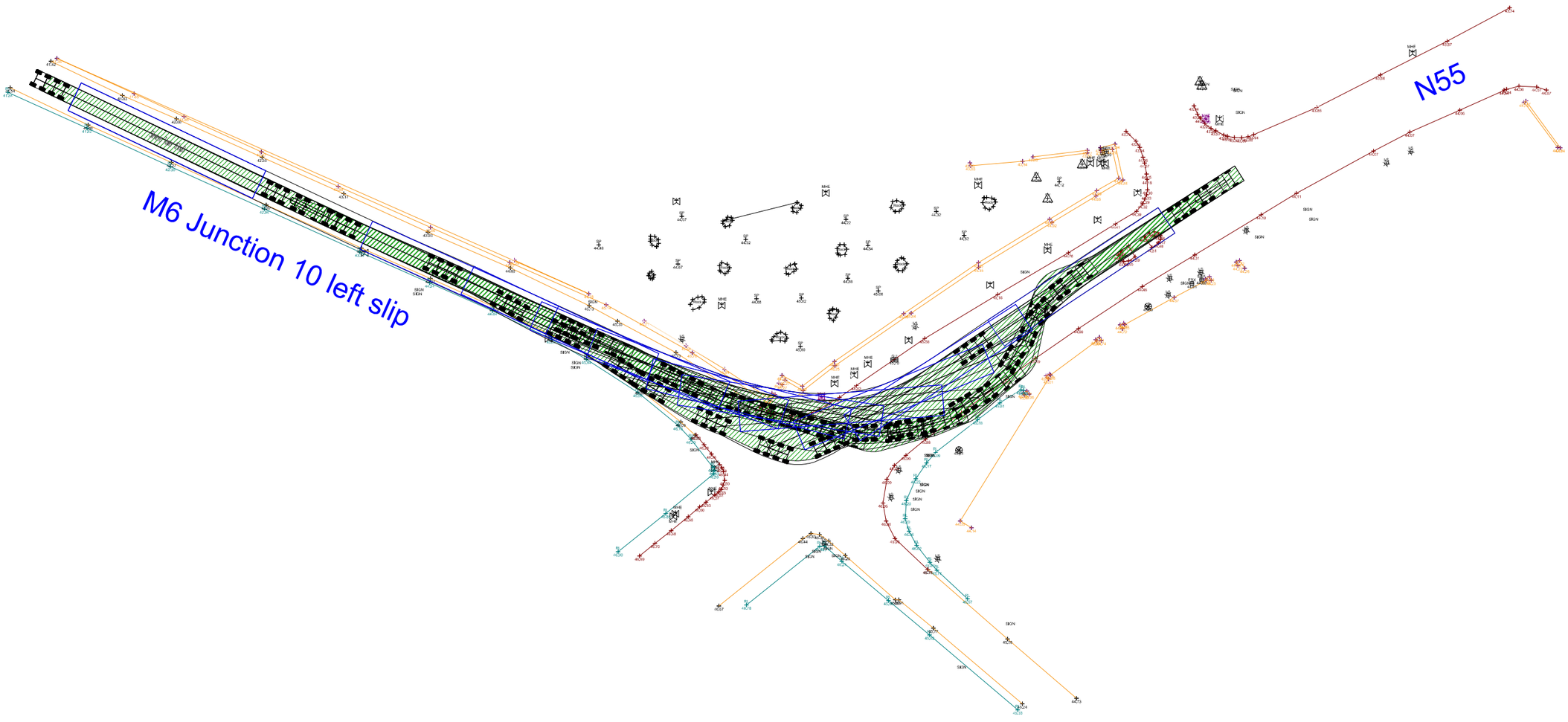

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Base mapping provided by MKO

Figure 14-15 Location 1 - M6 junction 10 left slip / N55 junction in Athlone, tower extended artic

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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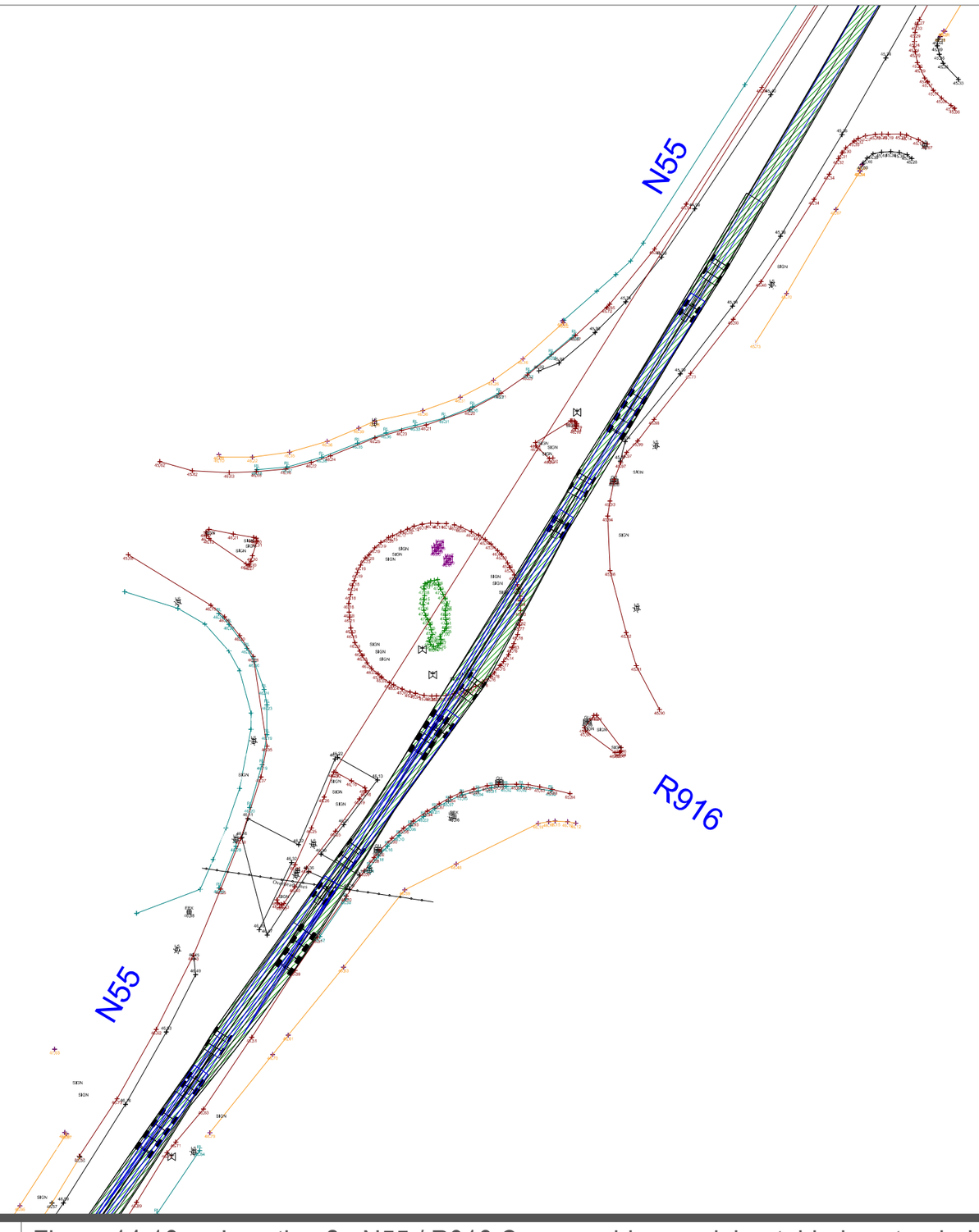
Location 2 – N55 / R916 Cornamaddy Roundabout

Figures 14-16 and 14-17 show that the blade and tower delivery vehicles will be accommodated with a temporary modification to the centre island of the roundabout to provide a temporary over–run area.



NOTES:

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Base mapping provided by MKO

Figure 14-16 Location 2 - N55 / R916 Cornamaddy roundabout, blade extended artic (81.0m blade)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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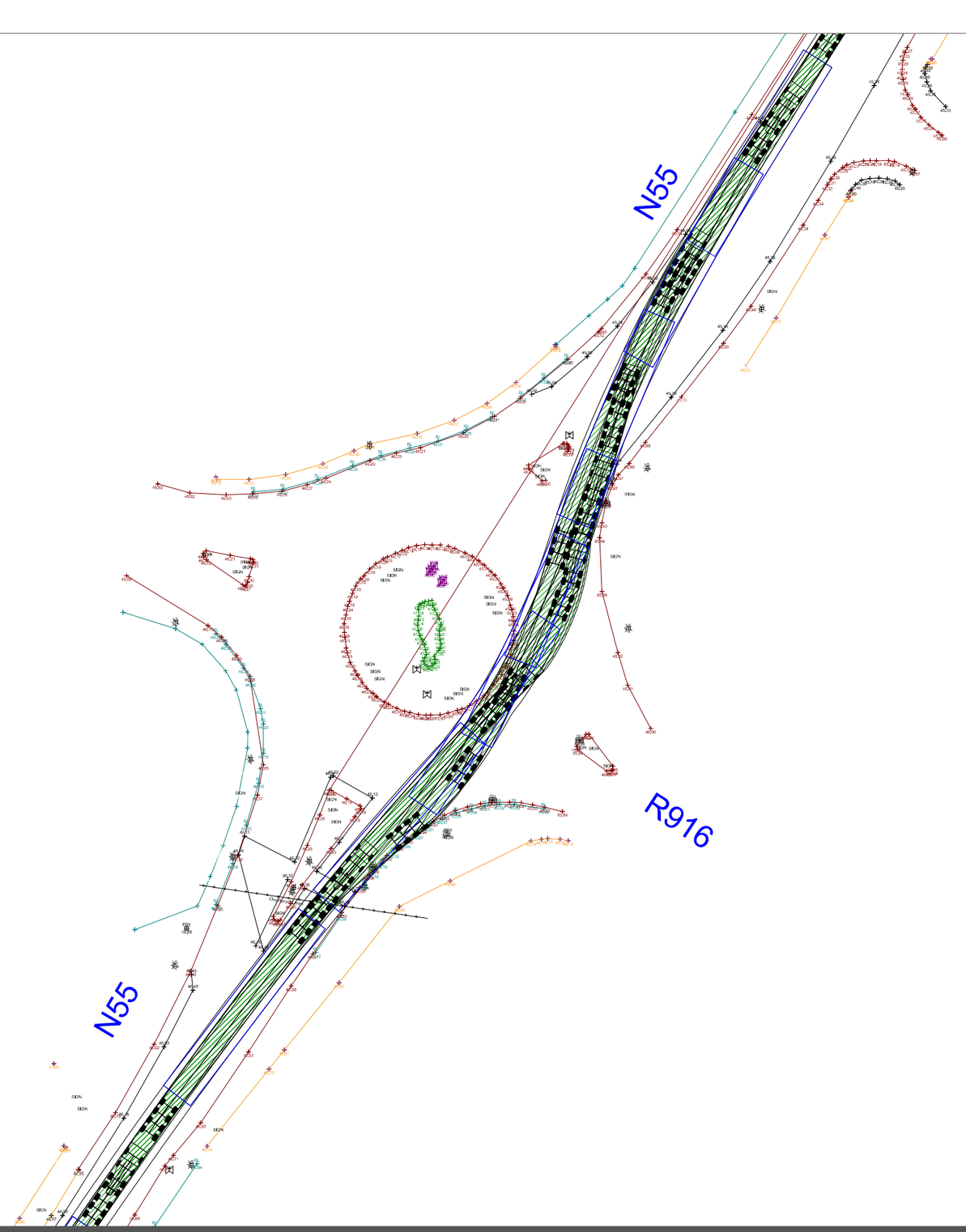

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Base mapping provided by MKO

Figure 14-17 Location 2 - N55 / R916 Cornamaddy roundabout, tower extended artic

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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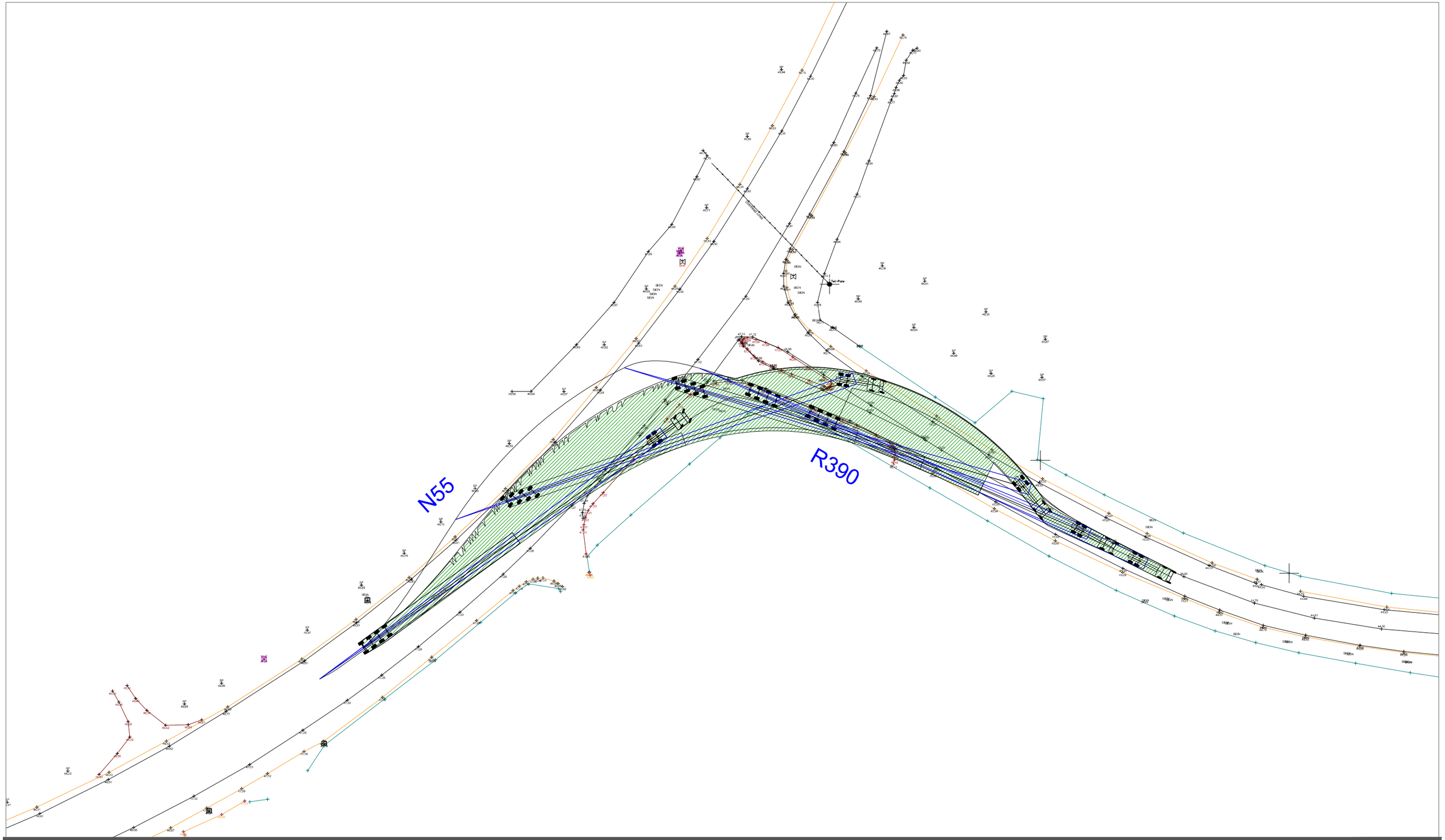
Location 3 – N55 / R390 junction

The swept path analysis undertaken for the blade transporter negotiating this location is shown in Figure 14-18. The figure shows that the optimum path through this junction will require the blade to oversail the western carriageway edge of the N55 with the blade tip remaining within the curtilage of the public road. In addition the figure shows that the body of the blade will require to slightly overhang the southern corner of the junction.

Figure 14-19 shows that the tower transporter will be accommodated at this location.



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Base mapping provided by MKO

Figure 14-18 Location 3 - N55 / R390 junction in Athlone, blade extended artic (81.0m blade)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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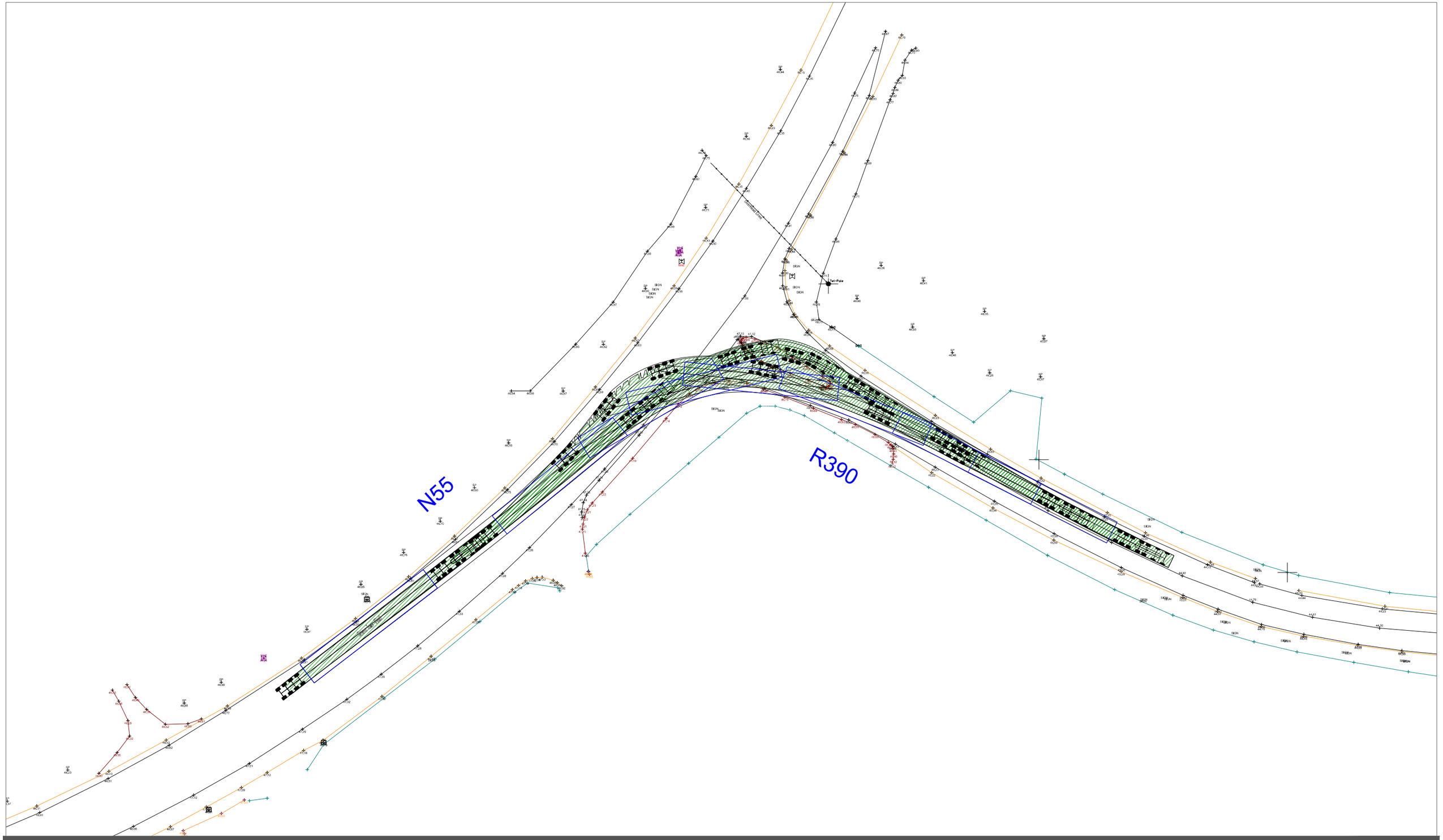

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Base mapping provided by MKO

Figure 14-19 Location 3 - N55 / R390 junction in Athlone, tower extended artic

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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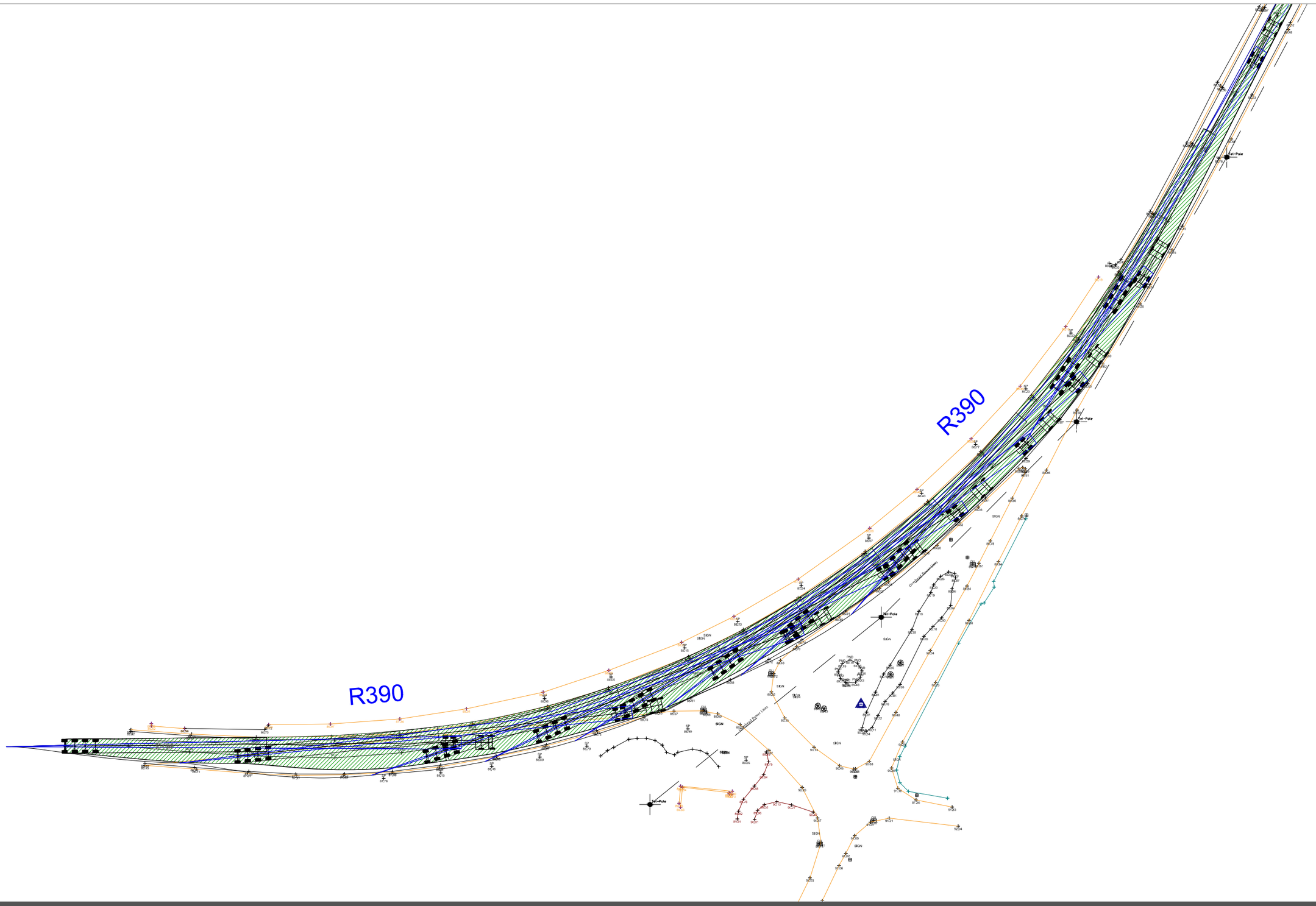
Location 4 – Bend on R390 at Coolteen

Figures 14-20 and 14-21 show that the blade and tower transport vehicles will be accommodated at this location.

Location 5 – Bends on R390 at Beachlawn

Figures 14-22 and 14-23 show that the blade and tower transport vehicles will be accommodated through these bends on the R390.



NOTES:

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Base mapping provided by MKO

Figure 14-20 Location 4 - Bend on R390 at Coolteen, blade extended artic (81.0m blade)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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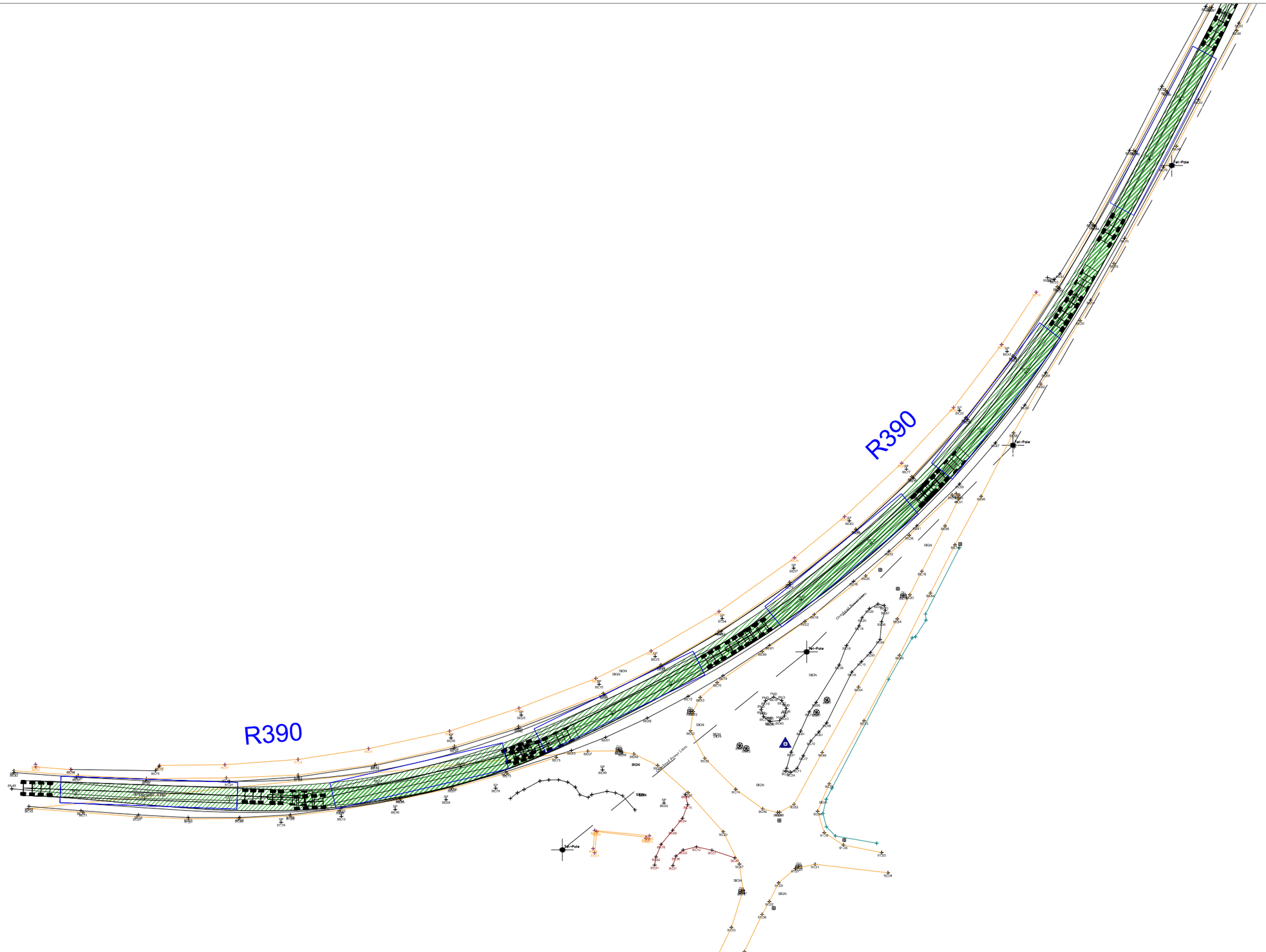

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Base mapping provided by MKO

Figure 14-21 Location 4 - Bend on R390 at Coolteen, tower extended artic

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

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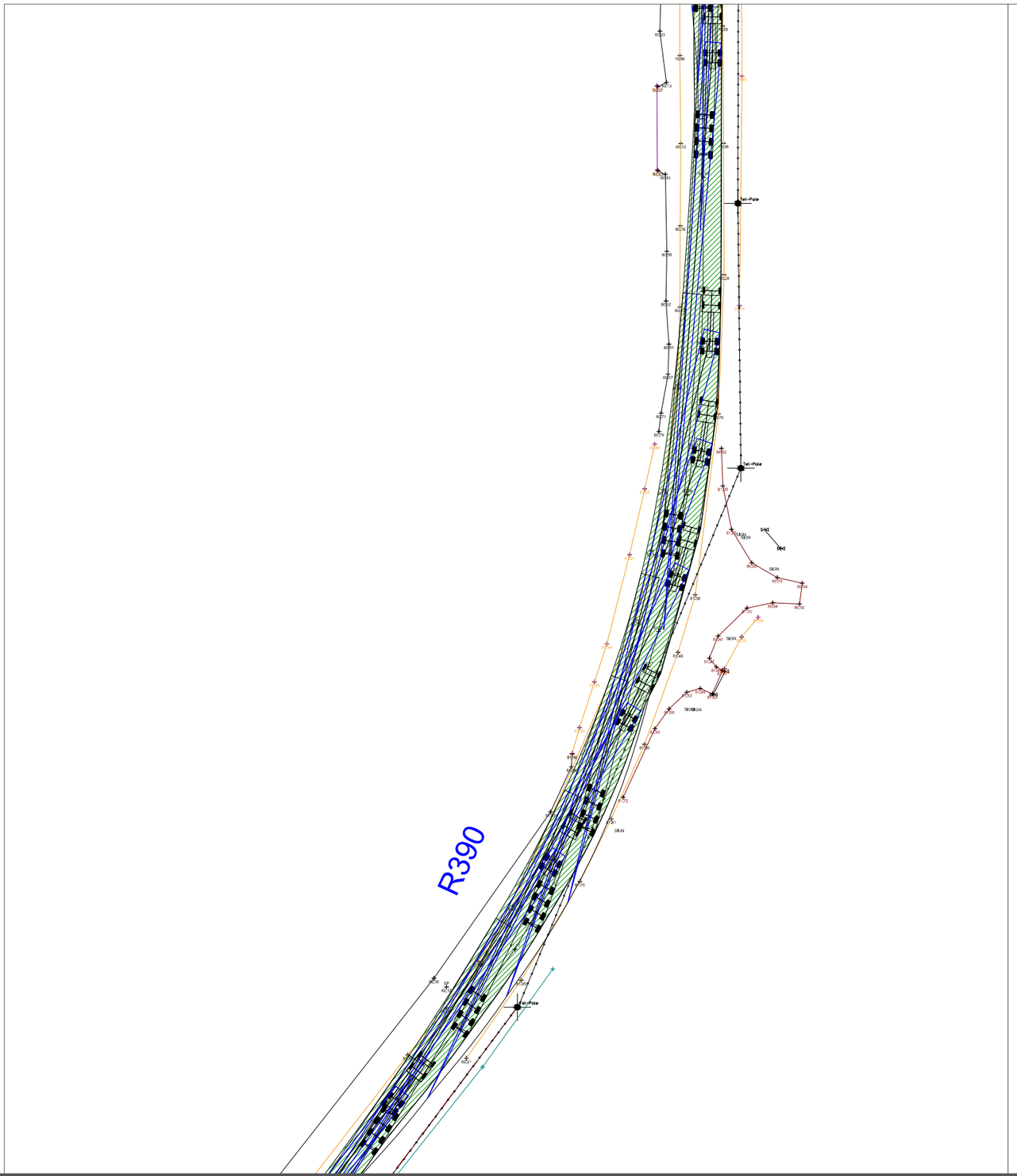
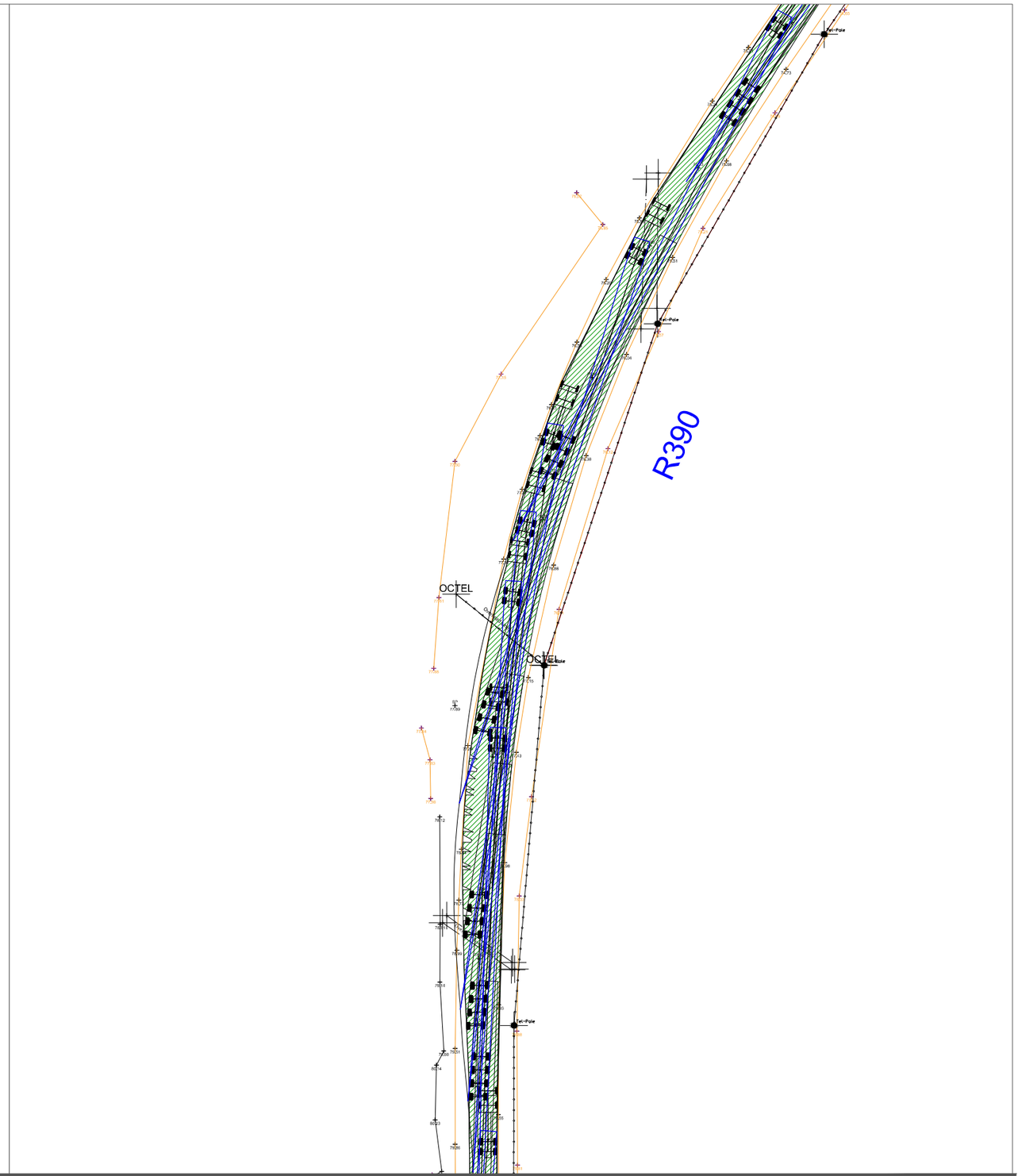




NOTES:

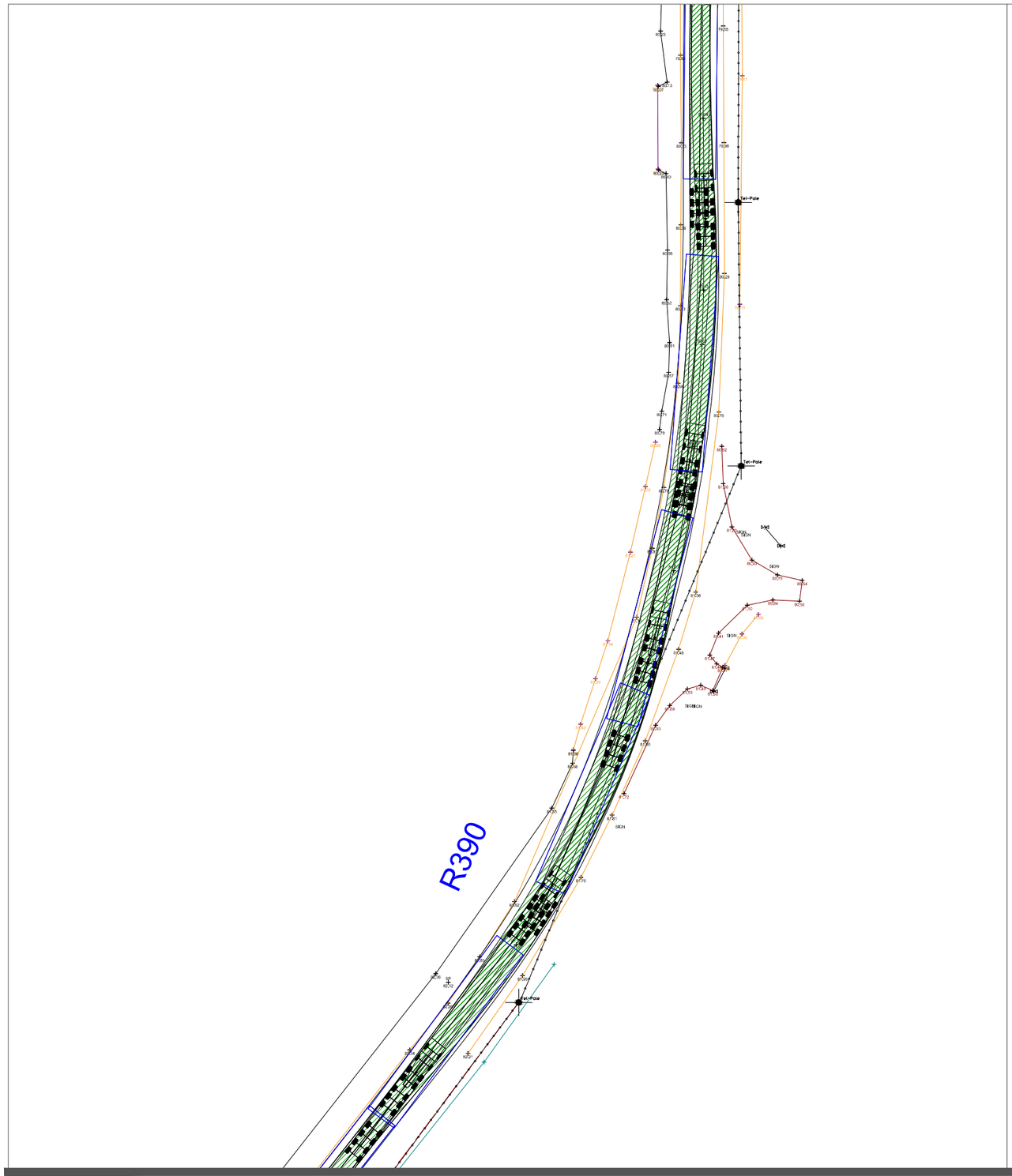
PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

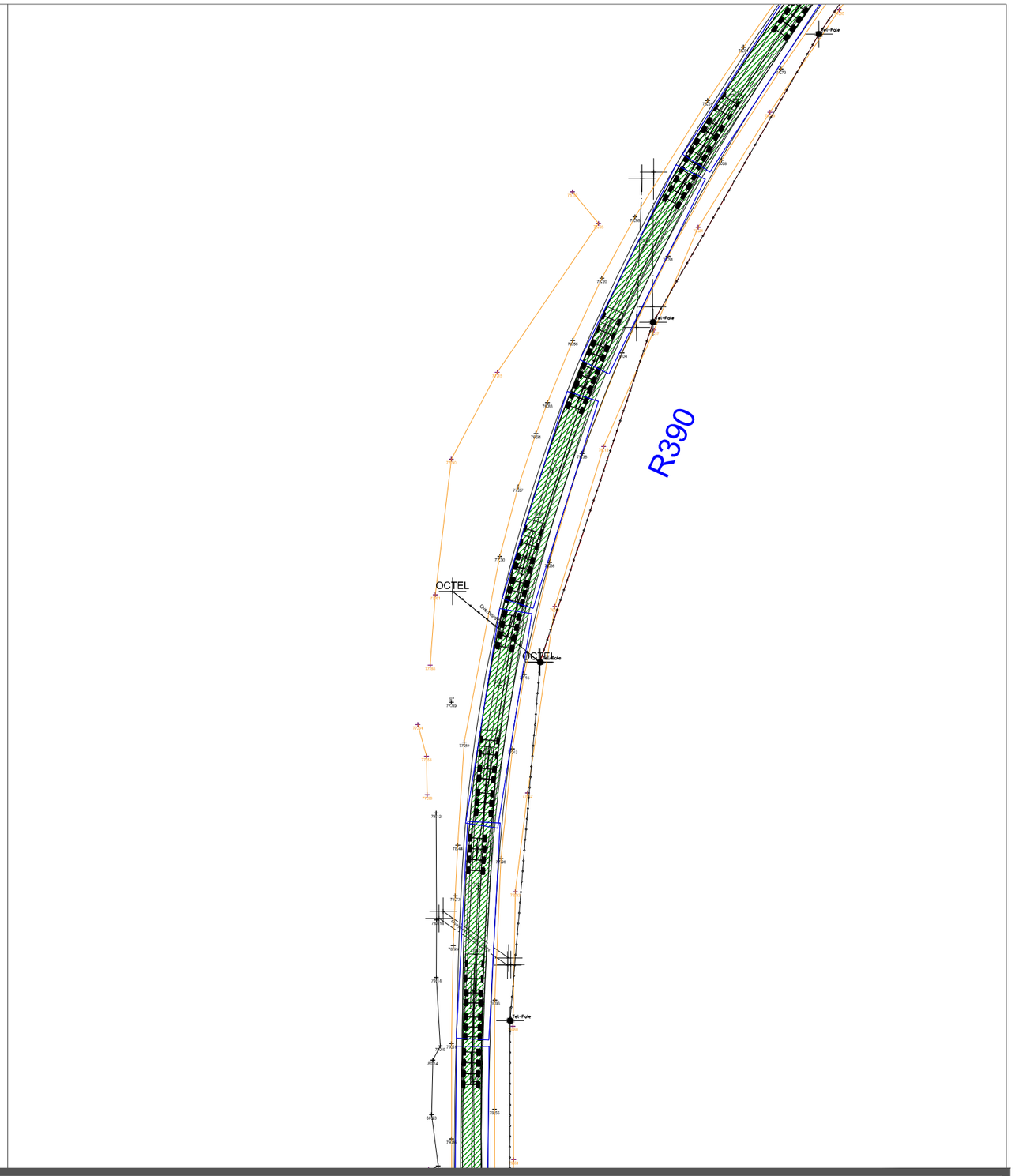
Base mapping provided by MKO

Figure 14-22 Location 5 - Bends on R390 at Beachlawn, blade extended artic (81.0m blade)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd		SCALE: 1:1000
PROJECT NO: 9290	DATE: 08.02.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS





NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

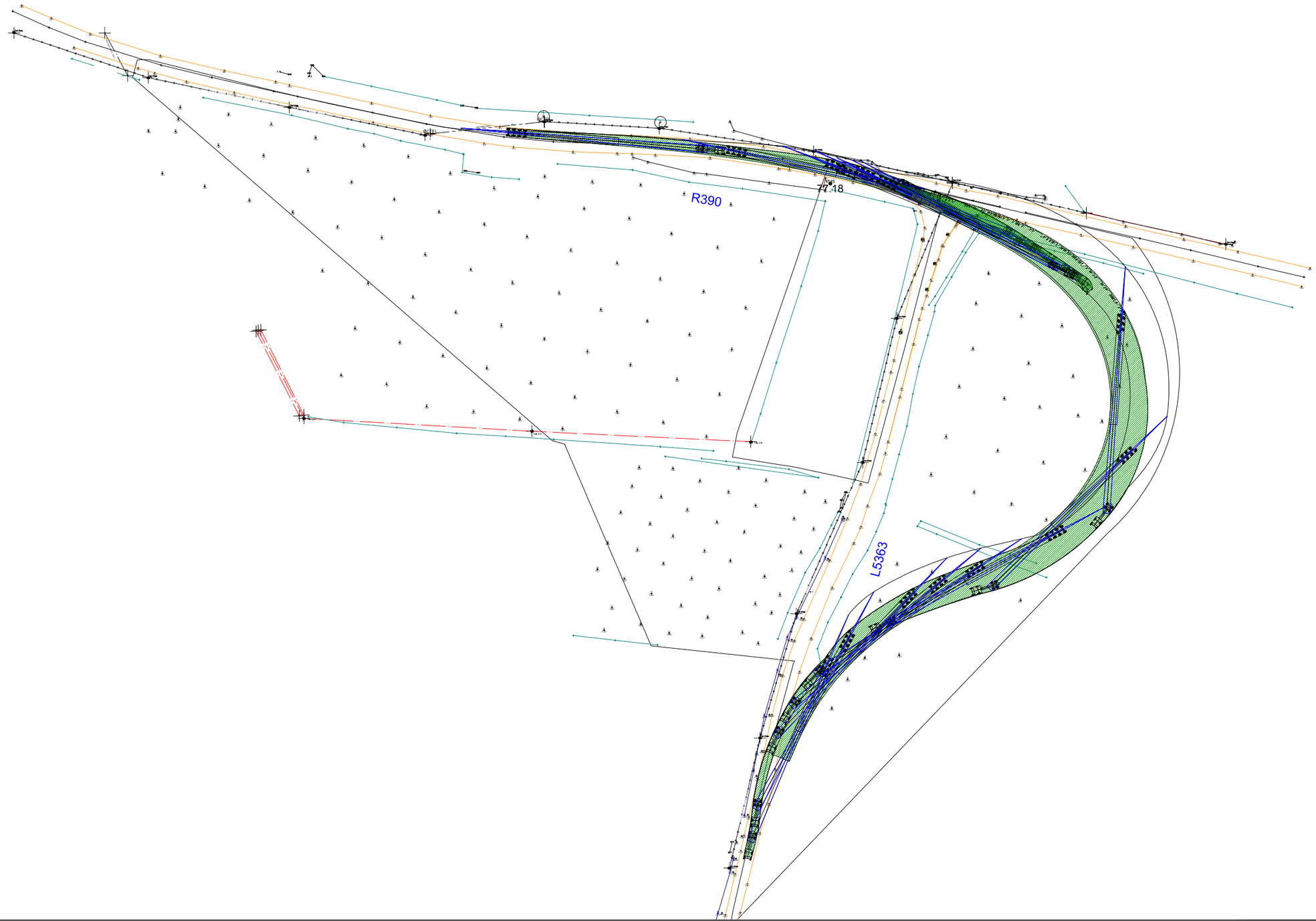
Figure 14-23 Location 5 - Bends on R390 at Beachlawn, tower extended artic

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Location 6 – R390 / L5363 junction

The swept path analysis for the blade and tower transport vehicles are shown in Figures 14-24 and 14-25. The swept path analysis indicates that a temporary one-way road will be required at this junction in order to accommodate the wind turbine vehicles. The figures show that it is proposed to utilise the field to the east of the L5363 for the large transport vehicles to negotiate this location It is noted that the standard road markings and visibility splays are not required at the access off the R390, or the exit onto the L5363, as the temporary access road will only be used for the transportation of abnormally sized loads, which will be delivered with a Garda escort and transient traffic management vehicles operated by the haulage company. This road will not be available for any other traffic and will be closed off and opened only for the delivery of the abnormally sized loads.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 14-24 Location 6 - R390 / L5363 junction, blade extended artic (81.0m blade)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd		SCALE: 1:2000
PROJECT NO: 9290	DATE: 08.02.23		DRAWN BY: AL

ALAN LIPSCOMBE
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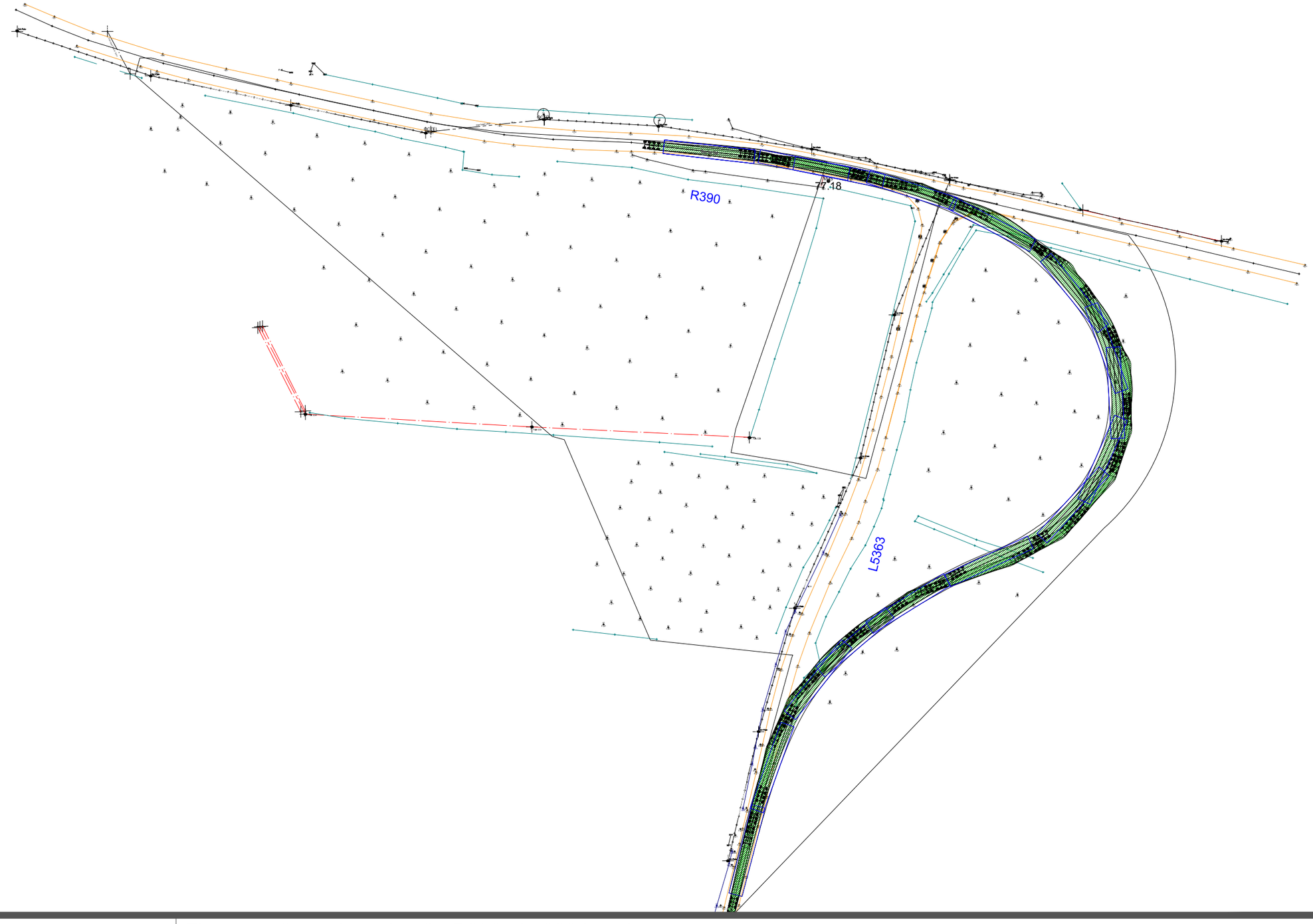


NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 14-25 Location 6 - R390 / L5363 junction, tower

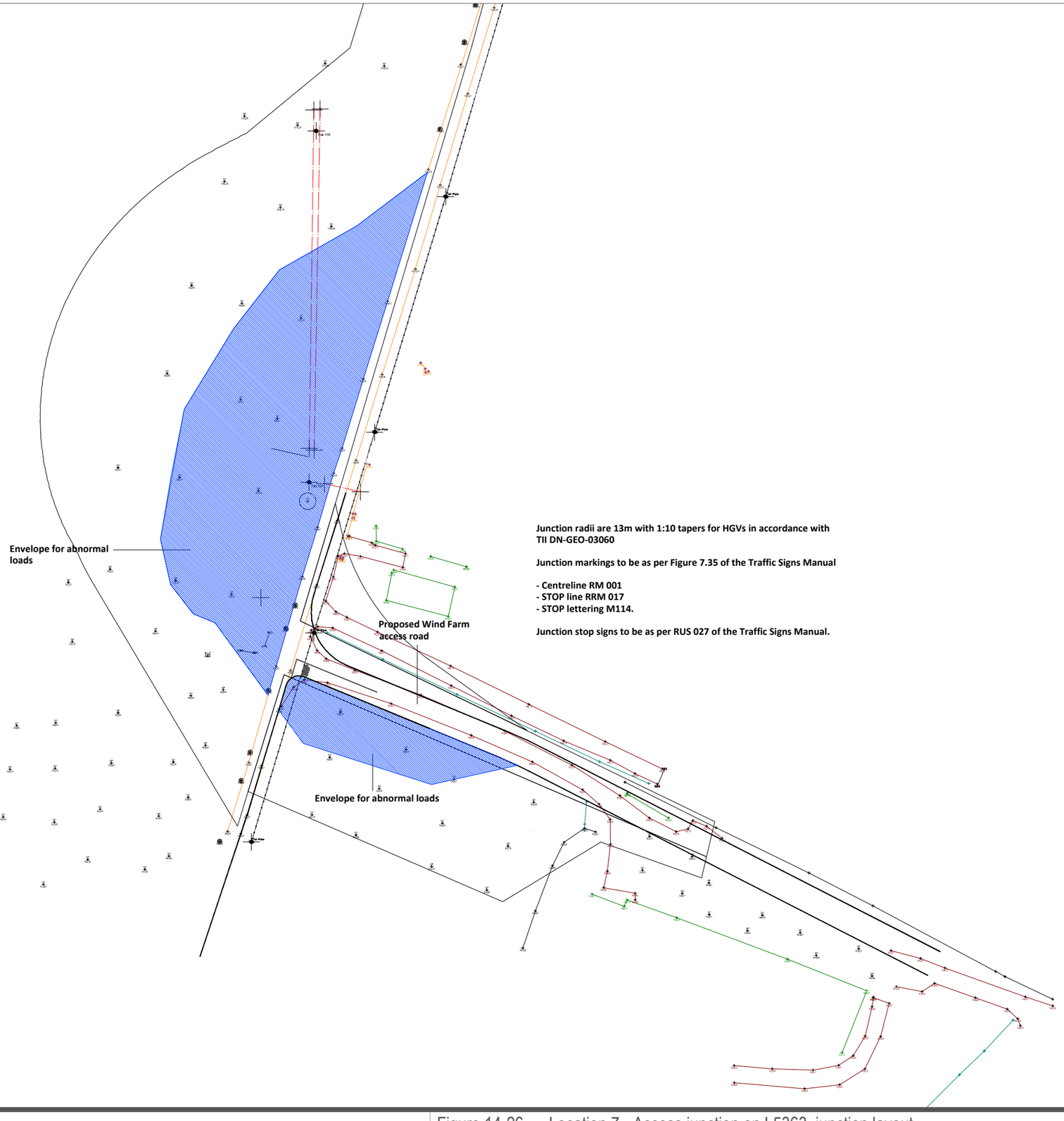
PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd		SCALE: 1:2000
PROJECT NO: 9290	DATE: 08.02.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Location 7 – Access junction on the L5363

The proposed access junction layout and visibility splays are shown in Figures 14-26 and 14-27 respectively. Visibility splays of 90m x 2.4m are provided in accordance with CPO of the Westmeath Development Plan 2021 - 2027 in order to facilitate safe access and egress through the junction. The junction design and visibility splays are in accordance with TII guidelines Geometric Design of Junctions (DN-GEO-03060). These splays will be kept clear during the construction and operational stages of the Proposed Development.

The swept path analysis indicates that a temporary road and visibility splays will be required at this junction in order to accommodate the wind turbine vehicles. The figures show that it is proposed to utilise the field to the west of the L5363 opposite the proposed site The autotrack assessment shown in Figures 14-28 and 14-29 indicates that the temporary road and run -over areas will accommodate the turning requirements of the blade and tower transport vehicles.



Junction radii are 13m with 1:10 tapers for HGVs in accordance with TII DN-GEO-03060

Junction markings to be as per Figure 7.35 of the Traffic Signs Manual

- Centreline RM 001
- STOP line RRM 017
- STOP lettering M114.

Junction stop signs to be as per RUS 027 of the Traffic Signs Manual.

NOTES:

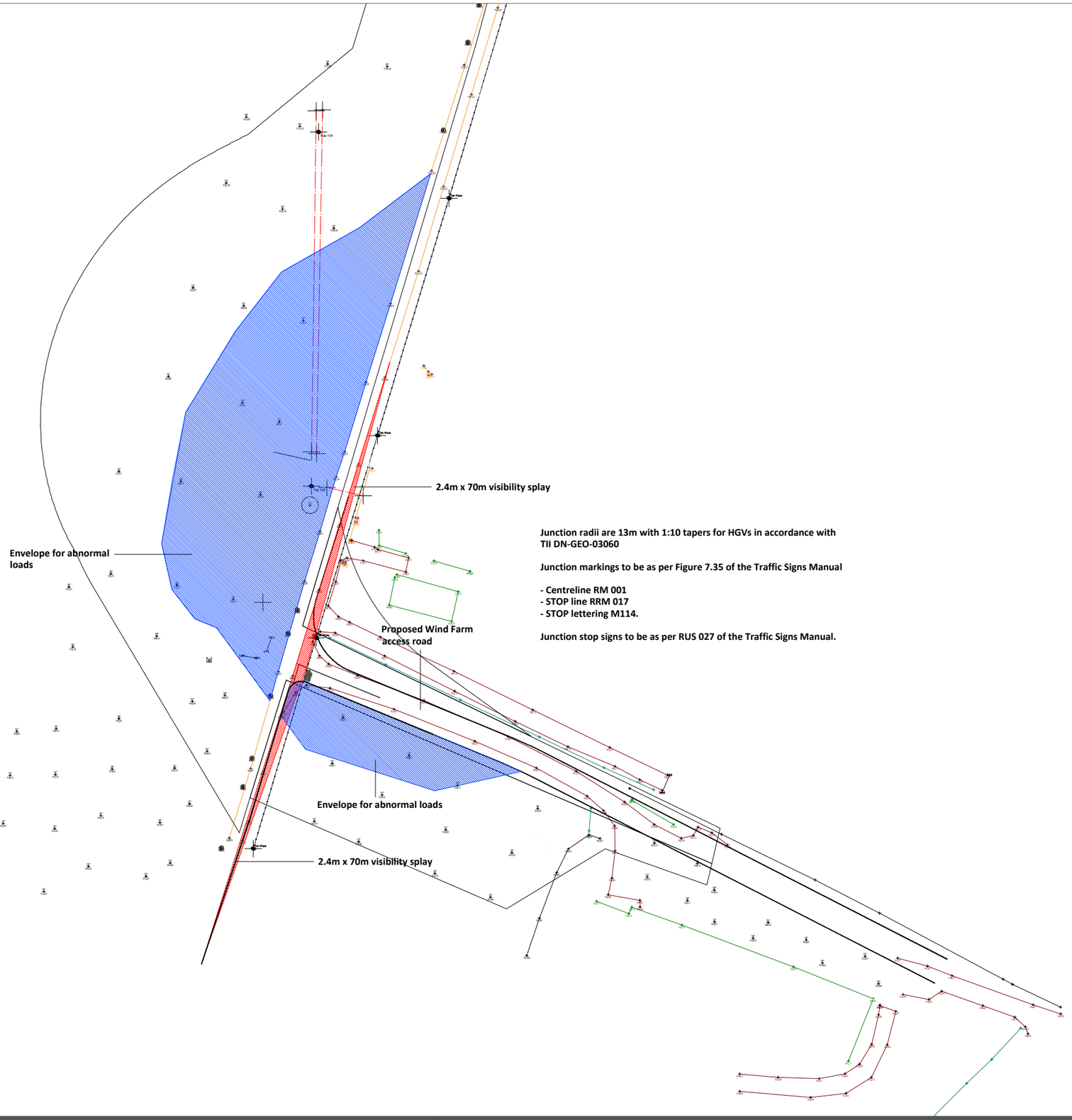
PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 14-26 Location 7 - Access junction on L5363, junction layout

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



Junction radii are 13m with 1:10 tapers for HGVs in accordance with TII DN-GEO-03060

Junction markings to be as per Figure 7.35 of the Traffic Signs Manual

- Centreline RM 001
- STOP line RRM 017
- STOP lettering M114.

Junction stop signs to be as per RUS 027 of the Traffic Signs Manual.

NOTES:

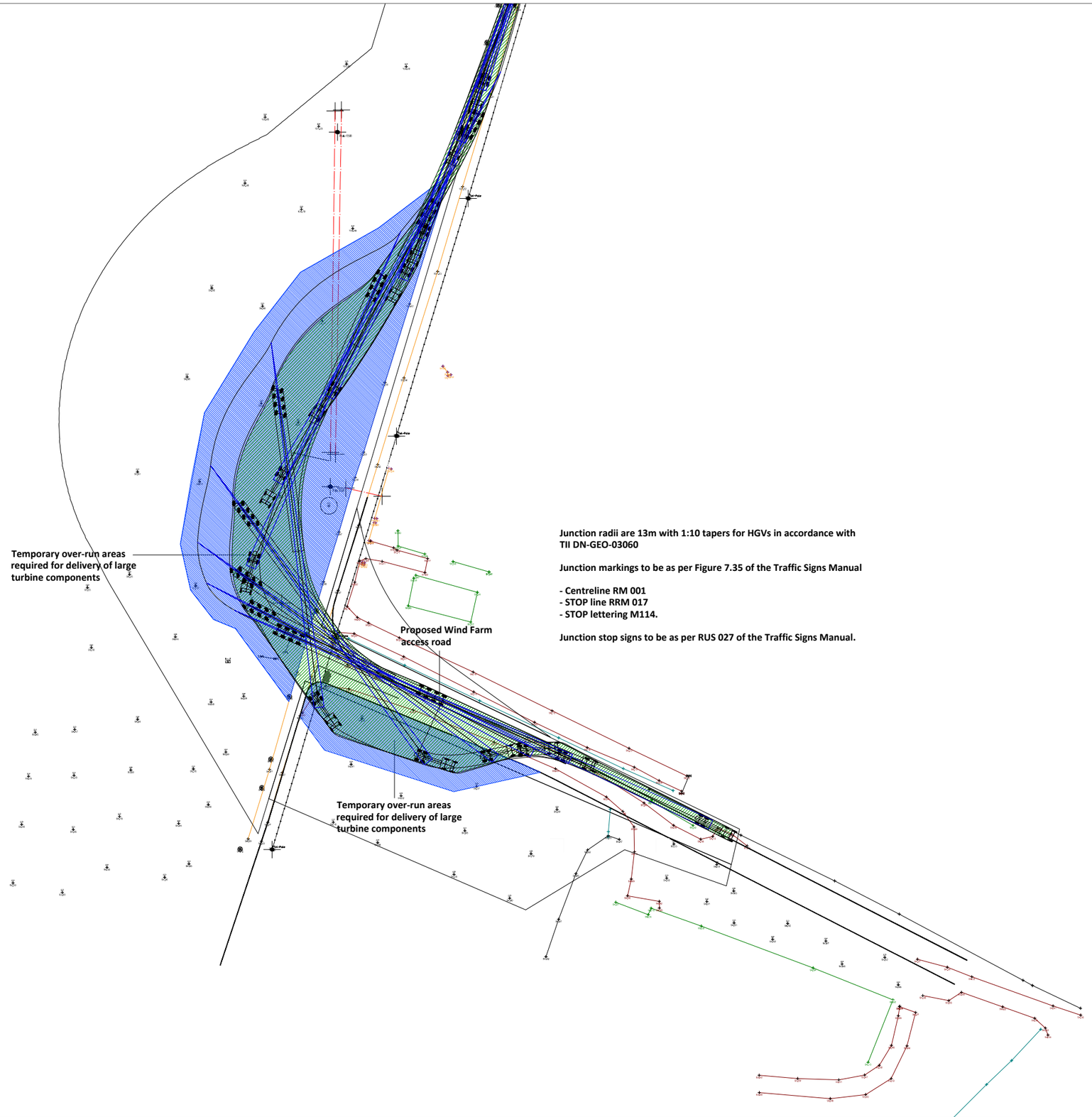
PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 14-27 Location 7 - Access junction on L5363, junction layout with visibility splay

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



Junction radii are 13m with 1:10 tapers for HGVs in accordance with TII DN-GEO-03060

Junction markings to be as per Figure 7.35 of the Traffic Signs Manual

- Centreline RM 001
- STOP line RRM 017
- STOP lettering M114.

Junction stop signs to be as per RUS 027 of the Traffic Signs Manual.

NOTES:

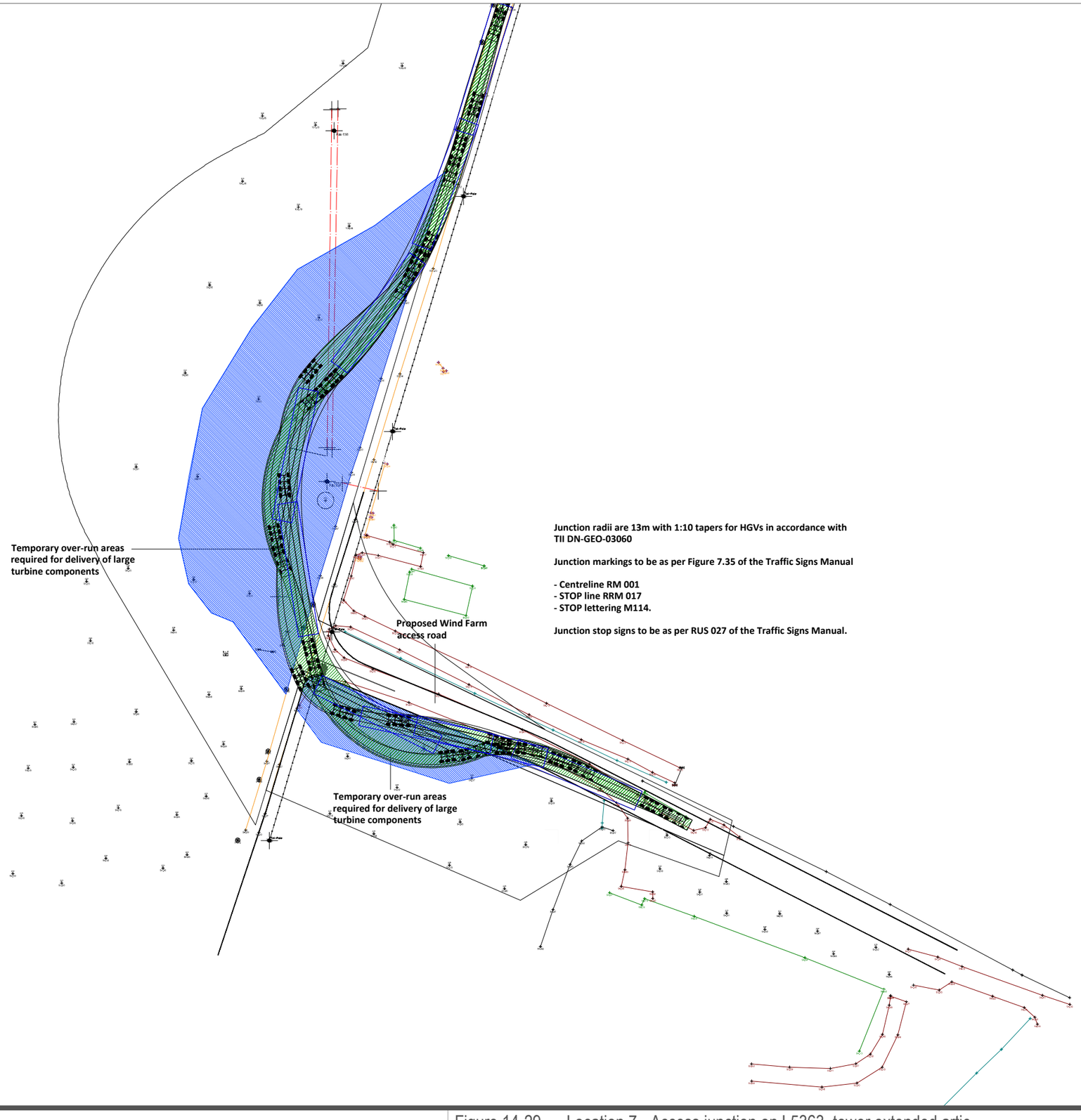
PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 14-28 Location 7 - Access junction on L5363, blade extended artic (81.0m blade)

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd		SCALE: 1:1000
PROJECT NO: 9290	DATE: 08.02.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



Junction radii are 13m with 1:10 tapers for HGVs in accordance with TII DN-GEO-03060

Junction markings to be as per Figure 7.35 of the Traffic Signs Manual

- Centreline RM 001
- STOP line RRM 017
- STOP lettering M114.

Junction stop signs to be as per RUS 027 of the Traffic Signs Manual.

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 14-29 Location 7 - Access junction on L5363, tower extended artic

PROJECT:	Umma More Renewable Energy Development		
CLIENT:	Umma More Ltd	SCALE:	1:1000
PROJECT NO: 9290	DATE: 08.02.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

14.1.10 Provision for Sustainable Modes of Travel

14.1.10.1 Walking and Cycling

The provision for these modes is not relevant during the construction stage of the Proposed Development and travel distances will likely exclude any employees walking or cycling to work.

14.1.10.2 Public Transport

There are no public transport services that currently pass the Wind Farm Site although mini-buses may be considered for transporting staff to and from the Wind Farm Site in order to minimise traffic generation and parking demand on the Wind Farm Site. As the Grid Connection underground electrical cabling route is located along the public road network there are a number of public transport services that service this aspect of the Site. However, due to the transient nature of construction works along the underground electrical cabling route, use of these public transport services would be limited to short durations along the underground electrical cabling route, with staff typically transported to the Site by mini-bus.

14.1.11 Likely and Significant Effects and Associated Mitigation Measures

14.1.11.1 'Do-Nothing' Scenario

If the Proposed Development does not proceed there will be no additional traffic generated or works carried out on the road network and therefore no effects with respect to traffic.

14.1.11.2 Construction Phase

During the 9 days when the concrete foundations are poured, the effect on the surrounding road network will be negative, resulting in an increase in traffic levels ranging from +1.4% on the N6 west of Athlone, to +5.0% on the N55 north of the R390, to 15.0% on the R390 leaving Athlone, to 29.5% on the R390 approaching the Wind Farm Site. On the L5363 leading to the Wind Farm Site, it is forecast that traffic flows will increase by 188% on these 9 days. This will have a temporary imperceptible negative effect on the M6, a temporary slight negative effect on the R390, and a temporary slight to moderate negative effect on the L5363.

During 341 days for the remaining site preparation and ground works and Grid Connection underground electrical cabling route construction it is forecast that the increase in traffic volumes on these days will range from +0.5% on the N6 west of Athlone, to +1.8% on the N55 north of the R390, to +5.3% on the R390 leaving Athlone, to 10.4% on the R390 approaching the Wind Farm Site. On the L5363 leading to the Wind Farm Site, it is forecast that traffic flows will increase by 66%. This will have a temporary negative effect on the M6, and a temporary slight negative effect on the rest of the delivery route. With respect to the traffic volumes that will be generated during the construction of the underground electrical cabling route, it is estimated that there will be approximately 14 daily return trips made by a truck transporting materials, and made by a minibus to transport construction staff, to and from the Site. By its nature the impacts of these additional trips on the network will be transient, and will therefore be temporary and slight.

During the 24 days when the various component parts of the wind turbine plant are delivered to the Wind Farm Site using extended articulated HGVs, the effect of the additional traffic on these days will be slight to moderate along the turbine delivery route due to the size of vehicles involved, resulting in increased traffic volumes ranging from +0.2% on the N6 west of Athlone, to +0.7% on the N55 south of the R390, to 2.7% on the R390 exiting Athlone, to +5.3% on the R390 approaching the Wind Farm Site.

On the L5363 leading to the Wind Farm Site it is forecast that traffic flows will increase by +34%. It is forecast that there will be a temporary. Imperceptible to slight negative effect on traffic flows as the delivery of the abnormally sized loads is undertaken at night.

During the 9 days of the turbine construction stage when general materials are delivered to the Wind Farm Site, the increase in traffic volumes on these days will range from +0.1% on the N6 west of Athlone, to +0.4% on the N55 south of the R390, to 1.7% on the R390 leaving Athlone, to 3.2% on the R390 approaching the Wind Farm Site. On the L5363 leading to the Wind Farm Site it is forecast that traffic flows will increase by 21%. This will have a temporary imperceptible negative effect on the N6, and temporary slight negative effect on the rest of the delivery routes.

14.1.11.3 Operational Phase

The impacts on the surrounding local highway network will be negligible given that there will only be an average of 3 trips made to and from the Wind Farm Site by car or light goods vehicle per day, with none required for the Grid Connection underground electrical cabling route. The effects of the maintenance traffic on the surrounding highway network will therefore be imperceptible.

14.1.11.4 Decommissioning Phase

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 30 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the site may be decommissioned fully.

Any impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during part of the construction phase when turbines were being erected. The impacts and associated effects will be materially less than during the construction phase as significant ground works are not required to decommission a wind farm.

Following decommissioning of the Wind Farm Site, turbine foundations, hardstanding areas and site tracks will be rehabilitated, i.e. left in place, covered over with local soil/subsoil and allowed to re-vegetate naturally, if required. The internal site access tracks may be left in place, as they may serve as useful access to the Agricultural and forestry land. It is considered that leaving these areas in-situ will cause less environmental damage than removing and recycling them.

While the actual number of loads that will require to be removed from the site in the event that the Proposed Development is decommissioned has not been determined at this stage, the impact in terms of traffic volumes will be significantly less than during the construction stage.

The underground electrical cabling connecting the turbines to the on-site substation will be removed from the cable ducts. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The Grid Connection underground electrical cabling route and onsite substation will remain in place as it will be under the ownership and operation of the ESB and Eirgrid. There are no impacts associated with this.

The works required during the decommissioning phase are described in Section 4.9 in Chapter 4: Description of the Proposed Development and the accompanying Decommissioning Plan included as Appendix 4-6 of this EIAR.

14.1.11.5 Cumulative Effects

An assessment of all other wind farm developments at varying stages in the planning process (from proposed to permitted), as detailed in Section 2.7 of this EIAR, with the potential for cumulative traffic effects with the Proposed Development assessed on the following criteria;

- Project status (proposed to operational)
- Degree of overlap on the highway network (low to high)
- Traffic volumes (low to high).

The development or activities that were considered to have potential cumulative impacts with the Proposed Development in terms of traffic impacts are set out below in Table 14-25. It is concluded that there are 3 potential developments (Kepak single wind turbine, Lemanaghan Wind Farm and Derryadd Wind Farm), where there is the potential for cumulative impacts with the Proposed Development. In the case of the Kepak Single Wind Turbine the turbine delivery route is from Dublin Port to Kepak Kilbeggan plant via the M4 and M6 and the L5202 (via N52 exit of the M6). The Proposed Development turbine delivery route is proposed from Galway Port, via the M6 National Road, however, other ports such as Shannon Port or Dublin Port could also be used. In the case of the Kepak turbine the extent of the overlap of the turbine delivery route would be limited to the M4 and M6 should Dublin Port be the chosen port of entry. Taking account of the low traffic volumes associated with the Kepak turbine, it is therefore considered that the potential for cumulative impacts between the Proposed Development and the Kepak turbine is imperceptible. In the case of the Lemanaghan Wind Farm the extent of the overlap of the turbine delivery route would be limited to a section of the M6 as the route to the Lemanaghan Wind Farm site follows the N52 to the south of Tullamore followed by the N62 northward via Ferbane. Similarly, the degree of overlap of the Derryadd delivery route with that of the Proposed Development is also limited to the M6, with the route towards the Derryadd site following the N61 from Athlone followed by the N63. It is therefore considered that the potential for cumulative impacts between the Proposed Development and both the Lemanaghan Wind Farm and the Derryadd Wind Farm is imperceptible to slight.

Table 14-25 Summary of other projects considered in cumulative assessment and potential for cumulative traffic effects with Proposed Development

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential cumulative traffic effects*
1 Kepak (Kilbeggan) Single Wind Turbine	Further Information requested (WCC ref: 22537)	Low	Low	Imperceptible
2 Lemanaghan Wind Farm (13 to 17 turbines)	Pre-Application - ABP	Low	Medium	Imperceptible to slight None
3 Derryadd Wind Farm	Pre-Application - ABP	Low	Medium	Imperceptible to slight None

* Forecast effect if constructed with the Proposed Development simultaneously

Offaly County Council, in partnership with Westmeath Road Schemes County Council and in association with Transport Infrastructure Ireland (TII), is developing the N52 Tullamore to Kilbeggan Link Scheme. The N52 Tullamore to Kilbeggan Link Scheme is now at the 'Early Planning'' Phase in accordance with the TII Project Management Guidelines. The Project Team has undertaken an appraisal of the Route Corridor Options published in November 2020 and has considered feedback received through the second non-statutory Public Consultation to identify an 'Emerging Preferred Route Corridor'. The project was advanced as far as the third stage of non-statutory Public Consultation, and are seeking feedback on the Emerging Preferred Route Corridors. No construction timeframe has been confirmed. It is noted that both general construction traffic, and approximately 3.5 km section of the Grid Connection underground electrical cabling route coincides with the section of the N52 being considered in this improvement scheme. With no emerging construction timeframe for the scheme and

a proposed construction year of 2028 for the Proposed Development it is considered unlikely that the construction phase for the Proposed Development will overlap with the construction of the N52 improvement scheme. Should the construction timeframe for both the Proposed Development and the N52 Tullamore to Kilbeggan Link Scheme coincide, given the low traffic volumes generated during the construction of the Grid Connection underground electrical cabling route and general construction traffic for the Proposed Development, the potential for cumulative impacts between the Proposed Development and N52 Tullamore to Kilbeggan Link Scheme will be imperceptible to slight.

3 no. solar farms were identified within Offaly/Westmeath situated within 200m of the proposed underground electrical cabling route. These include a 10 year permission for a solar farm on lands adjacent to the N52 near the townland of Gormagh (PL 22387), a 10 year permission for a solar farm at Dawn Meats near Kilbeggan (PL 22350) and a 10 year planning permission for the construction of a solar farm in the townland of Derries, Co. Offaly, of which the approved underground electrical cable is situated within 200m of the underground electrical cabling route of the Proposed Development. As the construction of the underground electrical cabling connection will be a relatively short construction project, which will be broken up into sections of ~100 to 150m works length (meaning that only ~100m of open trench will exist at any one time during the construction), the potential for cumulative effects with these nearby energy developments are not significant from the perspective of traffic and transport. The construction of the underground electrical cabling connection route for the Proposed Development would be subject to a Road Opening License, as would any other similar nearby grid connection works. The timing of these works would therefore be controlled by the road opening licensing process and would not overlap. It is also likely that the construction phases of these projects will not overlap with the construction phase of the Proposed Development.

14.1.11.6 Mitigation Measures

This section summarises the mitigation measures to minimise the effects of the Proposed Development during both the construction and operational stages (decommissioning will be same as construction where required).

Mitigation by Design

Mitigation by design measures include the following;

- Selection of the most appropriate delivery route to transport the wind turbine components, requiring the minimum remedial works to accommodate the vehicles as set out in Section 14.1.8

Mitigation Measures During the Construction Stage

The successful completion of the Proposed Development will require significant coordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction stage of the Proposed Development in order to minimise the effects of the additional traffic generated by the Proposed Development. The range of measures will include the following which are also set out in the CEMP Section 3.8, Traffic Management.

A detailed **Traffic Management Plan (TMP)**, incorporating all the mitigation measures set out in the CEMP included as Appendix 4-2 of this EIAR, will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the roads authority and An Garda Síochána prior to construction works commencing on Site. Illustrations for the traffic arrangements and diversion routes identified for the Grid Connection works are included in Appendix 14-2: Grid Connection Traffic Arrangements and Diversion Routes, and identifies sections along the Grid Connection underground electrical cabling route where there will be road and pedestrian footpath closures, diverted traffic, and Stop/Go or traffic lights. The detailed TMP will include the following:

Traffic Management Coordinator – a competent Traffic Management Co-ordinator will be appointed for the duration of the construction of the Proposed Development 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 and other relevant authorities in advance of deliveries of turbine components to the Wind Farm Site. Liaison with the relevant local authorities including the roads sections of local authorities that the delivery routes traverse and An Garda Siochana, during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required.

Information to locals – Locals in the area will be informed of any upcoming traffic related matters e.g. delivery of turbine components at night, 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 prior to construction commencement to record the condition of the road. A post construction survey will be carried out after works are completed. Where required the timing of these surveys will be agreed with the local authority.

Implementation of temporary alterations to road network at critical junctions – At locations where required highlighted in Section 14.1.8.

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

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

Travel plan for construction workers to underground electric cabling route – Due to the transient nature of the underground grid connection construction site which will generally be on a section of the public road, construction workers will be transported to and from the site by the construction company at the beginning and end of each shift.

Temporary traffic signs – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including the access junction on the L5363. 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 key junctions during peak delivery times.

Delivery times of large turbine components - The management plan will include the delivery of large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage.

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.

Mitigation Measures During Operational Stage

Due to the very low volumes of traffic forecast to be generated during this stage no mitigation measures are required.

Mitigation Measures During Decommissioning Stage

In the event that the Proposed Development is decommissioned after the 30 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Section 4.11 of Chapter 4. A Decommissioning Plan has been prepared (Appendix 4-6) the detail of which will be agreed with the local authority prior to any decommissioning. This plan will include a material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning.

14.1.11.7 Residual Effects

Construction Stage

During the 18-24 month construction stage of the Proposed Development, it is forecast that the additional traffic that will appear on the public road network serving the Site will have a short-term slight to imperceptible negative effect on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Operational Stage

As the traffic impact of the Proposed Development will be imperceptible during the operational stage, there will be no residual effects during this stage.

Decommissioning Stage

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

14.2 Telecommunications and Aviation

14.2.1 Introduction

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

The full description of the Proposed Development, including proposed turbine locations and elevations, is provided in Chapter 4 of this EIAR.

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Development', 'the Site', 'Wind Farm Site' and 'Grid Connection'.

Section 14.2.3 describes the way in which wind turbines can potentially interfere with telecommunications signals or aviation activities. Section 14.2.4 presents details on how such effects will be avoided, with the likely significant effects assessed (and mitigation measures proposed) in Section 14.2.5.

14.2.1.1 Statement of Authority

This section of the EIAR has been prepared by Tom Madden and Ellen Costello and reviewed by Michael Watson, all of MKO. Ellen is a Project Environmental Scientist with MKO with over three years' experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen's key strengths and expertise are Environmental Protection and Management, Environmental Impact Statements, Project Management, and GIS Mapping and Modelling. Tom is an Environmental Scientist with over 3 years' experience in professional environmental consultancies. Tom holds a BSc (Hons) in Environmental Science from the University of Limerick. Prior to joining MKO, Tom worked with environmental consultancies in Dublin and Carlow where he gained experience from working on a wide range of different projects. Michael has over 19 years' experience in the environmental sector and had worked for the Geological Survey of Ireland and then a prominent private environmental & hydrogeological consultancy prior to joining MKO in 2014. Michael completed an MA in Environmental Management at NUI, Maynooth in 1999. Michael is a professional geologist (PGeo) and full member of IEMA (MIEMA) as well as a Chartered Environmentalist (CEnv).

14.2.2 Methodology and Guidance

This section of the assessment focuses particularly on the scoping and consultation exercise conducted with telecommunications operators and aviation authorities. Scoping was carried out in line with the EPA guidelines, and the '*Best Practice Guidelines for the Irish Wind Energy Industry*' (Irish Wind Energy Association, 2012), which provides a recommended list of telecommunications operators for consultation.

A full description of the scoping and consultation exercise is provided in Section 2.6 of Chapter 2 of this EIAR. Consultation with the telecommunications operators and aviation bodies informed the constraints mapping process, which in turn informed the layout of the Proposed Development, as described in Chapter 3, Section 3.3.6 of the EIAR.

The assessment of likely significant effects on material assets uses the standard methodology and classification of impacts as presented in Section 1.7.2 of Chapter 1 of this EIAR.

14.2.3 Background

14.2.3.1 Broadcast Communications

Wind turbines, like all large structures, have the potential to interfere with broadcast signals, by acting as a physical barrier or causing a degree of scattering to microwave links. The most significant effect at a domestic level relates to a possible flicker effect caused by the moving rotor, affecting, for example, radio signals. The most significant potential effect occurs where the renewable energy development is directly in line with the transmitter radio path.

14.2.3.2 Domestic Receivers

Depending on local topography, a domestic receiver may receive broadcast signals from more than one location. The strength of the signals varies with distance from the transmitter, and the receiver's antenna is generally always directed towards the most local, and usually strongest, broadcasting station.

There are two types of potential electromagnetic interference to domestic receivers depending on the location of the receiver in relation to a wind farm. 'Shadowed' houses are located directly behind a wind farm, relative to the location from where the signal is being received. In this case, the main signal passes through the wind farm and the rotating blades can create a degree of signal scattering. In the case of viewers located beside the wind farm (relative to the broadcast signal direction), the effects are likely to be due to periodic reflections from the blade, giving rise to a delayed signal.

In both cases, i.e., shadowed houses located behind the wind farm and those located to the side of it, the effects of electromagnetic interference may depend to some degree on the wind direction, since the plane of rotation of the rotor will affect both the line-of-sight blockage to viewers located behind the wind farm and the degree of reflection to receivers located to the side.

14.2.3.3 Other Signal Types

Wind turbines have the potential to affect other signal types used for communication and navigational systems, for example tower-to-tower microwave communication links, and airborne and ground radar systems. Interference with radar systems occurs when wind turbines are located close to an airport or directly in line with the instrument landing approach. The published Corine Land Cover Maps (www.epa.ie) show an airport located along the north-eastern boundary of the Wind Farm Site, this has been misidentified by Corine and is an existing quarry (Baskin Pit), as detailed in Section 8.3.6.1 in Chapter 8 of this EIAR: Land, Soils and Geology. The nearest such operational airport to the Proposed Development site is the Abbeyshrule Aerodrome, which is located over 12 km to the north-east of the Wind Farm Site. The closest large international airport to the Proposed Development is Dublin Airport which is located over 90km to the east of the Wind Farm Site. Both airports listed above are outside the range at which such issues would be expected, and as detailed in Table 14-26 below, the Irish Aviation Authority noted no issues with the Proposed Development however they issued observations as discussed in Section 14.2.5.3.2.

14.2.4 Preventing Electromagnetic Interference

14.2.4.1 National Guidelines

Both the adopted '*Wind Energy Development Guidelines for Planning Authorities'* produced by the Department of the Environment, Heritage and Local Government (DoEHLG, 2006) (referred to as the Guidelines) and the Draft Wind Energy Development Guidelines for Planning Authorities (DoEHLG, 2019) (referred to as the draft Guidelines) state that interference with broadcast communications can be overcome by the installation of deflectors or repeaters where required.

Developers are advised to contact individual local and national broadcasters and mobile phone operators to inform them of proposals to develop wind farms. This consultation has been carried out by MKO as part of the assessment of the Proposed Development as summarised below in Table 14-26; full details are provided in Section 2.6 in Chapter 2 of this EIAR.

14.2.4.2 Scoping and Consultation

As part of the EIAR scoping and consultation exercise, MKO contacted the relevant national and regional broadcasters, fixed and mobile telephone operators, aviation authorities and other relevant consultees. Consultation was also carried out with ComReg in order to identify any other additional licensed operators in the vicinity of the Wind Farm Site to be contacted, who may not have been on the list of main operators.

The responses received from the telecommunications and aviation consultees are summarised below in Table 14-26.

Table 14-26 Telecommunications and Aviation Scoping Responses

Consultee	Response	Potential for Interference Following Consultation Exercise
Ajisko Ltd	Received 8th May 2021	No
Broadcasting Authority of Ireland	Received 5th May 2021	No
BT Communications Ireland	Received 4th May 2021	No
ComReg (Commission for Communications Regulation)	Received 5th May 2021	No
Eir	Received 7th May 2021	No
Enet	Received 4th May 2021	No
ESB Telecoms	Received 14th May 2021	No
Irish Aviation Authority (IAA)	Received 16th August 2021	IAA noted no issues with the Proposed Development, however they issued observations as discussed in Section 14.2.5.3.2
Imagine Group	Received 7th May 2021	Yes, links in the area, however there is no overlap.
RTE Transmission Network	Received 5th May 2021	No
Three Ireland Ltd	Received 10th May 2021	No
Viatel	Received 4th May 2021	No
Virgin Media	Received 4th May 2021	No

Consultee	Response	Potential for Interference Following Consultation Exercise
Vodafone Ireland	Received 7th May 2021	Yes, links in area, however there is no overlap

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

14.2.4.2.1 Broadcasters

There are two broadcasters operating in Ireland, RTÉ Transmission Network (operating as 2rn) and Virgin Media.

RTÉ Transmission Network, replied on the 5th May 2021 to a scoping request from MKO stating that the operation of the Proposed Development will not have any impact on RTÉ fixed links and stated that there is a low probability that it will cause any interference to Digital Terrestrial Television (DTT) services and Frequency Modulation (FM) services.

A standard Protocol Document has been prepared by 2rn for the Proposed Development, which has been signed by Umma More Ltd. A copy of the Protocol Document is presented in Appendix 14-2 of this EIAR.

Virgin Media replied on the 4th May 2021 to scoping requests from MKO stating that there was no potential for interference with their network.

14.2.4.2.2 Other Consultees

Of the scoping responses received from telephone, broadband and other telecommunications operators, those who highlighted an initial potential interference risk are addressed below. The final proposed turbine layout does not overlap with any of the telecoms links or clearance zones requested by these operators. The remaining consultees who responded to scoping, operate links either outside the Wind Farm Site, and therefore are not subject to any interference risk, or do not operate any links in the area.

Imagine

Imagine responded to a scoping request from MKO on the 7th of May 2021, noting that they had links in the area, however there was no overlap with proposed turbine locations and therefore no interference with their links are anticipated.

Vodafone

Vodafone responded to a scoping request from MKO on the 7th of May 2021, noting that they had links in the area. As detailed in Section 3.2.6.2 in Chapter 3 of this EIAR, initial turbine locations were overlapping with the Vodafone link, therefore the turbine locations have been altered to ensure that no overlap or interference will occur.

14.2.4.2.3 Aviation

As noted in Table 14-26 above, scoping responses were received from the following aviation consultees:

- Irish Aviation Authority (IAA)

Pertinent information has been summarised below, however the scoping response should be referenced to for further detail:

Irish Aviation Authority

In August 2021, a scoping response was received from the Irish Aviation Authority (IAA). The requirements of the IAA include the following:

1. *Agree an aeronautical obstacle warning light scheme for the wind farm development.*
2. *Provide as-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location. Horizontal extent of turbines and blade length will also be provided.*
3. *Notify the Authority of intention to commence crane operations with a minimum of 30 days prior notification of their erection.*

The nearest operational airport to the Proposed Development site is Abbeyshrule Aerodrome which is located approximately 12.35km to the north-east of the Wind Farm Site, The closest large international airport is Dublin Airport which is located approximately 79km to the east of the Wind Farm Site. The two airports listed above are therefore outside the range at which such issues would be expected.

In response to the lighting requirements requested by the IAA, the turbines will be marked on maps, lit at night and entered into aircraft navigation databases and therefore can be avoided during flight.

14.2.5 Likely Significant Effects and Associated Mitigation Measures

14.2.5.1 'Do-Nothing' Scenario

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

14.2.5.2 Construction Phase

The potential for electromagnetic interference from wind turbines occurs only during the operational phase of the Proposed Development. There are no electromagnetic interference impacts associated with the construction phase of the Proposed Development, and therefore no mitigation required. Potential impacts during turbine erection and commissioning are assessed in the operational phase impact assessment.

14.2.5.3 Operational Phase

14.2.5.3.1 *Telecommunications*

Pre-Mitigation Effect

Consultation regarding the potential for electromagnetic interference from the Proposed Development was carried out with the relevant national and regional broadcasters, fixed line and mobile telephone operators and other operators, which confirmed that no turbines are proposed within the areas requested to be left clear of turbines.

Mitigation Measures

In the event of interference occurring to telecommunications, the Guidelines acknowledge that '*electromagnetic interference can be overcome'* by the use of divertor relay links out of line with the wind farm.

Residual Effect

The Proposed Development will have no residual impact on the telecommunications signals of any other operator, due to distance from or absence of any links in the area.

Significance of Effects

There will be no significant effect on telecommunications from the Proposed Development.

14.2.5.3.2 *Aviation*

Pre-Mitigation Effect

The scoping response of the IAA has requested that standard lighting requirements be used at the Proposed Development.

Mitigation Measures

The scoping response from the IAA set out lighting requirements for turbines as detailed above. These requirements will be complied with for the Proposed Development and any further details will be agreed in advance of construction with the IAA, i.e crane erection. The coordinates and elevations for built turbines will be supplied to the IAA, as is standard practice for wind farm developments.

Residual Effect

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

Significance of Effects

There will be no significant effect on aviation operations due to the Proposed Development.

14.2.5.4 Decommissioning Phase

As stated in Section 14.2.5.2 above, the potential for electromagnetic interference from wind turbines occurs only during the operational phase of the Proposed Development. There are no electromagnetic interference impacts associated with the construction or decommissioning phases of the Proposed Development, and therefore no mitigation required.

14.2.5.5 Cumulative Effect

Chapter 2, Section 2.7 of this EIAR describes the methodology used in compiling the list of permitted or proposed projects and plans in the area, (wind energy or otherwise) considered in the assessment of cumulative effects, and provides a description of each project, including current status, and is set out in Section 2.7 in Chapter 2 of this EIAR. There are no existing wind farms in the surrounding area, the closest proposed wind farm development is 16.3km from the Wind Farm Site. Therefore, there will be

no cumulative effects relating to the Proposed Development and surrounding projects in relation to telecommunications or aviation.

During the development of any large project that holds the potential to effect telecoms or Aviation, the Developer is responsible for engaging with all relevant Telecoms Operators and Aviation Authorities to ensure that the proposals will not interfere with television or radio signals by acting as a physical barrier. In the event of any potential impact, the Developer for each individual project is responsible for ensuring that the necessary mitigation measures are in place. All modern wind farms have lighting requirements agreed with IAA and the turbine locations entered into aircraft navigation databases and therefore can be avoided during flight. It is on this basis that it can be concluded that there would be no cumulative impacts relating to the Proposed Development and surrounding projects in relation to Telecommunications or Aviation.

14.3 Other Material Assets

This section of the Material Assets chapter considers other utilities or built services in the area such as electricity supply and transmission, water, gas and underground telecommunications. This section also considers waste management during the construction, operational and decommissioning phases of the Proposed Development.

In order to assess the potential for significant effects on built services and waste management in the vicinity of the Proposed Development, scoping requests were made to EirGrid, Irish Water and numerous sections of Westmeath and Offaly County Councils including Water Services and Environment. Refer to Section 2.6 of Chapter 2 of this EIAR for details in relation to the EIA scoping exercise.

A scoping response was received from Irish Water, however, it did not provide details in relation to specific water services within the EIAR Site Boundary. No response was received from EirGrid, Irish Water or the local authority sections.

14.3.1 Existing Built Services and Utilities

A detailed survey of the entire Grid Connection underground electrical cabling route was prepared, picking up all identified existing services and utilities along the route and the proposed underground electrical cabling route has been designed to avoid these existing services and utilities.

There are no overhead electricity cables on the Wind Farm Site. There are overhead electricity lines crossing the public road corridor in which the Grid Connection underground electrical cabling route is proposed. However, no impacts on overhead electricity lines are likely to occur due to the nature of the underground cabling installation works.

There are no known existing underground electricity cables present on the Wind Farm Site. There are existing underground electricity cables present along the Grid Connection underground electricity cabling route, and in the vicinity of the Proposed Development site. Damage of underground electricity cables during construction operations could potentially result in serious injury or death of site staff. The Proposed Development has been designed to avoid exisiting underground electricity cables.

The Grid Connection underground electrical cabling route will pass over the existing Dublin to Galway Gas line. However, based on survey information, no impacts are likely to occur as the underground cabling installation works will not interfere with the existing gas pipeline at this location.

There are no other known existing services (i.e. water supply, sewage, telecommunications) present on the Wind Farm Site. There are existing services (i.e. water supply, sewage, telecommunications) present along the Grid Connection underground electricity cabling route, and in the vicinity of the Proposed

Development site. Damage of underground services during construction operations could potentially result in disruption to those local services, and a risk to health and safety of site staff.

As noted above the Grid Connection underground electricity cabling route has been designed to avoid identified services and utilities. Prior to commencement of construction the survey of the route will be repeated and updated, to ensure any new services and utilities will not be impacted by the Proposed Development.

14.3.2 Waste Management

A Waste Management Plan (WMP) has been prepared and forms part of the Construction and Environmental Management Plan (CEMP) in Appendix 4-2 of the EIAR.

The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Development. Disposal of waste will be a last resort.

All waste generated on Site will be contained in waste skips at a waste storage area on Site. This waste storage area will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein. The expected waste volumes generated on Site are unlikely to be large enough to warrant source segregation at the Proposed Development site. Therefore, all wastes streams generated on Site will be deposited into a single waste skip. This waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.

Site personnel will be instructed at induction that under no circumstances can waste be brought to Site for disposal in the on-site waste skip. It will also be made clear that the burning of waste material on Site is forbidden.

Further details on waste management are presented in the CEMP which is included as Appendix 4-2.

14.3.3 Likely Significant Effects and Associated Mitigation Measures

14.3.3.1 'Do-Nothing' Scenario

If the Proposed Development were not to proceed the opportunity to generate renewable energy and electrical supply to the national grid would be lost.

14.3.3.2 Construction Phase

The construction of the Proposed Development will be unlikely to have an impact on above ground or underground built services or waste management. The Grid Connectrion underground electrical cabling route has been designed to avoid exisiting underground electricity cables and other services and can be described as mitigation by design, therefore there is no potential to give rise to effects on electrical and other services.

Proposed Mitigation Measures

Notwithstanding the above, specific measures are incorporated into the CEMP, included as Appendix 4-2 of this EIAR, to ensure that the construction of the Proposed Development will not have effect on underground electrical cables and built services at the Proposed Development site. The mitigation measures include the following:

- Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works.
- Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified.
- Excavation permits will be completed and all plant operators and general operatives will be inducted and informed as to the location of any services.
- The contractor must comply with and standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks.

Residual Impacts

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative residual impact during the construction phase of the Proposed Development.

Significance of Effects

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

14.3.3.3 Operational Phase

There will be no operational phase impacts or associated effects on built services and waste management associated with the Proposed Development.

14.3.4 Cumulative Impact Assessment

The potential cumulative impact of the Proposed Development and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Development will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans in the area, in the vicinity of the Proposed Development site, as set out in Section 2.7 in Chapter 2 of this EIAR.

3 no. solar farms were identified within Offaly/Westmeath situated within 200m of the proposed underground electrical cabling route. These include a 10 year permission for a solar farm on lands adjacent to the N52 near the townland of Gormagh (PL 22387), a 10 year permission for a solar farm at Dawn Meats near Kilbeggan (PL 22350) and a 10 year planning permission for the construction of a solar farm in the townland of Derries, Co. Offaly, of which the approved underground electrical cable is situated within 200m of the underground electrical cabling route of the Proposed Development. As the construction of the underground electrical cabling connection will be a relatively short construction project, which will be broken up into sections of ~100 to 150m works length (meaning that only ~100m of open trench will exist at any one time during the construction), the potential for cumulative effects with these nearby energy developments are not significant from the perspective of built services and waste management. The construction of the underground electrical cabling connection route for the Proposed Development would be subject to a Road Opening License, as would any other similar nearby grid connection works. The timing of these works would therefore be controlled by the road opening licensing process and would not overlap. It is also likely that the construction phases of these projects will not overlap with the construction phase of the Proposed Development.

On the basis of the assessment above, the Proposed Development will have no impact on built services and waste management. It is on this basis that it can be concluded that there would be a short-term imperceptible cumulative impact on built services and waste management from the Proposed Development and permitted or proposed projects and plans in the area as set out in Section 2.7 in Chapter 2 of this EIAR.