15. MATERIAL ASSETS

15.1 Introduction

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'.*

Material Assets may be either of human or natural origin. This chapter of the EIAR addresses the likely significant effects of the Proposed Project on transportation infrastructure and Irish Rail (Section 15.2 Traffic and Transport), and Other Material Assets (Utilities, Waste Management Telecommunications and Aviation) (Section 15.3), which are economic material assets of human origin. Waste Management is considered within the EPA 2022 Guidelines as part of Material Assets. EPA Waste Management pertaining to the construction, operation and decommissioning of the Proposed Project is summarised in Chapter 4 of the EIAR. A Waste Management Plan (WMP) is included in the Construction and Environmental Management Plan which is included as Appendix 4-3 of this EIAR. Traffic volumes generated by the removal of waste from the Site to fully authorised waste facilities, is considered in Section 15.3 below.

Cultural assets of Archaeology and Cultural Heritage are addressed in Chapter 13 of this 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: Hydrology and Hydrogeology, Chapter 10: Air Quality and Chapter 11: Climate. Tourism and amenity resources, which are also considered material assets, are addressed in Chapter 5: Population and Human Health.

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

For the purposes of this EIAR:

- The '**Proposed Wind Farm'** refers to the 9 no. turbines and supporting infrastructure which is the subject of this Section 37E application.
- The '**Proposed Grid Connection'** refers to the 110kV substation and supporting infrastructure which will be the subject of a separate Section 182A application.
- The '**Proposed Project'** comprises the Proposed Wind Farm and the Proposed Grid Connection, all of which are located within the EIAR Study Boundary (the '**Site**') and assessed together within this EIAR.

Please see section 1.1.1 of this EIAR for further details. A detailed description of the Proposed Project is provided in Chapter 4 of this EIAR.

15.2 Traffic and Transport

15.2.1 Introduction

15.2.1.1 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 Project.

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 Project. A preliminary traffic management plan is also provided in Section 15.2.17.2 aimed at minimising the traffic impact on the local highway network. Refer also to the Construction and Environmental Management Plan (CEMP), Appendix 4-3 of this EIAR, for the Traffic Management Plan.

An assessment of the potential likely effects on Irish Rail infrastructure is also considered in this section.

15.2.1.2 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 University of 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 of Traffinomics Ltd. include TII, Local Authorities and many leading retailers.

15.2.1.3 Guidance on Assessment of Effects

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

15.2.1.4 Scoping and Consultation

Transport Infrastructure Ireland

Transport Infrastructure Ireland (TII) responded to Scoping via emails on 3 occasions, on the 7th of November 2022, 23rd of December 2022 and, the 2nd of May 2023 in which it provided a list of recommendations to be followed when preparing the EIAR. All relevant TII guidelines and policies have been taken adopted 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, October 2021
- DN-GEO-03060, Geometric Design of junctions, Transport Infrastructure Ireland, May 2023.

Specific issues raised by TII include the following;

- Consultations should be had with relevant Local Authority / National Roads Design Offices with regards to locations of existing and future national roads schemes.
    - It is confirmed that extensive consultation has been undertaken with the Local Authorities as set out below.
- TII would be specifically concerned as to potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the Proposed Project. In accordance with the provisions of Section 28 Ministerial Guidelines 'Spatial Planning and National Roads Guidelines for Planning Authorities' (DoECLG, 2012) policy, no direct access or intensification of direct access to national roads should occur; N62, national road refers. This provision applies to all categories of development.
    - The impacts of the Proposed Project in terms of link flows on the delivery routes are set out is Section 15.2.6.1 and 15.2.6.2 of the EIAR, while an assessment of the capacity of the N62 / L-3248 junction is set out in Section 15.2.6.4. An assessment of the impacts during the construction of the grid connection is set out in Section 15.2.7 while a swept path analysis undertaken for the abnormally large loads on the Turbine Delivery Route is set out in Section 15.2.9 of the EIAR. The assessment sets out the temporary local measures that will be required on the national, regional and local road networks during the construction of the Proposed Project.
- The developer, in preparing an EIAR, should have regard to TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works).
    - It is confirmed that the design of access junctions is in accordance with TII guidelines.
- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment be carried out in accordance with relevant guidelines, noting traffic volumes attending the Site and traffic routes to/from the Site with reference to impacts on the national road network and junctions of lower category roads with

national roads. In relation to national roads, the Authority's Traffic and Transport Assessment Guidelines (2014) should be referred to in relation to proposed development with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of the NRA/TII TTA Guidelines which addresses requirements for sub-threshold TTA. Any improvements required to facilitate development should be identified. It will be the responsibility of the developer to pay for the costs of any improvements to national roads to facilitate the private development proposed as TII will not be responsible for such costs.

  - It is confirmed that the assessment presented in Chapter 15 of the EIAR is undertaken in accordance with Traffic and Transport Assessment Guidelines, TII (2014).

- The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required.
  - It is noted that there are no new access junctions proposed on the national road network and that only minor temporary works are proposed at existing junctions in order to accommodate the abnormally loads. Any temporary additional access points that are proposed on the national road network will be open for the duration of the deliveries which will be managed by Garda Siochana escort vehicles. The temporary access point will be closed at all other times. For this reason, a Road Safety Audit has not been undertaken at this stage, although the Applicant will do so if considered appropriate as the design progresses.
- In the interests of maintaining the safety and standard of the national road network, the EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network.
  - All construction will be undertaken in accordance with current guidelines including 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).
- TII recommends that that applicant/developer should clearly identify haul routes proposed and fully assess the network to be traversed. Where abnormal 'weight' loads are proposed, separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route through all the relevant County Council administrative areas should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal 'weight' load proposed.
  - The proposed haul routes are identified in this Chapter 15 of the EIAR. While it is proposed that the delivery stage of the Proposed Project will involve abnormally large loads, the axle loadings will not exceed accepted limits. A program of pre-delivery condition and structural assessment of the route is however proposed, as set out in the Traffic Management Measures, included set out in Section 15.1.17.2.
- The haul route should be assessed to confirm capacity to accommodate abnormal 'length' loads and any temporary works required.
  - It is confirmed that a geometric assessment was undertaken, as set out in Section 15.2.9.
- The applicant/developer should also consult with all PPP Companies, Motorway Maintenance and Renewals Contractors (MMaRC) and road authorities over which the haul route traverses to ascertain any operational requirements, including delivery timetabling, etc. to ensure that the strategic function of the national road network is safeguarded.
  - The applicant agrees with this condition.
- Where temporary works within any MMaRC Contract Boundary are required to facilitate the transport of turbine components to the Site, the applicant/developer

shall contact thirdpartyworks@tii.ie in advance, as a works specific Deed of Indemnity will be needed by TII before the works can take place.
    - The applicant agrees with this condition.
- Additionally, any damage caused to the pavement on the existing national road arising from any temporary works due to the turning movement of abnormal loads (e.g. tearing of the surface course, etc.) shall be rectified in accordance with TII Pavement Standards and details in this regard shall be agreed with the Road Authority prior to the commencement of any development onsite.
    - The applicant agrees with this condition, as set out in Section 15.2.1.4 of this EIAR.

It is noted that any grid connection and cable routing proposals should be developed to safeguard proposed road schemes as TII will not be responsible for costs associated with future relocation of cable routing where proposals are catered for in an area of a proposed national road scheme. It is noted that the Proposed Grid Connection underground cabling route does not impact on the existing National Road Network.

Department of Transport

A response to scoping was received from The Department of Transport on the 26th July, 2023. The response refers to issues relating to proposed underground grid connection cable route works within the public road network as follows:

- Their presence within the public road could significantly restrict the Road Authority in carrying out its function to construct and maintain the public road and will likely add to the costs of those works.
- Their installation within the lands associated with the public road may affect the stability of the road. In particular where the road is a "legacy road" (where there is no designed road structure and the subgrade may be poor or poorly drained) the design needs to take account of all the variable conditions and not be based on a sample of the general conditions.
- The possible effect on the remaining available road space (noting that there may be need to accommodate other utilities within the road cross-section in the future).
- The necessity to have the power in the cables switched off where the Road Authority considers this necessary in order to carry out its function to construct and maintain the public road.

The Department of Transport requests that the proposed underground grid connection cable route should consider the following;

- Examination of options other than the routing of cables along the public road,
- Examination of options for connection to the national grid network at a point closer to the wind farm in order to reduce the adverse impact on public roads.
- Details of where within the road cross section cables are to be placed so as to minimise the effect on the Roads Authority in its role of construction and maintenance,
- Examination of details of any chambers proposed within the public road cross section so as to minimise the effect on the Roads Authority in its role of construction and maintenance,
- Examination of the possible elimination of jointing bays to protect the integrity of the road structure for the safety of those driving on the public road by eliminating hard spots and also preserve the road width for other utilities and,
- Rationalisation of the number of cables involved (including existing electric or possible future cables) and their diversion into one trench, in order to minimise the impacts on the road network and the environment along the road boundary (hedgerows).

It is confirmed that the above points raised by The Department of Transport have been considered in the route selection and design of the proposed underground grid connection cable route as set out in Chapter 4 of this EIAR.

Tipperary County Council

A meeting was held with Tipperary County Council (TCC)on the 10th of May 2023 to discuss the Proposed Project. The key points within this meeting pertaining to traffic and transport are as follows:

- TCC highlighted the standard centralised policy for all large grid connections and recommended issuing the grid design to the TCC roads department. Relevant contact details for the road department were provided.
- TCC stated that local road conditions should not deteriorate due to the construction, operation and decommissioning of the Proposed Project. TCC provided contacts to discuss any proposed works on local roads.

Following on from the above, a meeting was arranged with the Roads department of TCC on 13th July 2023. Issues relating to the proposed underground grid connection cable route, the junctions with the public road network and associated impacts were discussed. The key point discussed were as follows:

- Issues relating to the proposed underground grid connection cable route were discussed including a request by TTC to explore off-road grid connection options. It was confirmed that process has been undertaken and is addressed in Chapter 3 of this EIAR.
- The proposed temporary access for the abnormally sized loads located at the existing N62 / L-3248 junction was discussed. It was agreed that the purpose of this access was for the delivery of the abnormally sized loads, which would be made using an escort provided by An Garda Siochana. And that this access would be closed at all other times.

- The scheduling and traffic management for construction traffic was discussed with these issues addressed in Sections 15.2.8 and 15.1.12.6 of this EIAR.
- General design issues were discussed, including visibility splays which are addressed in Section 15.2.9 of this EIAR.

Onsite Meeting with Tipperary County Council

A meeting was held onsite with the Community Liaison Officer (CLO) James Crowley and Council Engineer Enda Walsh on the 19th October 2023 to discuss the proposed Project access locations and proposed underground grid connection cable route. The CLO sought to meet with TII regarding the Proposed Project design; however, an email response was received on the 6th of December 2023 stating that TII do not consult with third parties and recommended consultation with the local planning authority instead. 'Please see Appendix 2-2 Scoping Responses for details.

Irish Rail

A scoping request was issued to Irish Rail on the 10th of May 2022 and again on the 17th of November. A response was received on the 21st of November 2022 querying the potential grid route connection route. On the 13th of April a response was issued to Irish Rail confirming that the proposed Grid Connection would not cross Irish Rail infrastructure (railway line or bridge) but would run parallel to it, at a minimum of 20m north of the line. The response below was received on the 14th of April. Please see section 15.2.15 for mitigation measures pertaining to construction and operation near Irish Rail assets.

- *It is noted that they propose to run beside the L7038 perpendicular to the track before coming parallel. The approach embankments to bridge no. OBC202 would be ours and we would need to be sure that they would not be undermined;*
- *We need to be sure that, where they are running parallel to the track, that they are not destabilising in any way the railway embankment slope. They should not interfere with the zone of influence (shown in the diagram below from I-DEP-0121);*
- *They should not interfere with the railway drains parallel to the track which are generally outside the railway fence;*
- *I note that they are crossing a stream adjacent to culvert UBC201F which is approximately 185m northeast of the road bridge. They should not undertake works which undermine this culvert including making it more susceptible to scour;*
- *High power cables parallel to the track are particularly liable to cause electromagnetic interference with signalling cables parallel to the track (this is why we normally require cables to cross the railway at right angles as they are less likely to cause electromagnetic interference). Given the proximity of the cable parallel to the track, an electromagnetic compatibility assessment report will be required to show that interference will not occur. For guidance on what is required for this report they should refer to the CRR document*[1]*.*

Separate to the above, Irish Rail contacted MKO regarding the potential for impacts from turbines on antennae that may be sited along the railway line. Irish Rail cited a French Study[2] (2002) which discusses potential impacts from turbines on various communication structures such as radar and radio signals. The study states that should an impact occur, approximately 95% of cases are settled amicably with the installation of a rebroadcaster by the wind developer.

15.2.1.5 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 Project, including the proposed haul route, an assessment of 2023 traffic flows and traffic forecasts during an assumed construction year of 2028 (Section 15.2.2 Receiving Environment and 15.2.3 – Existing Traffic Volumes),
- A description of the nature of the Proposed Project and the traffic volumes that it will generate during the different construction stages and when it is operational (Section 15.2.4 – Proposed Project Traffic Generation),
- A description of the abnormally large loads and vehicles that will require access to the Site (Section 15.2.5 Construction Traffic Vehicles),
- A review of the effects of development generated traffic on links and junctions during construction and when the facility is operational (Section 15.2.6 –Traffic Effects During Construction and Operation),
- An assessment of the effects during the proposed underground grid connection cable route (Section 15.2.7 – Effect on Network of Grid Connection,

[1] *Irish Rail Industry 2020 Irish Railway Standard IRS-203-B: EMC Co-ordination. Available at: https://www.crr.ie/assets/files/pdf/15941257845371181.pdf*
[2] *French Renewables 2002 Wind Turbines, Radars and Waves. Available at: https://fee.asso.fr/comprendre-leolien/les-eoliennes-les-radars-et-les-ondes/#:~:text=La%20r%C3%A9flexion%20et%20la%20diffraction%20des%20ondes%20%C3%A9lectromagn%C3%A9tiques,fait%20l%E2%80%99objet%20de%20nombreuses%20%C3%A9tudes%20dans%20plusieurs%20pays*

- Traffic management of large deliveries and a geometric assessment of the routes and their capacity to accommodate the abnormal loads associated with the Proposed Project (Section 15.2.8 – Traffic Management of Large Deliveries and Section 15.2.9– 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 15.2.10 – Provision for Sustainable Modes of Travel),
- A description of potential significant effects on Roads and Traffic (Section 15.2.12 – Likely and Significant Effect and Associated Mitigation Measures).

15.2.2 Receiving Environment

15.2.2.1 Site Location

The Proposed Project, known as Borrisbeg Renewable Energy Development, is located in County Tipperary in the townlands listed in Table 1-1 of Chapter 1.

The Site is located approximately 11 kilometres south of Roscrea Town and approximately 2.5kms northeast of Templemore town centre, in County Tipperary as shown in Figure 15.1a. The route that will be used to deliver the large turbine components to the Site (Turbine Delivery Route or TDR) is also shown in Figure 15-1a. Additional routes that may be used for the delivery of other materials to the Site are shown in Figure 15-1b.

15.2.2.2 Proposed Abnormal Size Load Delivery Route

The proposed port of entry for the large wind turbine components is Dublin with the proposed turbine delivery route following the National and Motorway road networks to reach a point on the M7 Motorway approximately 14km to the north of the Town of Templemore, as shown in Figure 15-1a. From this point the proposed turbine delivery route is as follows;

- The abnormally sized loads will travel westbound along the M7 motorway exiting onto the southbound slip lane at Junction 22.
- The route follows the southbound slip-road before turning left onto the N62 National Road.
- The TDR travel south on the N62 for approximately 9.4 kms to the existing junction with the L-3248 local road which joins the N62 from the east.
- The TDR turns left onto the L-3248 where it is proposed that the abnormally sized loads will access the Site via a new temporary access heading due east on a site access road running parallel and to the south of the existing L-3248.

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 exit off the M7, to the proposed site entrance, as identified in Figure 15.2a. The swept path assessment undertaken for these locations is discussed in Section 15.2.9.

The Proposed Grid Connection includes for the proposed onsite 110kV substation, associated underground 110kV cabling and 2no. new end masts connecting to the existing Ikerrin to Thurles overhead transmission line (OHL) which traverses the site in a northeast to southwest direction in the townland of Strogue. The underground cabling route measuring approximately 2km of which approx. 870m is located within the public road corridor. The Proposed Grid Connections and associated traffic related impacts are discussed in Section 15.2.7.

15.2.2.3 Proposed Construction Traffic Haul Route

In order to facilitate the construction of the Proposed Project, the majority of all rock and hardcore material for the Proposed Wind Farm element will be won from the on-site borrow pits. Materials required for the Proposed Grid Connection infrastructure (onsite 110kV substation, c.2km underground cable route connection and end mast towers) will, however, be sourced from local, appropriately authorised quarries. Potential quarries within 20km of the Site are shown on Figure 4-20.

The potential routes for general construction materials for the purposes of this assessment are shown in Figure 15-1b and are as follows;

- As per the TDR to the junctions with the L-3248. From this point the route travels northeast along the L-3248 for approximately 80 metres to a new site access junction located on the south side of the L-3248 for cars, LGVs and standard HGVs.
- From the southwest, south and southeast to Templemore, followed by north on the N62 for approximately 4.8kms before turning right onto the L-3482 and on to the proposed new access junction.
- From the southwest, south and southeast to Templemore, followed by east on the R433 for approximately 4kms, followed by a left turn onto the L-7039 travelling northwest for 0.8kms. At this point the route turns left at a proposed improved junction with the L-7039-1, before travelling west for approximately 1km towards the secondary site access serving the Site. This route will be used for all traffic associated with the construction of the Proposed Grid Connection infrastructure.

15.2.2.4 'Do-Nothing' Scenario

If the Proposed Project 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.

15.2.3 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.

15.2.3.1 Background Traffic Flows

The 7 locations included in the link flow assessment and for which base year 2023 traffic count data was collated are shown in Figure 15-2b. The locations included in the assessment are as follows,

- Link 1 – M7 between junctions 21 and 22,
- Link 2 – N62 north of L3248,
- Link 3 – N62, Templemore Main Street,
- Link 4 – N62, Templemore north,
- Link 5 – N62, South of L3248,
- Link 6 – L3248 leading to site,
- Link 7 – R433.

Two sources of data were used to provide all day traffic flows for the links included in the assessment, as set out in Table 15-1. For link 1 on the M7 data obtained from automatic traffic counters maintained by Transport Infrastructure Ireland (TII) was used. For the remaining 6 links, all day traffic counts were

undertaken at the N62 / L-3248 junction adjacent to the main development access, and at the N62 / R433 junction in Templemore, to provide 2-way links flows and junction turning count data. These traffic counts were undertaken by Traffinomics Ltd on Tuesday 12th September 2023. All base year Traffic count data is included as Appendix 15-1.

The all-day traffic flows observed for the base year 2023 are shown in terms of vehicle numbers in Table 15-2. 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 13,502 vehicles per day on the M7 to the north east of the site, to 4,421 vehicles per day of the N62 just north of the L-3248, to just 250 vehicles per day on the L-3248, all of which are on the TDR. On the other links that may be used for standard HGV deliveries, daily traffic volumes range from 9,385 vehicles on N62 Templemore Main Street, to 7,253 on the N62 north of Templemore, reducing to 4,583 on the N62 just to the south of the L-3248. A daily volume of 4,870 vehicles was observed on the R433 heading east from Templemore.

While link capacities are discussed for the construction year 2028 in further detail in Section 15.2.6.2, it is worth noting that the link flows observed on various links on the TDR and alternative delivery route were observed to be high in the year 2023, as set out in Table 15-2 and summarized below.

- Link 2 – N62, north of L3248 - All day traffic flow = 4,421 vehicles (88%)
- Link 3 – N62, Templemore Main Street - All day traffic flow = 9,385 vehicles (188%)
- Link 4 – N62, Templemore north - All day traffic flow = 7,253 vehicles (145%)
- Link 5 – N62, south of L3248 - All day traffic flow = 4,583 vehicles (92%)
- Link 7 – R433 - All day traffic flow = 4,870 vehicles (97%)

As they leave the urban area the link capacity for each link may be estimated based on road types and widths as set out in the TII Standards document DN-GEO-03031 Road Link Design, Table 6/1. For each of these roads it is considered in general that the road type is Type 3 single with a daily capacity of 5,000 vehicles. Based on this capacity and the flows above, it may be determined that Links 2, 5 and 7 are currently operating between 80-100% of capacity in the year 2023, with links 3 and 4, both on the N62, operating at 188% and 145% of capacity respectively. While the traffic flows observed on these links are high it is important when considering the impacts of the Proposed Project to consider the relative increase compared to background traffic levels. This issue is discussed further in Section 15.2.6.2.

Table 15-1 Count locations and data source

Link	Data source
1 – M7 between junctions 21 and 22	TII ATC site
2 – N62 north of L3248	Classified count
3 – N62, Templemore Main Street	Classified count
4 – N62, Templemore north	Classified count
5 – N62 south of L3248	Classified count
6 – L3248 leading to site	Classified count
7 – R433	Classified count

Table 15-2 All day traffic flows by location, year 2023 (2-way vehicles)

Link	2023
1 – M7 between junctions 21 and 22	13,502
2 – N62 north of L3248	4,421
3 – N62, Templemore Main Street	9,385
4 – N62, Templemore north	7,253
5 – N62 south of L3248	4,583
6 – L3248 leading to site	250
7 – R433	4,870

15.2.3.2 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 Tipperary and factors for the years relevant to this study are shown in Tables 15-3 and 15-4. Based on TII growth rates it is estimated that traffic volumes will increase by 6.1% during the period from 2023, when the base traffic data was collected, and the year 2028, when the construction of the Proposed Project is forecast to take place. Year 2023 and 2028 all day traffic flows on the study area network are compared in Table 15-5.

It should be noted that while the assumed construction year of 2028 may vary within the 10 year period for which planning permission is sought, 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 1.19% (as shown in Table 15-3 as 1.0119) and the traffic volumes generated by the Proposed Project will remain unchanged regardless of construction year, as presented subsequently in Section 15.2.4. For example, in the event that the construction year is 2030 rather than 2028, background traffic volumes will increase from the base year of 2023 by 8.6% rather that 6.1%, as also shown in Table 15-3.

TII traffic count data recorded at the TII count site on the M7, 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 shown in Table 15-6 and range from a minimum of 2.8% observed on Link 6 on the L-3248, to a maximum of 10.8% observed on the M7 to the northeast of the Site.

Table 15-3 TII traffic growth forecasts, growth per annum and cumulative, County Tipperary

Year	Lights – Annual Factor			Lights – Cumulative Factor		
	Low	Medium	High	Low	Medium	High
2023	1.0102	1.0119	1.0152	1.000	1.000	1.000
2024	1.0102	1.0119	1.0152	1.010	1.012	1.015
2025	1.0102	1.0119	1.0152	1.021	1.024	1.031
2026	1.0102	1.0119	1.0152	1.031	1.036	1.046
2027	1.0102	1.0119	1.0152	1.041	1.048	1.062
2028	1.0102	1.0119	1.0152	1.052	1.061	1.078
2029	1.0102	1.0119	1.0152	1.063	1.074	1.095
2030	1.0102	1.0119	1.0152	1.074	1.086	1.111

Table 15-4 TII traffic growth rates by growth scenario

Period	New Factors		
	Low	Medium	High
2023 – 2028	1.052	1.061	1.078

Table 15-5 All day traffic flows by location and year (2-way vehicles)

Link	2023	2028
1 – M7 between junctions 21 and 22	13,502	14,326
2 – N62 north of L3248	4,421	4,691
3 – N62, Templemore Main Street	9,385	9,957
4 – N62, Templemore north	7,253	7,695
5 – N62 south of L3248	4,583	4,863
6 – L3248 leading to site	250	265
7 – R433	4,870	5,167

Table 15-6 All day flows, percentage HGVs and flows by vehicle type, year 2023

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / lgvs	HGVs	Cars / lgvs	Total
1 – M7 between junctions 21 and 22	14,326	10.8%	1,547	12,778	3,713	12,778	16,492
2 – N62 north of L3248	4,691	10.5%	493	4,198	1,182	4,198	5,380
3 – N62, Templemore Main Street	9,957	7.2%	717	9,241	1,721	9,241	10,961
4 – N62, Templemore north	7,695	7.4%	569	7,126	1,367	7,126	8,493
5 – N62 south of L3248	4,863	10.3%	501	4,362	1,202	4,362	5,564
6 – L3248 leading to site	265	2.8%	7	258	18	258	276
7 – R433	5,167	4.9%	253	4,914	608	4,914	5,522

15.2.3.3 Irish Rail

The EIAR study boundary, which incorporates a larger area than the Proposed Project footprint, takes in a portion of the Dublin-to-Cork Irish Rail line which runs in a northeast to southwest direction approximately 20m south of the proposed Grid Connection cable route. The Railway bridge OBC 202 is located approximately 30m from the proposed underground grid connection cabling route

15.2.4 Proposed Project and Traffic Generation

Proposed Access Junctions

While the design of the junctions that will provide access to the proposed Site is discussed in Sections 15.2.9 and 15.2.10, a summary of the proposed access junctions is provided below.

Temporary Turbine Component Entrance

A temporary entrance will be constructed on the L-3248, adjacent to the N62 in the northwest of the Site. This entrance will facilitate the delivery of the turbine components and will be manned for the duration of the turbine component delivery phase. This new entrance measures approx. 1,349m^2 and was subject to autotrack assessment to identify the turning area required. Appropriate sightlines will be established to the north and south of the proposed turbine component entrance for the safe egress of traffic.

General Construction Entrance

The main construction entrance will be constructed off the L-3248, approximately 70m northeast of the N62. This entrance will be used as the main entrance for construction traffic and staff vehicles. Appropriate sightlines will be established to the north and south of the proposed Site entrance for the safe egress of traffic during the operational phase. An existing farm entrance adjacent to this new entrance will be closed permanently. This new main construction entrance on the L-3248 will continue to provide operational phase access to the Proposed Project and agricultural use access in lieu of the existing field gate being closed permanently. On completion of the construction phase, the Site entrance will be reduced in size and gated for security.

Secondary Site Entrance

A secondary site access will be established to the southeast of the site with the upgrade of the L-70391 Local Road which is within the Site and upgrade of the junction between the L-70391 and the L-7039. This entrance was subject to autotrack assessment to identify the turning area required. Appropriate sightlines will be established to the north and south of this entrance for the safe egress of traffic. The proposed works will result in the widening of 460m of the L-70391 road and resurfacing of the of the entire L-70391 (approx. 1.1km total length). This secondary Site entrance will also facilitate the construction of the Proposed Grid Connection, with the proposed substation located immediately adjacent to the L-70391 and will provide operational access for maintenance of the Proposed Project and existing public access to lands involved in the Proposed Project.

15.2.4.2 Development Trip Generation – During Construction

For the purpose of assessing the effects of traffic generated during the construction of the Proposed Project, the construction phase is in the following stages.

- Stage 1 – Proposed Project construction: groundworks, tree felling, construction of temporary construction compounds, turbine foundations, met mast foundations, onsite substation, internal electrical cabling and construction of the proposed underground grid connection cable route.
- 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 Project will be carried out in accordance with the CEMP, included as Appendix 4-3 of this EIAR, which will be agreed, where required, with the relevant Local Authority.

The construction phase of the Proposed Project 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 construction of the Proposed Project 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.

15.2.4.2.1 Stage 1 – Site Preparation and Groundworks

For assessment purposes, this stage of the Proposed Project construction, which includes the Site preparation and ground works tree felling, construction of temporary construction compounds, turbine foundations, met mast foundations, onsite substation, internal electrical cabling and construction of the proposed underground grid connection cable route, is assumed to last between 16 to 17 months (350 days). The total numbers of deliveries made to the Site during that period are shown in Table 15-7. It is estimated that a total of 6,741 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 Site over a 12-hour period, resulting in 9 HGV trips to and from the Site per hour.

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

The estimated additional daily traffic generated on the road network during these days are shown in Tables 15-8 and 15-9.

The figures show that on the 9 days that concrete will be delivered to the 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 15-8. Similarly, on the 341 days when other materials will be delivered to the Site, traffic volumes on the local network will increase by an average of 82 PCUs, as set out in Table 15.9.

Table 15-7 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
Sand / binding / stone / pile foundation	197	Truck

Ducting and cabling (internal)	264	Large artic
Tree felling	67	Truck
Crane (to lift steel)	1	Large artic
Stone for Wind Farm	2,370	Truck
Stone for Grid Connection	2,260	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	**6,741**	

Table 15-8 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 15-9 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
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

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Sand / binding / stone / pile foundation	72	Truck	2.4	472.8	1.39	2.77
Ducting and cabling (internal)	264	Large artic	2.4	633.6	1.86	3.72
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
Stone for Wind Farm	2,370	Truck	2.4	5,688.0	16.68	33.36
Stone for Grid Connection	2,260	Truck	2.4	5,424.0	15.91	31.81
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	5,781			13,874.4	40.69	81.4
* Estimation based on groundwork period of 341 working days						

15.2.4.2.2 Stage 2 – Turbine Construction

During the turbine construction stage, including delivery and assembly, there will be deliveries to the 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 also 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 Site during the turbine construction period are shown in Table 15-10, which summarises that a total of 72 trips will be made to and from the Site by extended artics, with a further 36 trips made by standard large articulated HGVs.

Table 15-10 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 Site on 5 days per week, which is a common delivery frequency for large turbine components from the port of entry to the 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 Site. The additional traffic movements for these two types of days are summarised in Tables 15-11 and 15-12. In Table 15-11 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 15-12, during the turbine construction phase.

Table 15-11 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
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

Material	Units	Truck Type	PCU Value	Total PCUs	2-way PCUs/ day
*Estimation based on 3 abnormal sized loads being delivered per day on 5 days per week (total 72 loads will take 24 nights spread over 5 weeks)					

Table 15-12 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

During the construction of the Proposed Project it is estimated that 100 jobs will be created at the Site. Of this total it is estimated that up to 70 staff members will be employed on the 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. 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 Project, 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 Project will be from maintenance personnel.

It is estimated that the traffic volumes that will be generated by the Proposed Project once it is operational will be minimal, with an estimated 1-2 staff employed on the Site at any time. The impact on the network of these trips during the operational stage is discussed in Section 15.2.6.

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.

15.2.5 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 in Chapter 4 of this EIAR, the turbine model to be installed on the Site will have an overall ground-to-blade tip height of 185 metres; blade rotor diameter of 163 metres and hub height of 103.5 metres. The turbine blades are the longest turbine component and a blade length of 81.5 metres has been assessed for the turbine delivery assessment for the Proposed Wind Farm.

It is noted that at Location 2 on the turbine delivery route it will be required to minimise the wheelbase of the vehicle and increase the over-sail of the rear tip of the blade from the standard 10m to 15m in order to minimise the impact at the existing N62 / L-3248 junction. This is discussed further in Section 15.2.9. The critical vehicles in terms of size and turning geometry requirements and used in the detailed route assessment discussed in Section 15.2.9 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 15-3a, and 15-3b for the options for the blade transporters and 15-3c for the tower transporter.

The key dimensions are as follows:

Transport of Blades – Standard articulated HGV with 10m blade overhang at rear (See Figure 15-3a)

Total length	86.9 m
Length of blade	81.5 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	81.5 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 off the L-3248 at the proposed main site entrance site entrance and at the secondary access via the L-7039 and L7039-1.

15.2.6 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 Project 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 Proposed Project travels to/from the Site from on the same route with the maximum increase in traffic volumes assessed on each link shown in Figure 15-2b.

15.2.6.1 Effect on Link Flows – During Construction

Background traffic volumes and Proposed Project generated traffic volumes are shown for the four typical construction stage scenarios, discussed in Section 15.2.4 and shown in Tables 15-13 to 15-16, 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 15-17 to 15-20. 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 Site.

If the concrete is delivered from the TDR it is forecast that the increase in traffic volumes will range from +3.5% on the M7 northeast of the site to +10.8% on the N62 just to the north of the L-3248, to a doubling of traffic flows (+211.1%) on the L-3248, which is currently lightly trafficked.

If deliveries are made from other potential routes traffic volumes may increase by up to +10.5% on both the N62 just to the south of the L-3248 and the R433 to the east of Templemore, to +6.9% on the N62 north of Templemore, to +5.3% on the N62 Templemore Main Street.

During Stage 1 – Site Preparation and Groundworks

For 341 days when the general construction and groundworks are undertaken an additional 151 PCUs will travel to/from the Site.

If the materials are delivered from the TDR it is forecast that the increase in traffic volumes will range from +0.9% on the M7 northeast of the site to +2.8% on the N62 just to the north of the L-3248, to a +54.8% increase on the L-3248 leading to the Site.

If deliveries are made from other potential routes traffic volumes may increase by up to +2.7% on the R433 to the east of Templemore, +2.7% on the N62 just to the south of the L-3248 to +1.8% on the N62 north of Templemore, to +1.4% on the N62 Templemore Main Street.

It is noted that all traffic for the proposed grid connection and the substation will be delivered via the L-7039 and the L-70391 at the southeastern end of the site.

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 Site, an additional 105 PCUs will travel to/from the Site.

It is forecast that the increase in traffic volumes will range from +0.6% on the M7 northeast of the Site to +2.0% on the N62 just to the north of the L-3248, to a +38.1% increase on the L-3248 leading to the Site.

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 Site. It is forecast that the increase in traffic volumes on these days will range from +0.4% on the M7 northeast of the site to +1.2% on the N62 just to the north of the L-3248, to a +23.2% increase on the L-3248 leading to the Site.

Table 15-13 Daily traffic volumes on during concrete pouring - background, Proposed Project generated and total (PCUs)

Link	Background PCUs			Proposed Project PCUs			Total PCUs (Background + Proposed Project)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – M7 between junctions 21 and 22	12,778	3,713	16,492	70	512	582	12,848	4,225	17,074
2 – N62 north of L3248	4,198	1,182	5,380	70	512	582	4,268	1,694	5,962
3 – N62, Templemore Main Street	9,241	1,721	10,961	70	512	582	9,311	2,233	11,543
4 – N62, Templemore north	7,126	1,367	8,493	70	512	582	7,196	1,879	9,075
5 – N62 south of L3248	4,362	1,202	5,564	70	512	582	4,432	1,714	6,146
6 – L3248 leading to site	258	18	276	70	512	582	328	530	858
7 – R433	4,914	608	5,522	70	512	582	4,984	1,120	6,104

Table 15-14 Daily Traffic volumes during site preparation and groundworks – background, Proposed Project generated and total (PCUs)

Link	Background PCUs			Proposed Project PCUs			Total PCUs (Background + Proposed Project)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total

1 – M7 between junctions 21 and 22	12,778	3,713	16,492	70	81	151	12,848	3,794	16,643
2 – N62 north of L3248	4,198	1,182	5,380	70	81	151	4,268	1,263	5,531
3 – N62, Templemore Main Street	9,241	1,721	10,961	70	81	151	9,311	1,802	11,112
4 – N62, Templemore north	7,126	1,367	8,493	70	81	151	7,196	1,448	8,644
5 – N62 south of L3248	4,362	1,202	5,564	70	81	151	4,432	1,283	5,715
6 – L3248 leading to site	258	18	276	70	81	151	328	99	427
7 – R433	4,914	608	5,522	70	81	151	4,984	689	5,673

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

Link	Background PCUs			Proposed Project PCUs			Total PCUs (Background + Proposed Project)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – M7 between junctions 21 and 22	12,778	3,713	16,492	45	60	105	12,823	3,773	16,597
2 – N62 north of L3248	4,198	1,182	5,380	45	60	105	4,243	1,242	5,485
3 – N62, Templemore Main Street	9,241	1,721	10,961	45	60	105	9,286	1,781	11,066
4 – N62, Templemore north	7,126	1,367	8,493	45	60	105	7,171	1,427	8,598
5 – N62 south of L3248	4,362	1,202	5,564	45	60	105	4,407	1,262	5,669
6 – L3248 leading to site	258	18	276	45	60	105	303	78	381
7 – R433	4,914	608	5,522	45	60	105	4,959	668	5,627

Table 15-16 Daily traffic volumes during turbine construction – standard artic HGVs, background, Proposed Project generated and total (PCUs)

Link	Background PCUs			Proposed Project PCUs			Total PCUs (Background + Proposed Project)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – M7 between junctions 21 and 22	12,778	3,713	16,492	45	19	64	12,823	3,732	16,556
2 – N62 north of L3248	4,198	1,182	5,380	45	19	64	4,243	1,201	5,444
3 – N62, Templemore Main Street	9,241	1,721	10,961	45	19	64	9,286	1,740	11,025
4 – N62, Templemore north	7,126	1,367	8,493	45	19	64	7,171	1,386	8,557
5 – N62 south of L3248	4,362	1,202	5,564	45	19	64	4,407	1,221	5,628
6 – L3248 leading to site	258	18	276	45	19	64	303	37	340
7 – R433	4,914	608	5,522	45	19	64	4,959	627	5,586

Table 15-17 Summary daily effects of Proposed Project traffic - concrete pouring - % increase and number of days

Link	Background	Proposed Project	Total	% increase	Estimated No. of days
1 – M7 between junctions 21 and 22	16,492	582	17,074	3.5%	9
2 – N62 north of L3248	5,380	582	5,962	10.8%	9
3 – N62, Templemore Main Street	10,961	582	11,543	5.3%	9
4 – N62, Templemore north	8,493	582	9,075	6.9%	9
5 – N62 south of L3248	5,564	582	6,146	10.5%	9

Link	Background	Proposed Project	Total	% increase	Estimated No. of days
6 – L3248 leading to site	276	582	858	211.1%	9
7 – R433	5,522	582	6,104	10.5%	9

Table 15-18 Summary daily effect of traffic - site preparation and ground works - % increase and number of days

Link	Background	Proposed Project	Total	% increase	Estimated No. of days
1 – M7 between junctions 21 and 22	16.492	151	16,643	0.9%	341
2 – N62 north of L3248	5,380	151	5,531	2.8%	341
3 – N62, Templemore Main Street	10,961	151	11,112	1.4%	341
4 – N62, Templemore north	8,493	151	8,644	1.8%	341
5 – N62 south of L3248	5,564	151	5,715	2.7%	341
6 – L3248 leading to site	276	151	427	54.8%	341
7 – R433	5,522	151	5,673	2.7%	341

Table 15-19 Summary daily effect of Proposed Project traffic - turbine construction, extended artics - % increase and number of days

Link	Background	Proposed Project	Total	% increase	Estimated No. of days
1 – M7 between junctions 21 and 22	16,492	105	16,597	0.6%	24
2 – N62 north of L3248	5,380	105	5,485	2.0%	24
3 – N62, Templemore Main Street	10,961	NA	NA	NA	NA

Link	Background	Proposed Project	Total	% increase	Estimated No. of days
4 – N62, Templemore north	8,493	NA	NA	NA	NA
5 – N62 south of L3248	5,564	NA	NA	NA	NA
6 – L3248 leading to site	276	105	381	38.1%	24
7 – R433	5,522	NA	NA	NA	NA

Table 15-20 Summary daily effects of Proposed Project traffic- turbine construction, standard artic HGVs – % increase and number of days

Link	Background	Proposed Project	Total	% increase	Estimated No. of days
1 – M7 between junctions 21 and 22	16,492	64	16,556	0.4%	9
2 – N62 (north of L3248)	5,380	64	5,444	1.2%	9
3 – N62 (Templemore Main Street)	10,961	64	11,025	0.6%	9
4 – N62 (Templemore north)	8,493	64	8,557	0.8%	9
5 – N62 (south of L3248)	5,564	64	5,628	1.2%	9
6 – L3248 leading to site	276	64	340	23.2%	9
7 – R433	5,522	64	5,586	1.2%	9

15.2.6.2 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 15-21 to 15-23 with the capacity of the links on the route options,

as shown in Table 15-21, varying from 52,000 vehicles per day on the M7, down to 5,000 vehicles per day for the majority of the delivery routes. 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 15-22, with the percentage capacity reached for each stage shown in Table 15-23.

Based on this assessment, it is forecast that with the exception of the M7 (32%), and the L3248 leading to the main site access (9%), the remaining links on the delivery route are forecast to operate over capacity by the construction year 2028 without the additional traffic forecast to be generated by the Proposed Project. For these links it is forecast that the level of capacity utilised by background traffic flows by the year 2028 will range from +105-115% on the N62 north of the L-3248 on the TDR, the section of the N62 south of the L-3248 and the R433. For the N62 in the centre of Templemore forecast levels for background traffic are +173% on the northern exit from the town, and +219% on Templemore Main Street.

As was set out previously in Section 15.2.3.2, it was determined that Links 2, 5 and 7 are currently operating between 80-100% of capacity in the year 2023, with links 3 and 4, both on the N62, operating at 188% and 145% of capacity respectively in the year 2023, and that when assessing the impact of the generated traffic on link flows on the delivery route, it is important to consider the relative increase due to the Proposed Project.

Based on this assessment, it is forecast that on the N62 on the TDR just to the north of the L3248 is forecast to operate at 108% of capacity by the year 2028 with background traffic only, increasing to a maximum of 119% for the 9 days during which the concrete foundations are poured. For all other construction days, the link is forecast to operate at a maximum of 111% capacity or 3% points above background levels. Similar levels of increases are forecast for the N62 south of the L3248 (background 111%, increasing to 123% during concrete pours, reducing to maximum of 114% during remainder of construction period) and the R443 (background 110%, increasing to 122% during concrete pours, reducing to maximum of 113% during remainder of construction period).

It is noted that sections of the N62 on the delivery route are forecast to operate significantly over capacity for the do nothing scenario, with the busiest being the N62 Templemore Main Street which is forecast to operate at 219% of capacity for the do nothing scenario, increasing to a maximum of 231% during the foundation concrete pours, reducing to 222% (+3 % points) for the general constriction period.

Table 15-21 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 – M7 between junctions 21 and 22	2 x 7m	Motorway	52,000
2 – N62 north of L3248	6.0	Type 3 single	5,000
3 – N62, Templemore Main Street	6.0	Type 3 single	5,000

4 – N62, Templemore north	6.0	Type 3 single	5,000
5 – N62 south of L3248	6.0	Type 3 single	5,000
6 – L3248 leading to site	<6.0	Local	3,000
7 – R433	<6.0	Type 3 single	5,000

Table 15-22 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 – M7 between junctions 21 and 22	52,000	16,492	17,074	16,643	16,597	16,556
2 – N62 north of L3248	5,000	5,380	5,962	5,531	5,485	5,444
3 – N62, Templemore Main Street	5,000	10,961	11,543	11,112	NA	11,025
4 – N62, Templemore north	5,000	8,493	9,075	8,644	NA	8,557
5 – N62 south of L3248	5,000	5,564	6,146	5,715	NA	5,628
6 – L3248 leading to site	3,000	276	858	427	381	340
7 – R433	5,000	5,522	6,104	5,673	NA	5,586

Table 15-23 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 – M7 between junctions 21 and 22	52,000	32%	33%	32%	32%	32%
2 – N62 north of L3248	5,000	108%	119%	111%	110%	109%
3 – N62, Templemore Main Street	5,000	219%	231%	222%	221%	221%
4 – N62, Templemore north	5,000	170%	181%	173%	172%	171%
5 – N62 south of L3248	5,000	111%	123%	114%	113%	113%
6 – L3248 leading to site	3,000	9%	29%	14%	13%	11%
7 – R433	5,000	110%	122%	113%	113%	112%

15.2.6.3 Effect on Link Flows – During Operation

Once the Proposed Project is operational it is estimated that there will be 1-2 staff members employed on site with a similar number of vehicle trips. As stated previously it is likely that the Proposed Project 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 imperceptible.

15.2.6.4 Effect on Junctions – During Construction

The capacity of the junction most affected on the delivery route will be the junction between the N62 and the L-3248 which leads to the main access junction. As set out above the N62 is forecast to operate over link capacity north and south of the L-3248 (as shown in Table 15-23), and the traffic volumes on the L-3248 are forecast to increase by 211.1% during the 9 days that the foundations are poured (see Table 15-17) and by 55.5% during the general groundworks and construction period (see Table 15-18).

The junction capacity tests were undertaken 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, in accordance with TII requirements.

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 15-17 to 15-20 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 site will take place during the day after the workers have arrived, and before they leave at the end of the day and will therefore not occur at the same time.

N62 / L-3248 Junction Capacity Test Results

The AM and PM peak hour traffic flows for the base year 2023 and the proposed construction year of 2028 are shown in Figures 15-5a and 15-5b respectively. The additional traffic movements that are forecast to be generated by construction workers are shown in Figure 15-5c, with proposed construction year 2028 traffic flows including the additional construction traffic shown in Figure 15-5d. The results of the junction capacity tests are shown in Table 15-24 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 4.0% to 5.7% during the AM peak hour, and from 5.9% to 8.5% 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%.

Table 15-24 Junction capacity test results, N56 / L-3248 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 L-3248 - right turn	1.1%	0.01	0.19	4.1%	0.04	0.19
	From L-3248 – left turn	4.0%	0.04	0.11	5.7%	0.06	0.11
	From N62 – right turn	2.1%	0.03	0.09	2.2%	0.03	0.09
PM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From L-3248 - right turn	0.3%	0.00	0.19	0.4%	0.00	0.19

Period	Location	Without construction traffic			With construction traffic		
	From L-3248 – left turn	3.9%	0.04	0.11	3.9%	0.04	0.11
	From N62 – right turn	5.9%	0.10	0.10	8.5%	0.15	0.10

Effect on Junctions – During Operation

As discussed in Section 15.2.6 it is forecast that once operational, the Proposed Project is expected to generate 1 to 2 trips per day for maintenance purposes. It is therefore concluded that the Proposed Project will have an imperceptible effect on the local network once constructed.

15.2.7 Effect on Network of Proposed Grid Connection

A detailed description of the Proposed Grid Connection is provided in Chapter 4 of this EIAR. It is proposed that the 110kV onsite electrical substation is connected by means of an underground 110kV electricity cable to the existing Ikerrin to Thurles 110kV overhead transmission line which traverses the Site. The proposed connection point is located 1.4 kms to the east of the proposed substation (as the crow flies). The proposed underground electrical cabling route is approximately 2kms in length with approx. 870m located within the public road corridor.

The 110kV onsite substation and temporary construction compound have been considered in Section 15.2.6 above. The volumes of stone that will be delivered to the site for the purpose of the underground grid connection cable route is also considered in Section 15.2.6. All traffic for proposed Grid Connection and the substation will be delivered via the L-7039 and the L-70391 at the southeastern end of the site.

For the extent of the underground electrical cabling route that will impact on the public road network, this is considered in the following 4 sections, as indicated in Figure 15-4a and summarised in Table 15-25.

Table 15-25 Underground Grid connection cable route link summary, link length (km), construction duration (days) and diversion during construction

Grid route section	On-road/ off-road	Length (kms)	Construction Duration (days)	Diversion during construction (kms)
Section 1 – L-7039-1	Off-road	0.15	1.5	0.0
Section 2 – L-7039	On-road	0.85	8.5 + 10 for bridge crossing = 18.5	5.2
Section 3 – L-7038	0.02km on road	0.02	1	8.0
	0.18km off road	0.18	2	0
Section 4 – off road	Off road	0.82	8.2	0

Grid route section	On-road/ off-road	Length (kms)	Construction Duration (days)	Diversion during construction (kms)
Total route		2.02kms	31	NA
Total route on road		0.87kms	20	NA

Section 1 – (length 0.15 kms) – The underground electrical cabling route will continue northeast parallel with the L-7039-1 for approximately 0.15km before joining the L-7039. This section of the underground cabling route will be constructed within a new track in the field to the north, and the L-7039-1 will remain open for local access. Based on an average rate of 100m of cable being constructed in one day, it is estimated that this section of the underground electrical cabling route will take 1.5 days to complete.

Section 2 – (length 0.85 kms) – The underground electrical cabling route then continues southeast along the L-7039 for approximately 0.85 kms to a point where it meets the R433 which travels northeast from Templemore. This will take 8.5 days to construct. In addition there will be an HDD required to cross the bridge on this section of the route which will require an additional 10 construction days. During the 18.5 days required to construct this section of the cable grid route traffic will require to divert onto the route shown in 15.4b which will result in a diversion of 5.2 kms. This part of the route will include the crossing of the R433 with a "stop-go" arrangement operated in order to retain 2-way traffic flow on the regional road. The location of the construction will be transient in nature with the extent of the section of road closed kept to a minimum.

Section 3 – (length 0.20 kms) – The underground electrical cabling route then travels south on the L-7038 for 0.20 kms. For the first 20m construction will take place on the L-7038 with a full road closure required. During this one day of construction a temporary diversion for local traffic will be required, as shown in Figure 15.4c. This will result in a temporary diversion of 8.0 kms.

At this point the route diverts into the field on the eastern side of the L-7038 for the remaining 0.18 kms. There will be no diversion to local traffic required during these 2 construction days.

Section 4 – (length 0.82 kms) – This section of the proposed underground grid connection cable route heads off-road in a northeastern direction. This section of the route will require materials to be delivered to the Site although, being off-road, there will be no road closure required during this 8-day period.

In summary, the route will take a total of approximately 31 days to construct during which a road closure will be required at one point on the network on approximately 20 of these days. The diversions incurred will be a maximum of 8kms. It is noted that the diversions will be incurred by very few trips, as both the L-7039 and the L-7038 local roads are very lightly trafficked.

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 a further trip 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.

The construction methodology of providing an underground grid connection 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 TMP submitted as part of the Construction Environment Management Plan (CEMP), included as Appendix 4-

3 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.

15.2.8 Traffic Management of Large Deliveries

Traffic management measures are included in Section 15.2.17.2 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. It is not anticipated that any sections of the local road network will be closed during the delivery of the abnormally sized loads.

Refer also to the Construction and Environmental Management Plan (CEMP), Appendix 4-3 of this EIAR, for the Traffic Management Plan.

15.2.9 Abnormal Load Route Assessment

A route assessment was undertaken covering the proposed turbine delivery route, with the route and assessment locations shown in Figure 15-2a.

Dublin Port is the proposed point of arrival for the large turbine components for the Proposed Project. The port is a well-established point of arrival for wind turbine components of similar scale into the State on a regular basis, as is the road network between the port and the national road network. It is proposed that the abnormal loads will be transported from Dublin Port northwards on the M50 before circulating Dublin. The route then exits the M50 at junction 9 onto the N7. The route then travels southwest on the N7 / M7 to junction 22 located to the south of Roscrea. The extent of the Turbine Delivery Route from Dublin Port is shown in Figure 4-33.

A swept path analysis was 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 Project.

Location 1 – M7 junction 22 left slip / N62 junction

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-6 and 15-7 respectively. The swept path for the blade transporter shows that as the vehicle turns left off the M7, in order to minimise the impact on the eastern corner of the M7 / slip road junction, the blade tip will be required to over-sail into the eastbound carriageway of the M7. This will require to

be managed in consultation with TII and will require a short term closure of the eastbound arm of the motorway during the delivery of the turbine blades.

Location 2 – N62 / L-3248 / site access junction

The proposed temporary access for the abnormally sized loads is shown in Figure 15-8. The temporary access for the abnormally sized loads is located on the southern side of the L-3248 directly into the junction with the N62. For this reason, this access will be opened temporarily only on the nights that the abnormally sized vehicle convoys deliver to the Site, with Site access at this location managed by An Garda Siochana and staff provided by the haulage company. At all other times during the construction period this access will be closed by means of a gate/ traffic barrier. On the completion of the construction phase this location will be fenced off and re-instated to its original state and will be opened only for the purpose of replacing large turbine component parts.

The autotrack assessment shown in Figures 15-10 and 15-11 demonstrates that the temporary access proposed on the L-3248 will accommodate the turning requirements of the blade and tower transport vehicles.

15.2.10 Other Access Junctions

Location 3 –L-3248 site access junction

It is proposed to construct a new general construction traffic and operational maintenance access off the L-3248, as shown in Figure 15-8. This access is situated on the southern side of the L-3248 approximately 80m to the east of the N62. The junction has a radius of 13m on the western corner to provide for standard HGVs, in accordance with TII guidelines Geometric Design of Junctions (DN-GEO-03060). Visibility splays that will be kept clear during the construction and operational stages of the Proposed Project are shown in Figure 15-9. Splays of 90m at a setback of 2.4m will be provided which is appropriate for a 60 km/h operational speed as set out in the Tipperary County Development Plan 2022-2028, Appendix 6 Development Management Standards, Table 6.2.

Location 4 – L-7039 / L-7039-1 junction

It is proposed that some general construction traffic, including traffic associated with the Proposed grid connection, will gain access to the Site via the L-7039 / L7039-1 junction. It is proposed to improve the existing junction as set out in Figure 15-12, with the junction radius at the southern corner increased to 13m to provide for standard HGVs, in accordance with TII guidelines Geometric Design of Junctions (DN-GEO-03060). It is also proposed to widen 460m of the existing L-7039-1 carriageway to 5m in the proximity of the junction, and resurface the remainder of this road.

Visibility splays that will be kept clear during the construction and operational stages of the Proposed Project are shown in Figure 15-13. Splays of 90m at a setback of 2.4m will be provided which is appropriate for a 60 km/h operational speed.

The autotrack assessment shown in Figure 15-14 demonstrates that the improved junction will accommodate the turning requirements of a large standard articulated HGV.

Location 5 – Crossing of L-7039-1 and access for maintenance

The proposed temporary access routes for abnormally sized loads at this location are shown in Figure 15-15. These include a temporary crossing of the L-7039-1 to turbines no 8 and no. 9 and a right turn merge with the L-7039-1 to access turbine no 6 and no. 7. These areas will be opened temporarily only on the nights that the abnormally sized vehicle convoys are delivered to the site, with site access managed by An Garda Siochana and staff provided by the haulage company. At all other times during the

construction period the short sections comprising these routes will be closed by means of a gate. On the completion of the construction phase these sections will be closed off using reflective posts or similar. These sections will only be opened for the purpose of replacing large turbine component parts.

The proposed crossing of the L-7039-1 for general construction traffic and for maintenance access during the operational stage is also shown in Figure 15-15. The junction is in the form of a crossroads and it is therefore proposed that the junction will be managed by site staff during the construction period. During the operational phase it is proposed that the minor arms of the junction providing access to the site are both gated, with these gates opened by maintenance staff when required.

Visibility splays that will be kept clear during the construction and operational stages of the Proposed Project are shown in Figure 15-16. Splays of 70m at a setback of 2.4m will be provided which is appropriate for a 50 km/h operational speed as set out in the Tipperary County Development Plan 2022-2028.

The autotrack assessment shown in Figures 15-17 and 15-18 demonstrates that the temporary access proposed across and along the L-7039-1 will accommodate the turning requirements of the blade and tower transport vehicles.

15.2.11 Provision for Sustainable Modes of Travel

15.2.11.1 Walking and Cycling

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

15.2.11.2 Public Transport

Public bus routes 395 (Templemore / Thurles / Tipperary) and 812 (Nenagh / Roscrea / Templemore / Urlingford) travers the site boundary, stopping at Templemore. It is noted that at present these services are infrequent, and while staff will be encouraged to use them, they are unlikely to be suitable for most construction staff to access the Site. The provision of mini-buses will be considered for transporting staff to and from the Site in order to minimise traffic generation and parking demand on the Site. As the proposed underground grid connection 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.

15.2.12 Likely and Significant Effects and Associated Mitigation Measures

15.2.12.1 'Do-Nothing' Scenario

If the Proposed Project 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 and the potential to impact on Irish Rail infrastructure would be removed.

If the Proposed Project were not to proceed, the opportunity to capture part of Tipperary's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

If the Proposed Project were not to proceed, the opportunity to retore a segment of the Eastwood River by improving channel stability, instream habitat and establishing a natural wooded riparian buffer would be lost. Please see Appendix 6-4 Biodiversity Management and Enhancement Plan for details.

15.2.12.2 Construction Phase: Traffic and Transport

During the 9 days when the concrete foundations are poured, the effect on the surrounding road network will be negative. If the concrete is delivered from the TDR it is forecast that the increase in traffic volumes will range from +3.5% on the M7 northeast of the Site to +10.8% on the N62 just to the north of the L-3248, to a doubling of traffic flows (+211.1%) on the L-3248, which is currently lightly trafficked. If deliveries are made from other potential routes traffic volumes may increase by up to +10.5% on both the N62 just to the south of the L-3248 and the R433 to the east of Templemore, to +6.9% on the N62 north of Templemore, to +5.3% on the N62 Templemore Main Street. This will have a temporary slight negative effect on the delivery routes with the impact forecast to be moderate on the short section of the L-3248 leading to the main access junction.

During 341 days when general construction materials are delivered to the Site, if materials are delivered via the TDR it is forecast that the increase in traffic volumes will range from +0.9% on the M7 northeast of the Site to +2.8% on the N62 just to the north of the L-3248, to a +54.8% increase on the L-3248 leading to the Site. If deliveries are made from other potential routes traffic volumes may increase by up to +2.7 on the R433 to the east of Templemore. +2.7% on the N62 just to the south of the L-3248, to +1.8% on the N62 north of Templemore, to +1.4% on the N62 Templemore Main Street. This will have a temporary negative effect on the study network ranging from slight on the majority of the delivery routes to moderate on the short section of the L-3248 leading to the main access junction.

During the 24 days when the various component parts of the wind turbine plant are delivered to the 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 +0.6% on the M7 northeast of the site to +2.0% on the N62 just to the north of the L-3248, to a +38.1% increase on the L-3248 leading to the site. It is forecast that there will be a negative temporary, slight 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 Site for the Proposed Wind Farm, it is forecast that the increase in traffic volumes on these days will range from +0.4% on the M7 northeast of the site to +1.2% on the N62 just to the north of the L-3248, to a +23.2% increase on the L-3248 leading to the site. This will have a temporary imperceptible negative effect on the M7, and temporary slight negative effect on the rest of the delivery routes.

With respect to the traffic volumes that will be generated during the construction of the underground grid connection cable route, all traffic for this and the substation will be delivered via the L-7039 and the L-70391 at the southeastern end of the site. It is estimated that there will be approximately 14 daily return trips made by a truck transporting materials, and 4 return trips made by a car to transport construction staff, to and from the Site. Short term diversions are forecast for local traffic although the traffic volumes that will be impacted on the local road network are low. By its nature the effects of these additional trips and diversions on the network will be transient, will be temporary and will be slight.

15.2.13 Construction Phase: Irish Rail

Identification of Impact

Proposed Wind Farm

The Dublin to Cork Irish Railway line travels through the EIAR Study Boundary, however, no wind farm infrastructure will physically interact with the line.

The proposed borrow pit is not located near any Irish Rail infrastructure. Therefore the temporary borrow pit will have a temporary negative imperceptible effect on Irish Rail infrastructure.

The spoil placement areas are not located near any Irish Rail infrastructure. Therefore the creation of the spoil placement areas will have a temporary negative imperceptible effect on Irish Rail infrastructure.

The river restoration area is not located near any Irish Rail infrastructure. Therefore the river restoration plan will have a temporary negative imperceptible effect Irish Rail infrastructure.

Identification of Impact

Proposed Grid Connection

The Dublin-to-Cork Irish Rail line railway line runs in a northeast-to-southwest direction, at a minimum of 20m south of the proposed Grid Connection cable route. No proposed grid infrastructure will physically interact with the railway line. There is no requirement to cross Railway bridge OBC 202 located approximately 30m south of the Proposed Grid Connection infrastructure. There will be no interference with the railway slope embankment or zone of influence of 5m. The proposed grid route will run at a minimum of 20m north of the railway track and therefore more than sufficient setback is incorporated into the grid design.

Mitigation and Monitoring Measures

- Cognisance of requirements for third parties as set out in 'CCE Department Technical Guidance Document CCE-TMS-310 Guidance on Third Party Works' and 'CCE Departmental and Multidisciplinary Standard I-DEP-0121 Third Party Works: Additional Details of Railway Safety Requirements' will be adhered to.
- Contact will be made to IEDR 30 days prior to the works that will take place at a minimum of 20m northwest of CIE infrastructure.

Residual Impact

With the implementation of the proposed mitigation measures the residual impact is negative, imperceptible, temporary, effect on Irish Rail infrastructure during the construction phase.

Significance of Effects

Based on the assessment above the effects on Irish Rail infrastructure during the construction phase of the Proposed Project will be imperceptible.

15.2.14 Operational Phase: Traffic and Transport

The impacts on the surrounding local highway network will be negligible given that there will only be an average of approximately 1 to 2 trips made to the Site for the Proposed Wind Farm by car or light goods vehicle per day, with less than that required for the Proposed Grid Connection. The effects of the maintenance traffic on the surrounding highway network will therefore be imperceptible.

15.2.15 Operational Phase: Irish Rail

Identification of Impact

Proposed Wind Farm

A general submission by Irish Rail was made to MKO pertaining to potential for impacts from turbines on antennae along track citing a 2002 French Study. The proposed temporary borrow pit, proposed spoil management areas and proposed river restoration plan are only associated with the construction phase of the Proposed Project.

Identification of Impact

Proposed Grid Connection

The Irish Rail scoping response as detailed in section 15.2.1.4 refers to the potential for electromagnetic interference with signalling cables parallel to the track:

'High power cables parallel to the track are particularly liable to cause electromagnetic interference with signalling cables parallel to the track (this is why we normally require cables to cross the railway at right angles as they are less likely to cause electromagnetic interference). Given the proximity of the cable parallel to the track, an electromagnetic compatibility assessment report will be required to show that interference will not occur. For guidance on what is required for this report they should refer to the CRR document[3].'

Mitigation Measures

- There will be no operational impact on properties (residential or other uses) as the ICNIRP guidelines will not be exceeded at any distances even directly above the cables.
- As illustrated in the ESB EMF booklet 2017 (section 15.3.5.2.2 below), EMF from 110kV underground cables diminishes quickly with distance from cable dropping from 4µT to 0.5µT at 10m away, reducing to almost 0µT at 20m.The proposed Grid Connection cable route will be sited at a minimum 20m from the railway track.
- Cognisance of requirements for third parties as set out in 'CCE (Chief Civil Engineers) Department Technical Guidance Document CCE-TMS-310 Guidance on Third Party Works' and 'CCE Departmental and Multidisciplinary Standard I-DEP-0121 Third Party Works: Additional Details of Railway Safety Requirements' will be adhered to.
- Contact will be made to IEDR (Iarnród Éireann Designated Representative) 30 days prior to the works that will take place at a minimum of 20m northwest of CIE infrastructure.
- Engagement with Irish Rail will continue during the operational phase. The implementation of a retranmsitter may be implemented at the Site if required, in

[3] *Irish Rail Industry 2020 Irish Railway Standard IRS-203-B: EMC Co-ordination. Available at: https://www.crr.ie/assets/files/pdf/15941257845371181.pdf*

agreement with Irish Rail. The French Study states that 95% approximately cases are settled amicably with the installation of a rebroadcaster by the wind developer, should any interference be detected. The 2006 WEDGs also acknowledges that wind turbines produce electromagnetic radiation which can interfere with communications but that '*electromagnetic interference can be overcome'* by installation of deflectors or repeaters.

Residual Impact

With the implementation of the proposed mitigation measures listed above, the residual impact is negative, imperceptible, long-term effect on Irish Rail infrastructure during the operational phase of the Proposed Project.

Significance of Effects

Based on the assessment above the effects on Irish Rail infrastructure during the operational phase of the Proposed Project will be imperceptible.

15.2.16 Decommissioning Phase: Traffic and Transport

The wind turbines proposed as part of the Proposed Project 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 Proposed Wind Farm, 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 Wind Farm 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 will remain in place as it will remain under the management and operation of EirGrid. There are no impacts associated with this.

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

15.2.17 Decommissioning Phase: Irish Rail

The impact assessment outcome of the decommissioning phase on Irish Rail infrastructure will be the same as the construction phase. The effects on Irish Rail infrastructure during this phase are not significant.

15.2.17.1 Cumulative Effects

A detailed assessment of all developments at varying stages in the development process (from pre-planning to operational), is set out in Section 2.8 of Chapter 2 with all developments included listed in Appendix 2-1. The potential cumulative traffic effects with the Proposed Project are assessed based on the following criteria;

- Project status (pre-planning to operational)
- Degree of overlap with the Proposed Project delivery highway network (low to high)
- Traffic volumes (low to high).

Other wind farms

From a review of all existing and approved wind farms set out in Appendix 2-1 it has been determined that the potential for cumulative impacts will only occur with other wind farms that have yet to be constructed, as the traffic generation for existing operational wind farms is very low.

As set out in Table 15-26 there is just 1 permitted Wind Farm development within 20km of the Proposed Project, yet to be constructed, that has the potential to cause cumulative effects in relation to traffic and transport. The planning application is for the increase in size of the permitted, but yet to be constructed, 22 turbines at the Upperchurch Wind Farm, located 2km to the west of Upperchurch Village in County Tipperary. This permitted development is located within relatively close proximity of the Proposed Project and with the TDRs for both developments potentially sharing common sections of the M7 and the N62. In the event that the construction of the Proposed Project coincides with the Upperchurch Wind Farm, the traffic related cumulative impacts would be negative, short-term and moderate, based on the potential overlap of TDRs and associated traffic generation. It is therefore proposed that the construction phase of the Proposed Project will be scheduled, where possible, to avoid the construction phases of the permitted Upperchurch Wind Farm. This will ensure that the potential for cumulative effects is minimised.

Other development applications in the planning system

A planning search was undertaken by MKO of the EIA planning register for all development planning applications within 25km of the Proposed Project site, as set out in Appendix 2-1. Of the developments included in the list it was considered that the 12 proposed developments listed in Table 15-27 should be considered. Based on the location and scale of these developments it is considered that the potential for cumulative impacts with the Proposed Project are slight.

Table 15-26 Summary of other wind farms considered in cumulative assessment and potential for cumulative traffic effects with Proposed Project

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential cumulative traffic effects
1 – ABP -310171-21 Upperchurch - Wind Farm – Amendments to the authorised (but not constructed) twenty-two turbine Upperchurch Windfarm, previously authorised under ABP Ref:L22.243040. To include an increase in the size of the authorised wind turbines and amendments to the two authorised met masts - Located 2km west of Upperchurch Village, County Tipperary.	Permitted	Medium	Medium	Medium

Table 15-27 Summary of other wind farms considered in cumulative assessment and potential for cumulative traffic effects with Proposed Project

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential cumulative traffic effects
1 – 20816 Tipperary CC– Upgrade of existing anaerobic digestion facility – Derryville Moyne, Thurles	Conditional	Low	Low	Low
2 – 21599 Kilkenny CC – Recommencement of underground mining – Galmoy, Co Kilkenny	Conditional	Low	Low	Low
3 – 20211 Tipperary CC – Demolition of 3 pig houses and construct a second stage weaner house, extend farrowing	N/A	Low	Low	Low

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential cumulative traffic effects
house, extend a loose sow house, pre-finisher house and slurry reception tank – Ballymackey, Nanagh, Co Tipperary				
4 – 22716 Laois CC– Recomencemnt of underground mining – Kyle, Co Laois	Conditional	Low	Low	Low
5 – ABP-306204-19 ABP – Proposed 110kV Substation and associated works – Mountphilips to Knockcurraghbola, Upperchurch, County Tipperary	Conditional	Low	Medium	Low
6 – 2260395 Tipperary CC – Bioproduct Campus – Derryville Moyne, Thurles, County Tipperary	Conditional	Low	Medium	Low
7 – 21627 Kilkenny County Council – Grid connection cable route, Killeen, Rathnacan, Gortnagap, Kyleballyoughter, Courtstown, Raheen, Lates, Curraghscarteen, Canvarstown, Trenchardstown, Lisnalea, Hillend, Coldharbour, Killahy, Greenhill, Lughinny, Craddockstown, Tubbrid Lower, Clomantagh Lower, Barna, Newtown	Conditional	Low	Low	Low
8 – PL92.249060 ABP – 58.11 Ha solar PV Farm – Leonards Bog, The Sheehys, Derrymore, Roscrea	Conditional	Medium	Low	Low
9 – 21929 – Tipperary CC - Extension to	Conditional	Low	Low	Low

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential cumulative traffic effects
existing sand and gravel extraction – Garrane, Templederry, Nenagh, Co Tipperary				
10 – 20550 ABP – Increase the annual waste intake at an existing biological waste treatment plant from 45,000 tonnes to 80,000 tonnes - . Ballybeg, Littleton, County Tipperary	Conditional	Low	Low	Low
11 – 18601296 Tipperary CC - A biorefinery facility comprising a building with processing areas, plant rooms, stores, personnel and administrative areas - Killoran, Moyne, Thurles, Co Tipperary	Conditional	Low	Medium	Low
12 – 21599 – Kilkenny CC – Recommencement of underground mining at the former Galmoy Zinc and Lead Mine - Kyle, Co. Laois	Conditional	Low	Low	

As determined above, the effects on Irish Rail assets during the construction, operation or decommissioning phases of the Proposed Project will be not significant. Therefore, no significant cumulative effects are foreseen.

15.2.17.2 Mitigation Measures

This section summarises the mitigation measures to minimise the effects of the Proposed Project 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 15.2.9.

Mitigation Measures During the Construction Stage

The successful completion of this project 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 Project in order to minimise the effects of the additional traffic generated by the Proposed Project.

A detailed **Traffic Management Plan (TMP)**, incorporating all the mitigation measures set out in the TMP submitted as part of the CEMP, included as Appendix 4-3 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. 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 Project and this person will be the main point of contact for all matters relating to traffic management.

Delivery Programme – a programme of deliveries will be submitted to Tipperary County Council and other relevant authorities in advance of deliveries of turbine components to the Site.

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 Project 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.

Liaison with the relevant local authorities - 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.

Implementation of temporary alterations to road network at critical junctions – At locations where required highlighted in Section 15.2.9.

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

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

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 junctions on the L-3248 and L-7039 and L-7039-1. 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 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 Project is decommissioned after the 30 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Chapter 4 and Appendix 4-4 Decommissioning Plan. This plan will include a material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning.

15.2.17.3 Residual Effects

Construction Stage

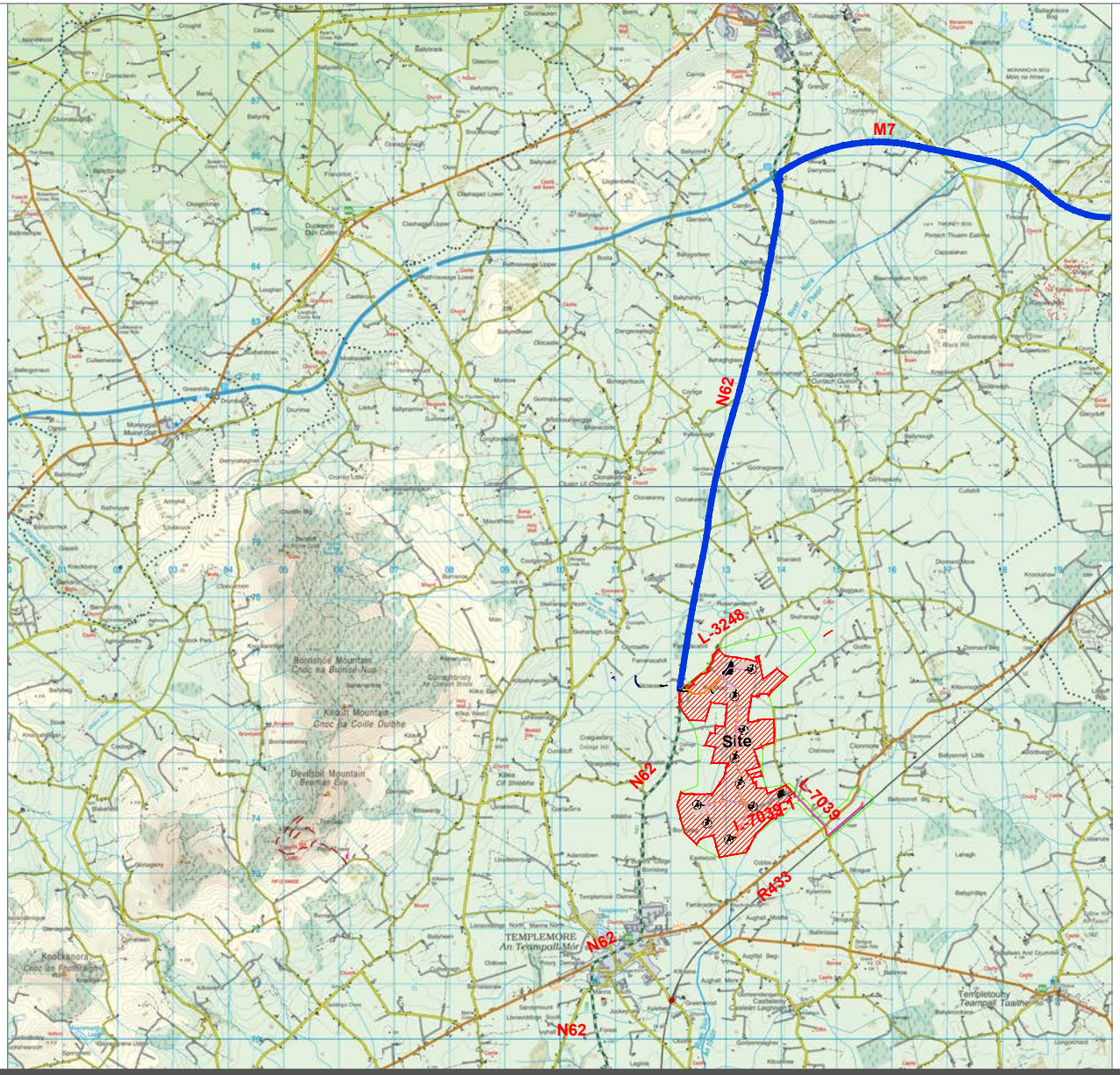
During the 18–24-month construction stage of the Proposed Project, it is forecast that the additional traffic that will appear on the public road network serving the Site will have a slight to moderate and temporary negative effect on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed Traffic Management Plan.

Operational Stage

As the traffic impact of the Proposed Project 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 Project 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.



KEY

Turbine haul route

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-1a Site location and turbine delivery route

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	NTS
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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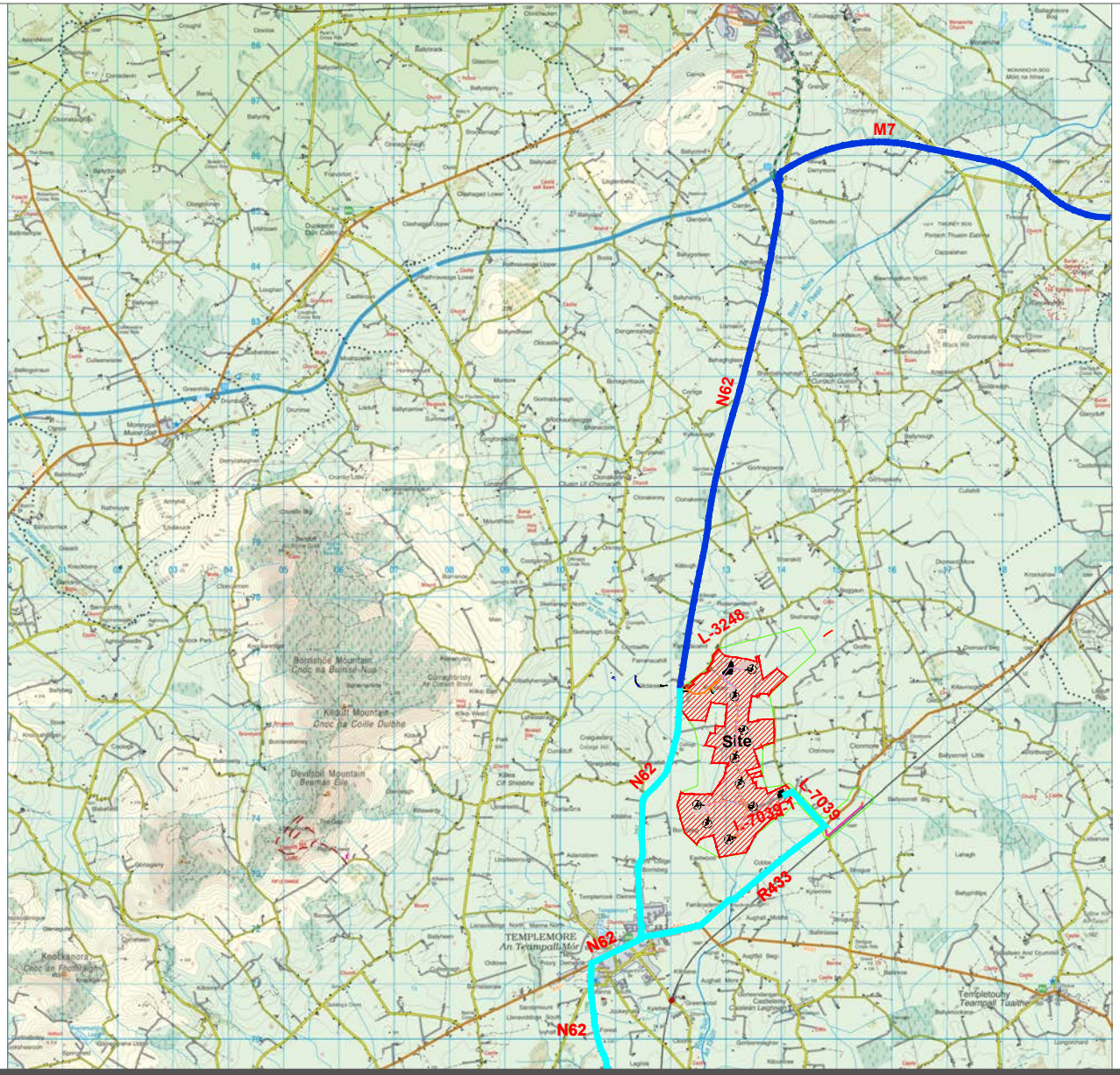

KEY

Turbine haul route

Other HGV delivery route

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-1b Site location, turbine delivery route and alternative delivery routes for standard HGVs

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd		SCALE: NTS
PROJECT NO: 10380	DATE: 06.12.23		DRAWN BY: AL

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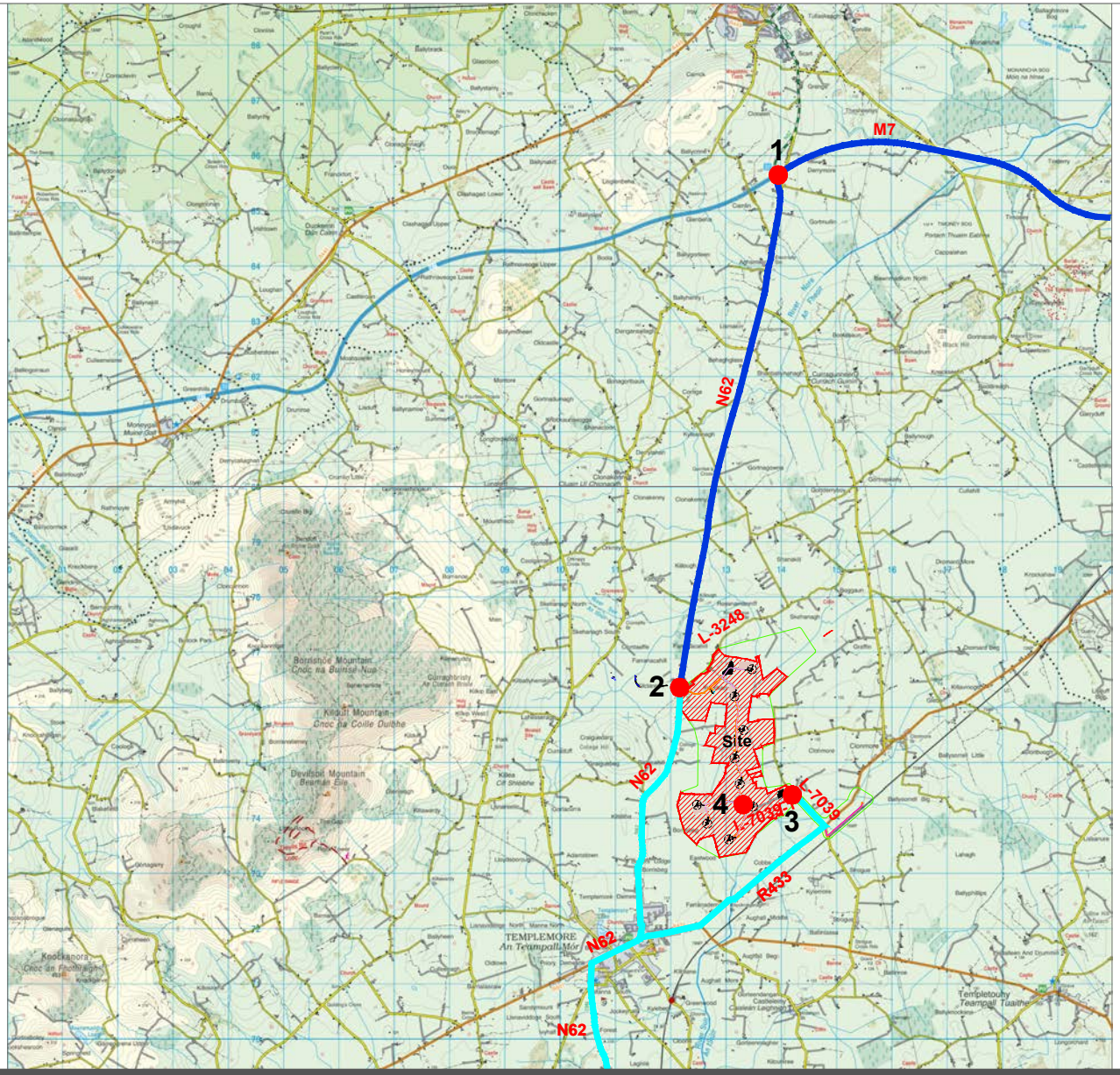

NOTES:

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Base mapping provided by MKO

Figure 15-2a Route assessment location plan

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	NTS
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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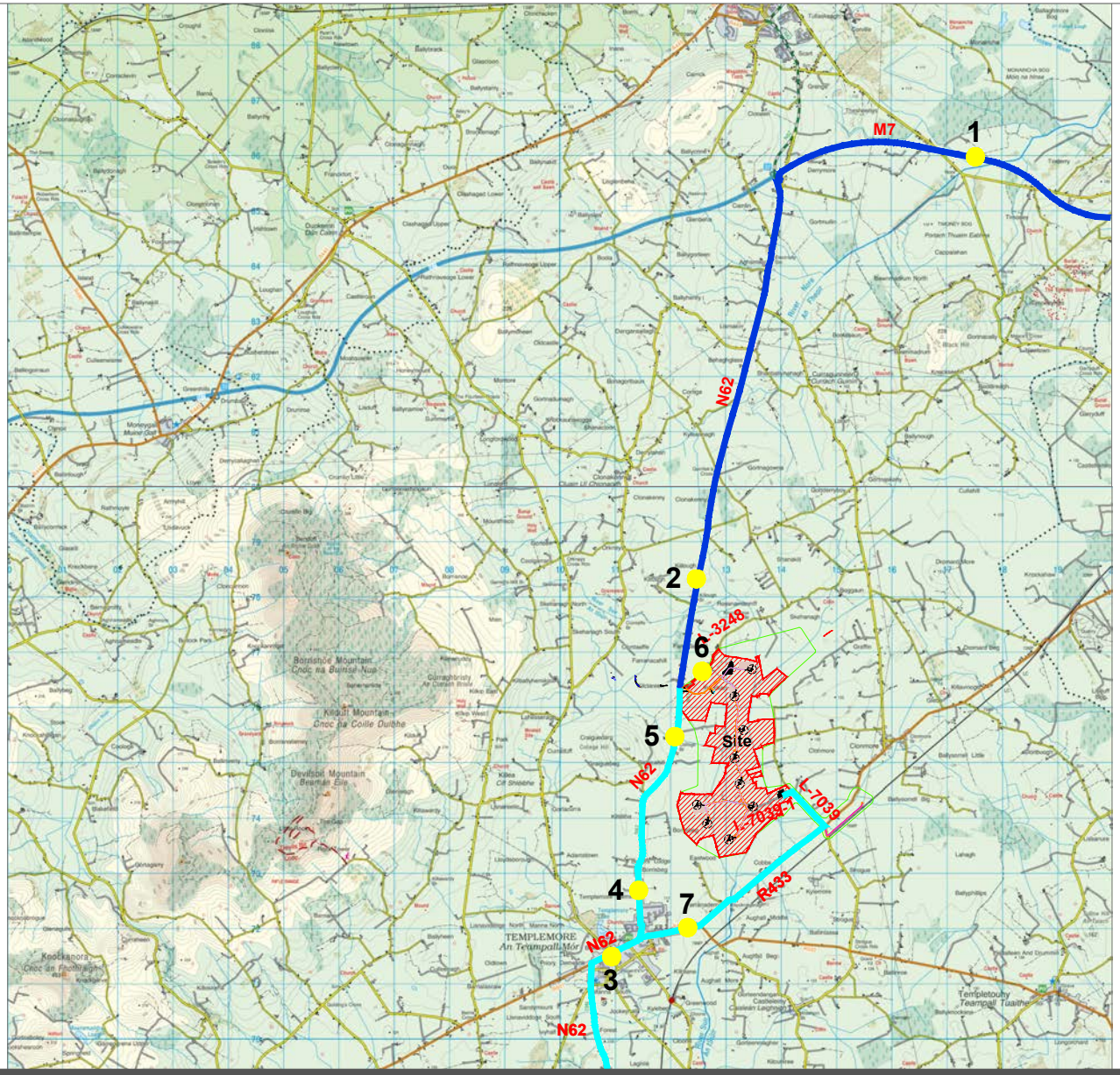

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-2b Link count locations

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	NTS
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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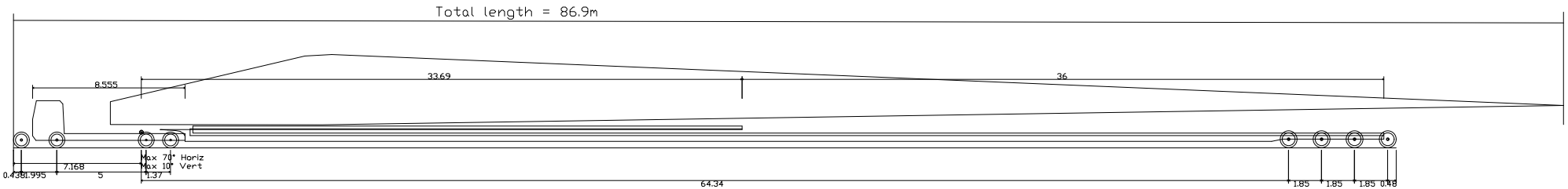

81.5m blade	
Overall Length	77.537m
Overall Width	2.550m
Overall Body Height	2.661m
Min Body Ground Clearance	0.375m
Track Width	2.500m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

FIGURE 15-3a Design blade extended artic profile

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	NTS
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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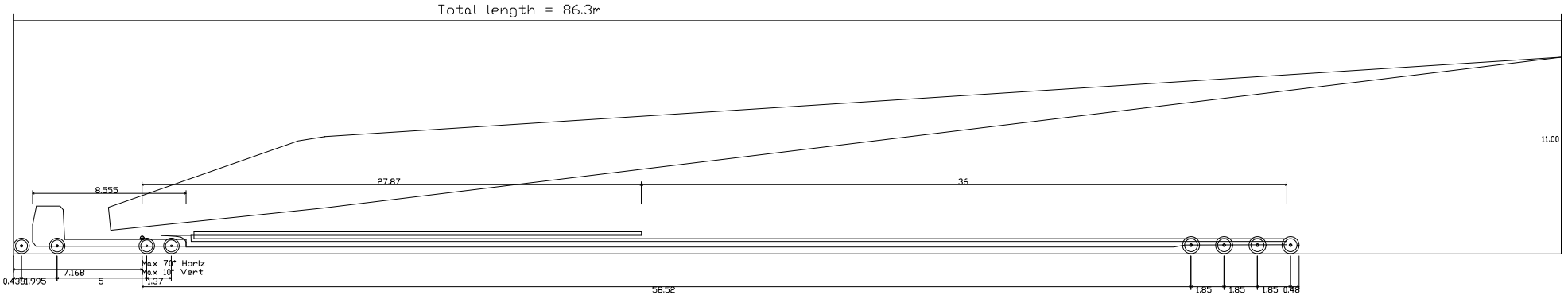

81.5m blade with lifter and 15m overhang

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

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	NTS
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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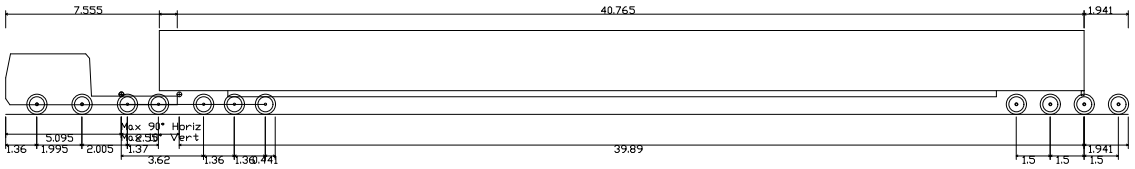

Tower	
Overall Length	49.476m
Overall Width	2.550m
Overall Body Height	3.695m
Min Body Ground Clearance	0.427m
Max Track Width	2.520m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

NOTES:

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FIGURE 15-3c Design tower extended artic profile

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	NTS
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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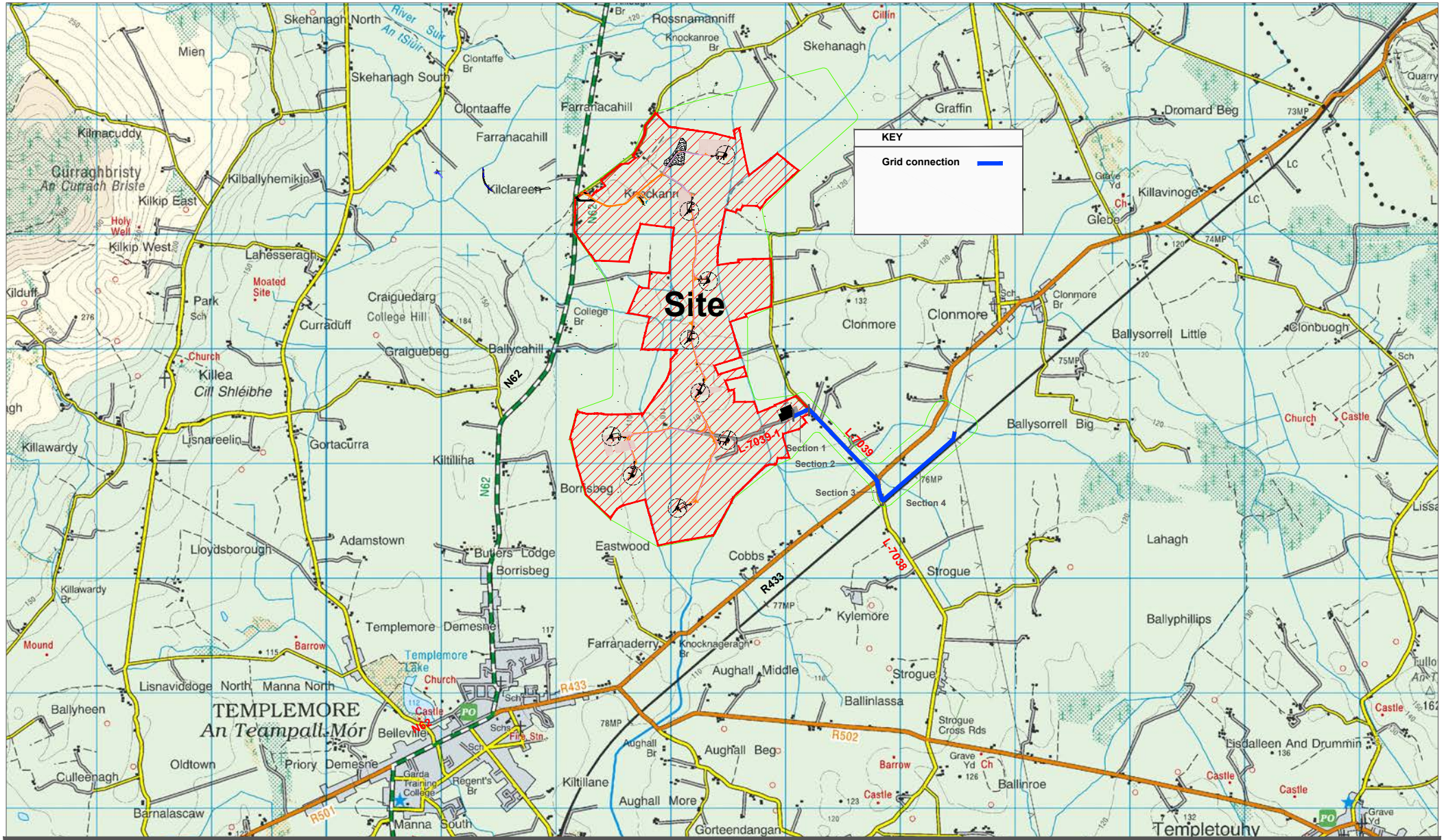

NOTES:

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Base mapping provided by MKO

Figure 15-4a Proposed grid connection

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	NTS
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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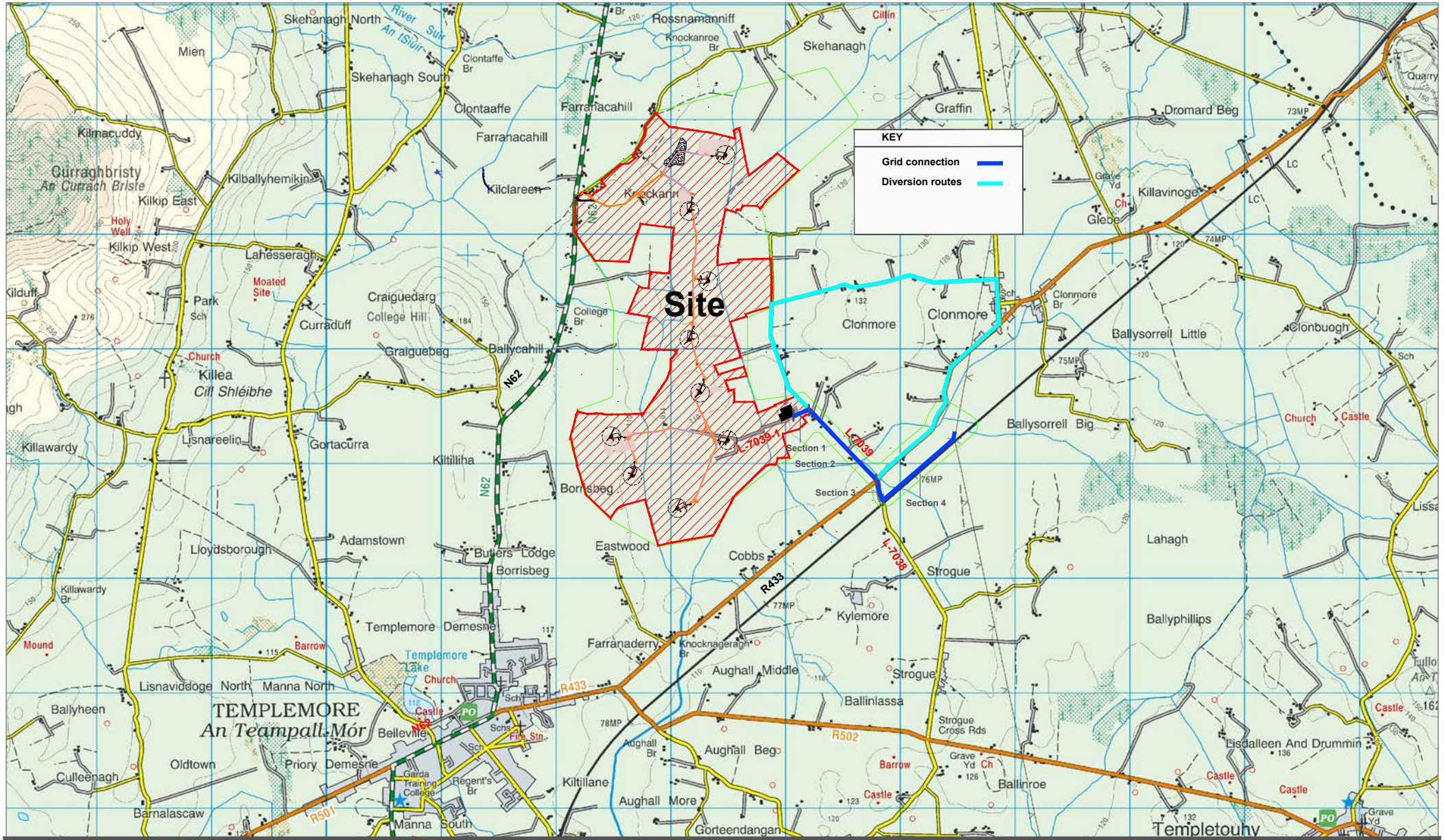

NOTES:

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Base mapping provided by MKO

Figure 15-4b Proposed grid connection - Diversion route for Section 2

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	NTS
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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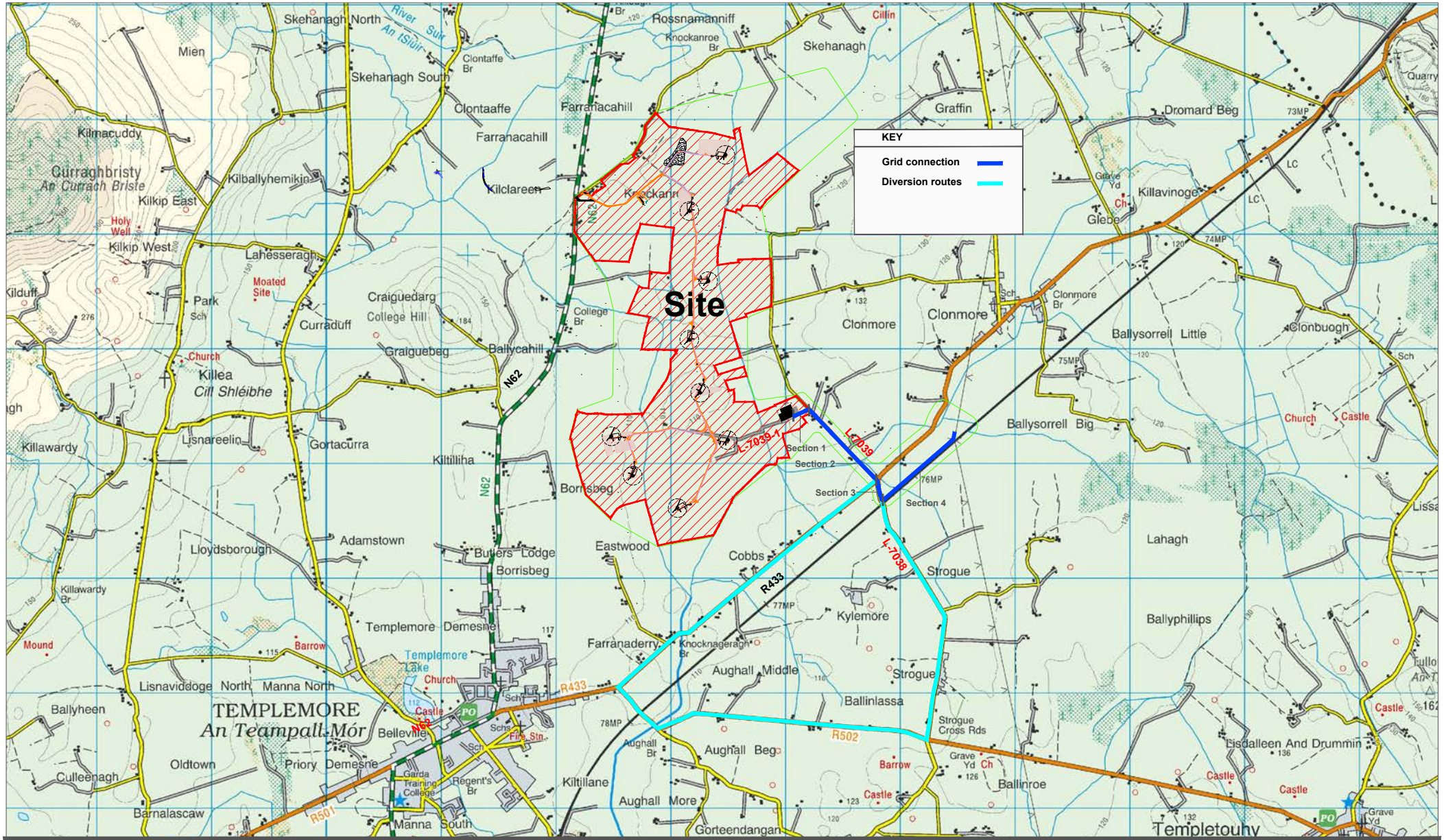

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-4c Proposed grid connection - Diversion route for Section 3

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd		SCALE: NTS
PROJECT NO: 10380	DATE: 06.12.23		DRAWN BY: AL

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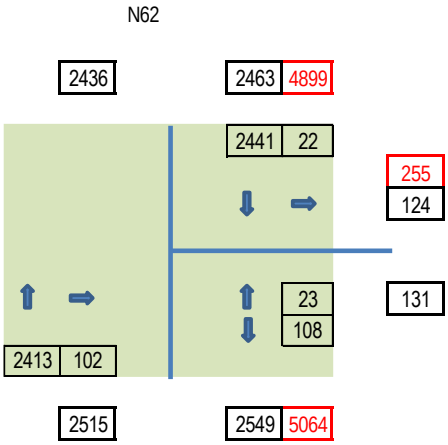
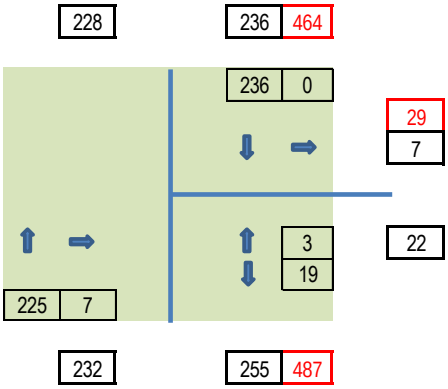
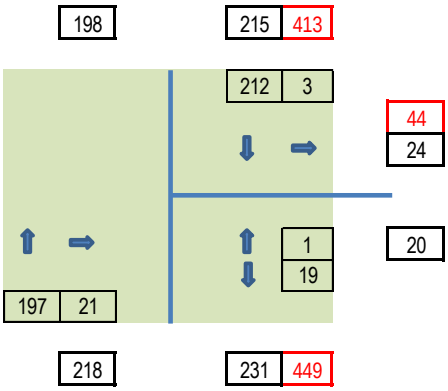


Observed traffic flows
Tuesday September 12th 2023 N62
24 hour N62 / L3248 junction
All flows in pcus



Observed traffic flows
Tuesday September 12th 2023 N62
AM peak hour (08:00 - 09:00) N62 / L3248 junction
All flows in pcus



Observed traffic flows
Tuesday September 12th 2023 N62
PM peak hour (17:00 - 18:00) N62 / L3248 junction
All flows in pcus

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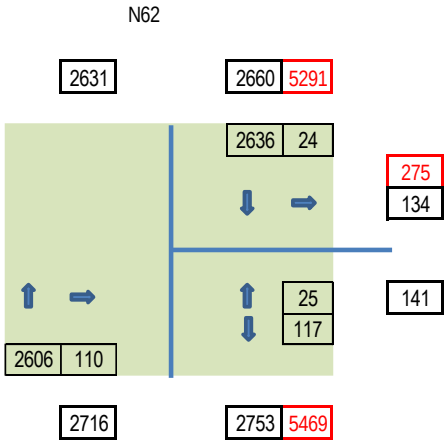
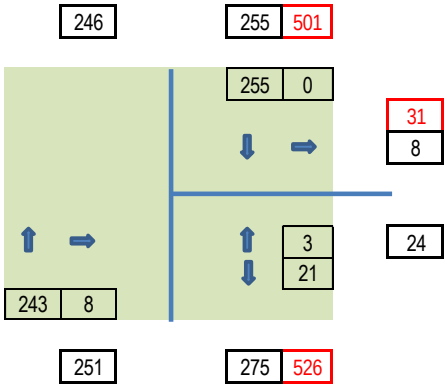
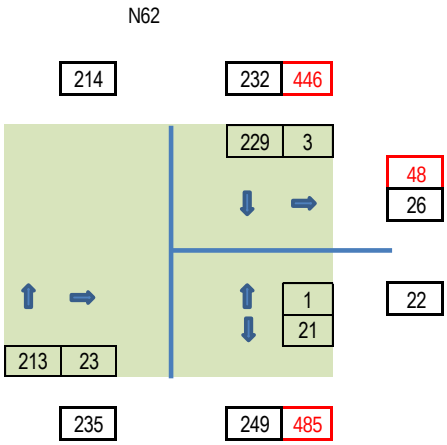
Figure 15-5a Observed traffic flows, N62 / L3248 junction
Year 2023 - pcus



Forecast background traffic flows
Year 2028 N62
24 hour N62 / L3248 junction
All flows in pcus



Forecast background traffic flows
Year 2028 N62
AM peak hour (08:00 to 09:00) N62 / L3248 junction
All flows in pcus



Forecast background traffic flows
Year 2028 N62
PM peak hour (17:00 to 18:00) N62 / L3248 junction
All flows in pcus

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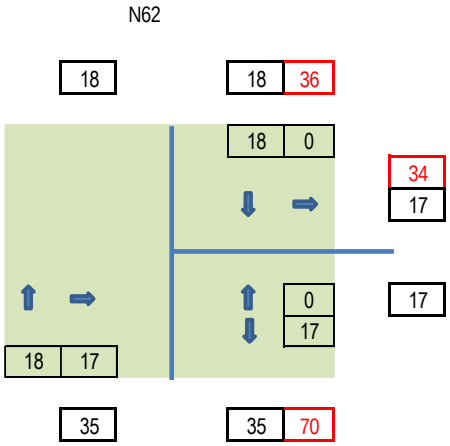
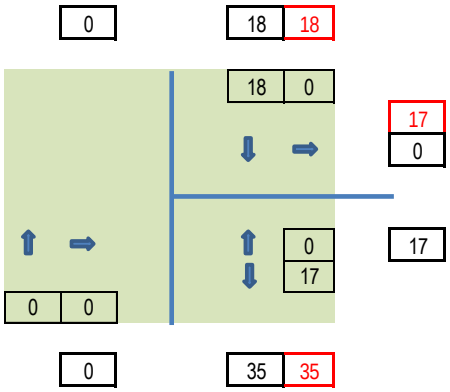
Figure 15-5b Background traffic flows, N62 / L3248 junction
Year 2028 - pcus



Construction traffic
Year 2028
24 hour
PCUs

N62

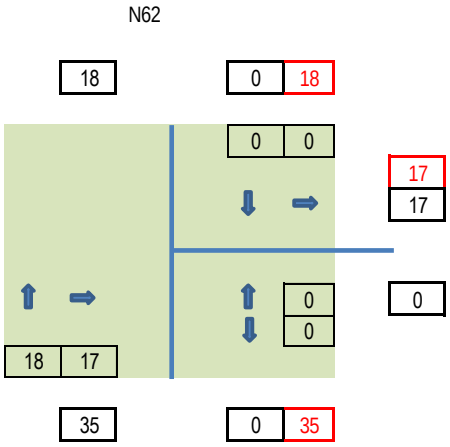
N62 / L3248 junction



Construction traffic
Year 2028
AM peak hour (08:00 to 09:00)
PCUs

N62

N62 / L3248 junction



Construction traffic
Year 2028
PM peak hour (17:00 to 18:00)
PCUs

N62

N62 / L3248 junction

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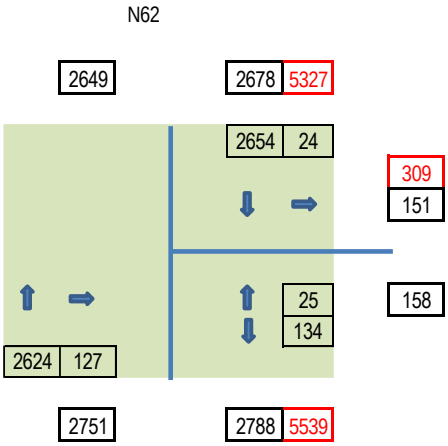
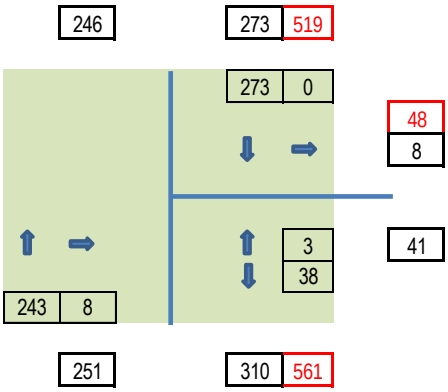
Figure 15-5c Construction traffic flows, N62 / L3248 junction
pcus



With construction traffic flows
Year 2028
24 hour
All flows in pcus

N62

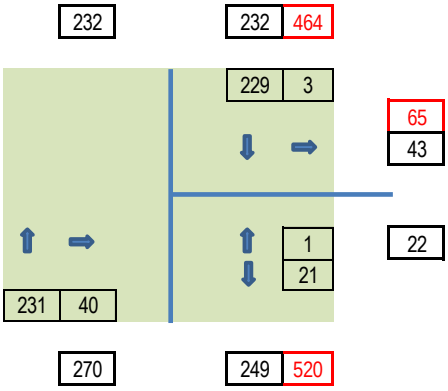
N62 / L3248 junction



With construction traffic flows
Year 2028
AM peak hour (08:00 to 09:00)
All flows in pcus

N62

N62 / L3248 junction



With construction traffic flows
Year 2028
PM peak hour (17:00 to 18:00)
All flows in pcus

N62

N62 / L3248 junction

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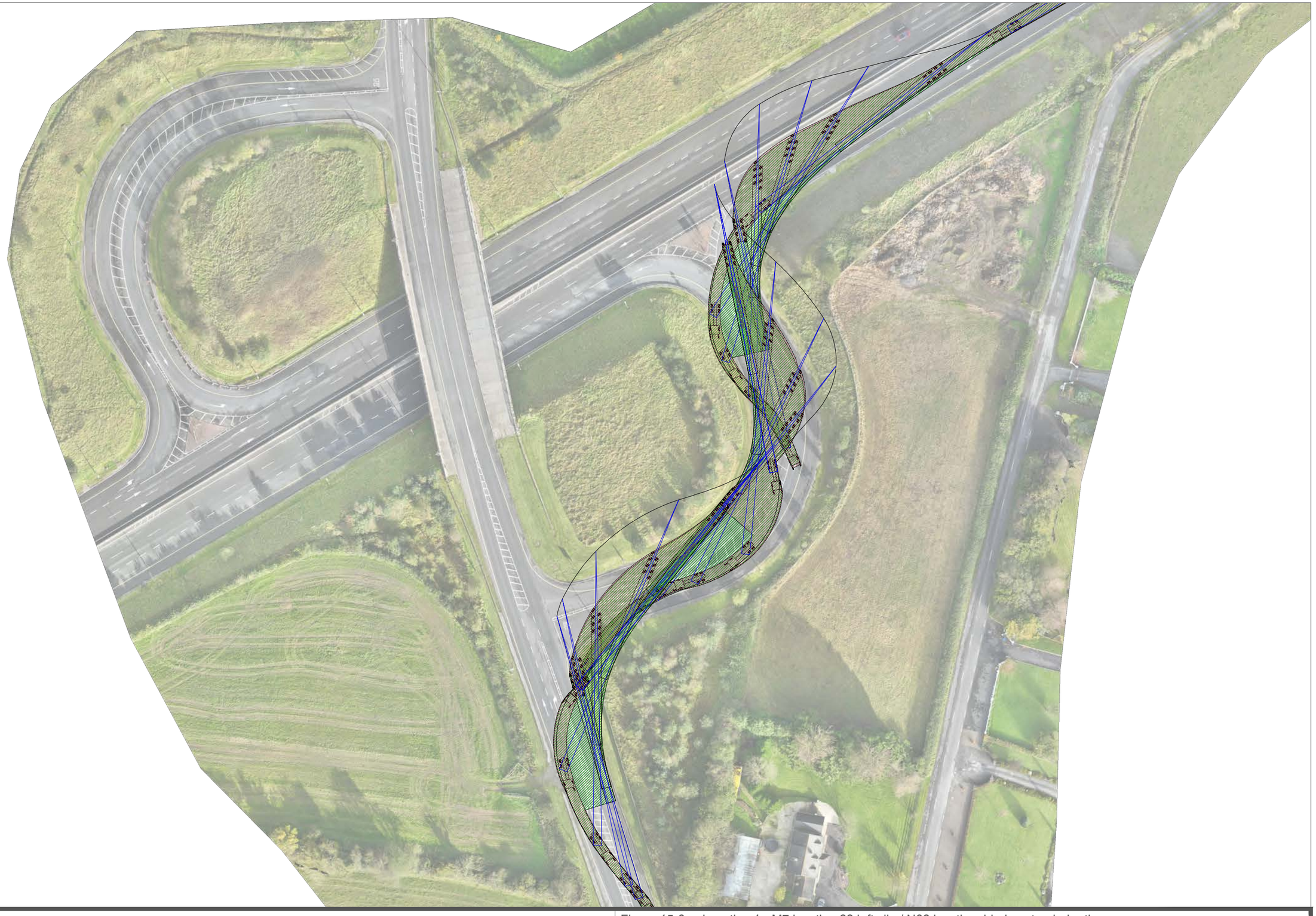
Figure 15-5d With construction traffic flows, N62 / L3248
Year 2028 - pcus



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-6 Location 1 - M7 junction 22 left slip / N62 junction, blade extended artic

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd		SCALE: 1:1000
PROJECT NO: 10380	DATE: 06.12.23		DRAWN BY: AL

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NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-7 Location 1 - M7 junction 22 left slip / N62 junction, tower extended artic

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd		SCALE: 1:1000
PROJECT NO: 10380	DATE: 06.12.23		DRAWN BY: AL

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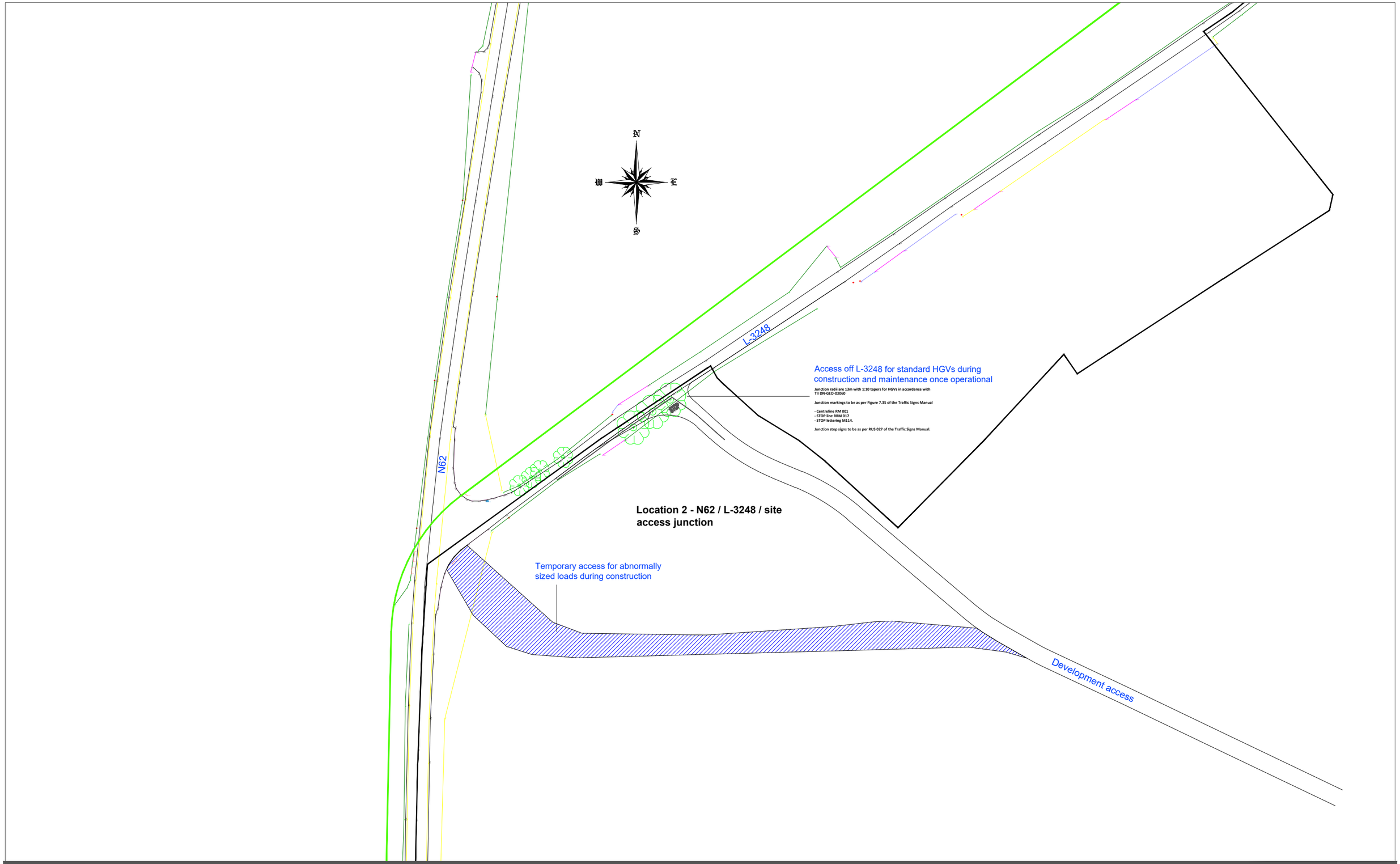

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-8 Location 2 - N62 / L-3248 / site access, junction layout

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	1:1000
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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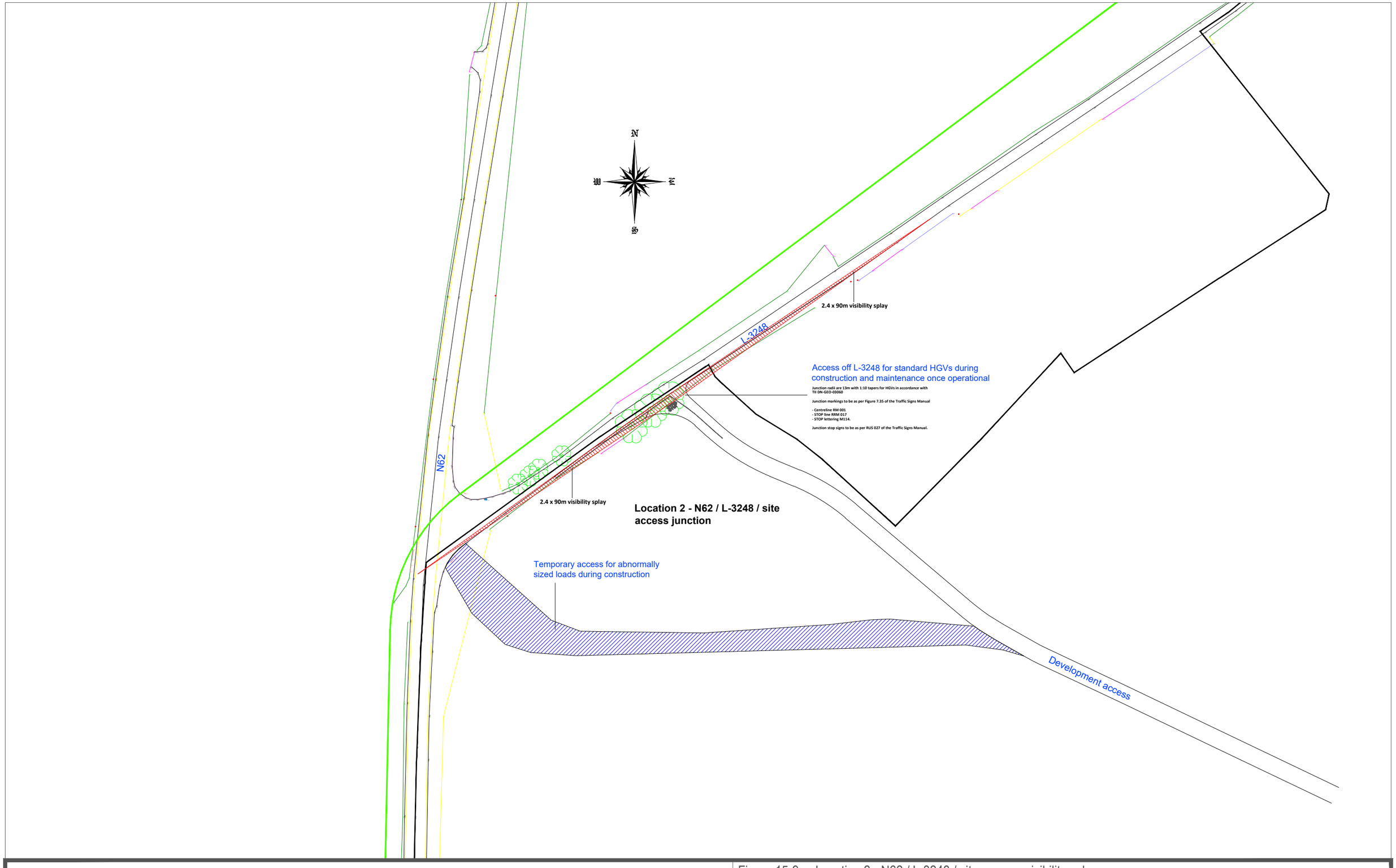


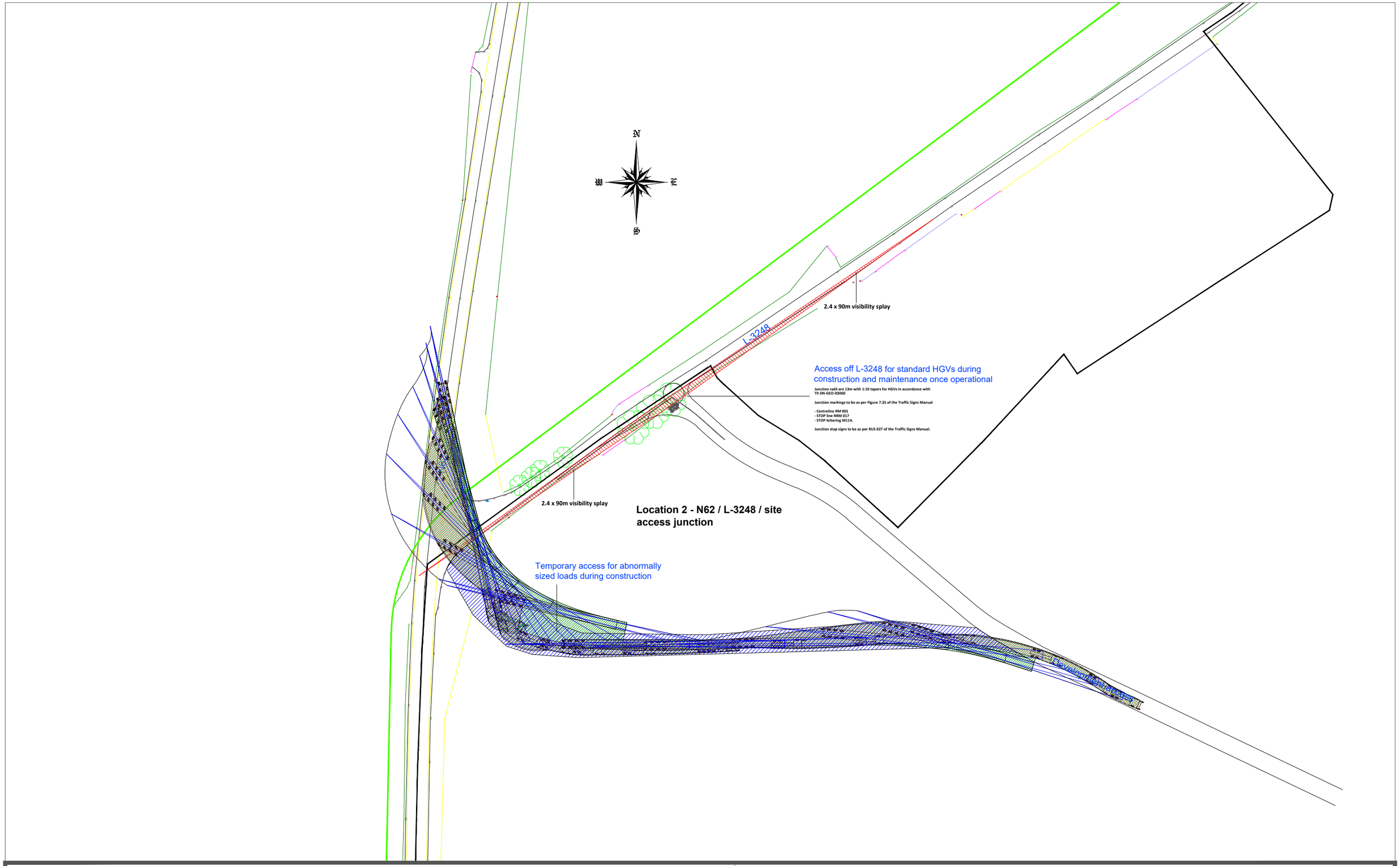
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-9 Location 2 - N62 / L-3248 / site access, visibility splays

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd		SCALE: 1:1000
PROJECT NO: 10380	DATE: 06.12.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-10 Location 2 - N62 / L-3248 / site access, blade extended artic

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd		SCALE: 1:1000
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY: AL	

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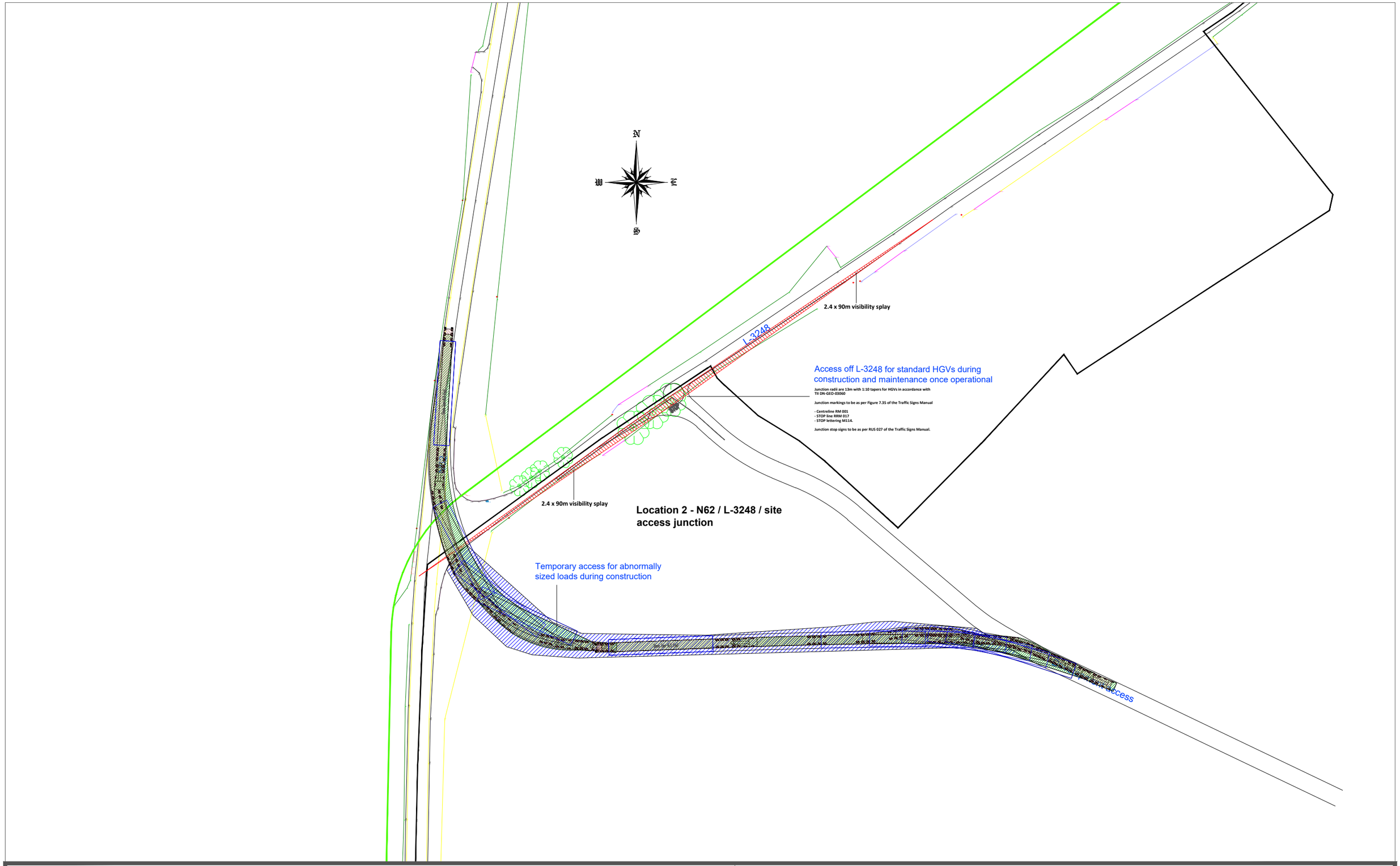

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-11 Location 2 - N62 / L-3248 / site access, tower extended artic

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	1:1000
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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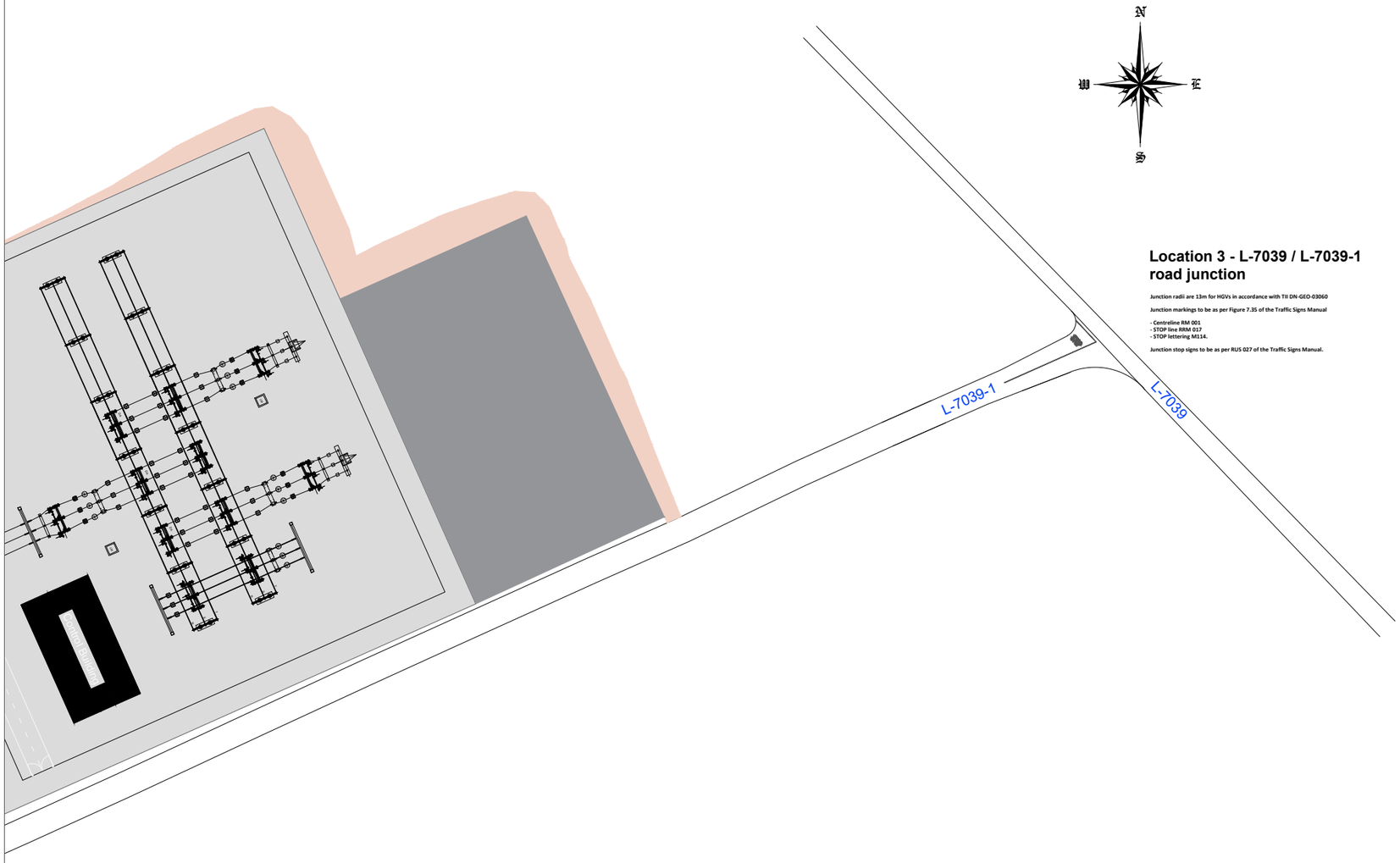

Location 3 - L-7039 / L-7039-1 road junction

Junction radii are 13m 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:

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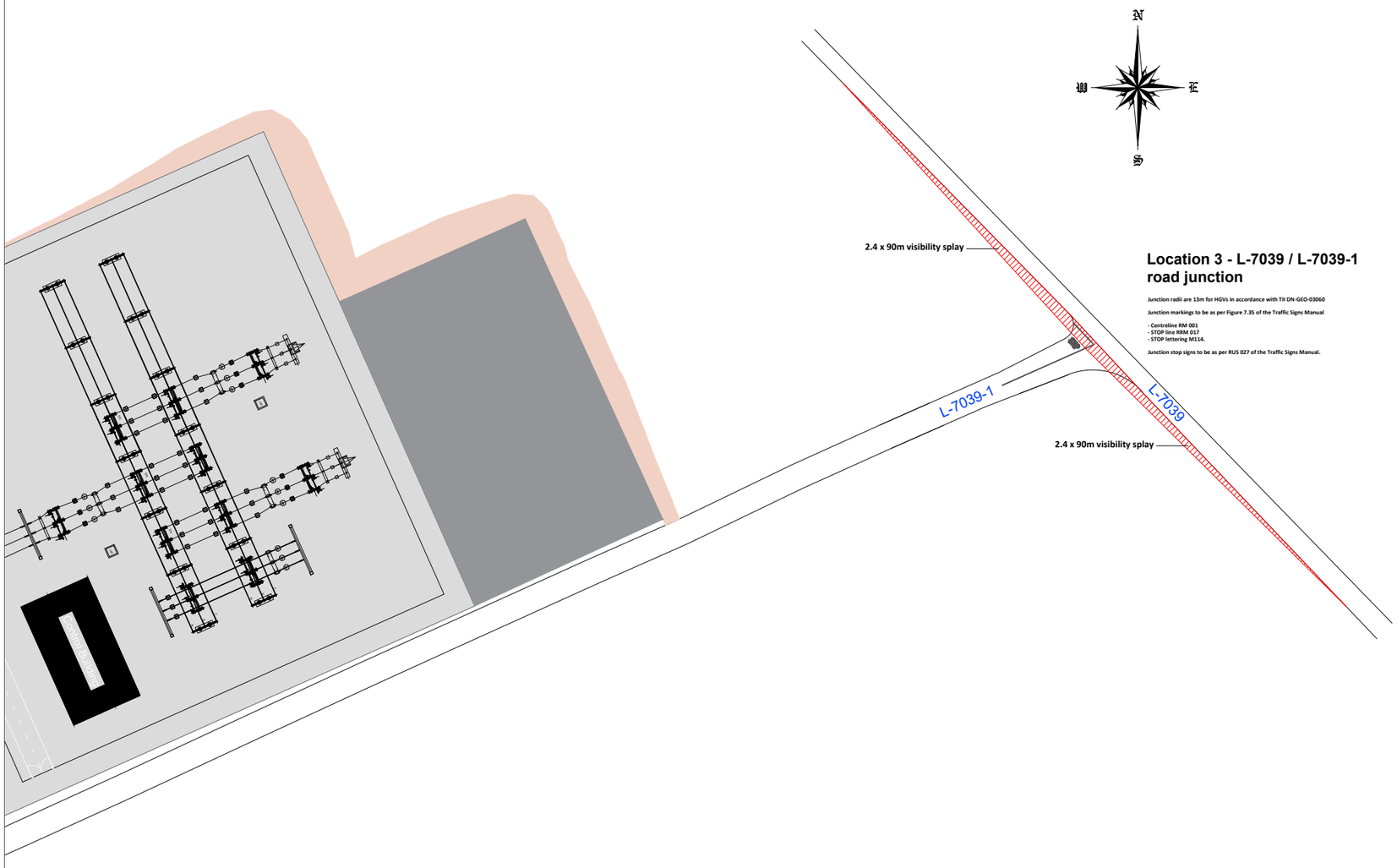
Figure 15-12 Location 3 - L-7039 / L-7039-1 junction layout

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	1:1000
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



Location 3 - L-7039 / L-7039-1 road junction

Junction radii are 13m 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:

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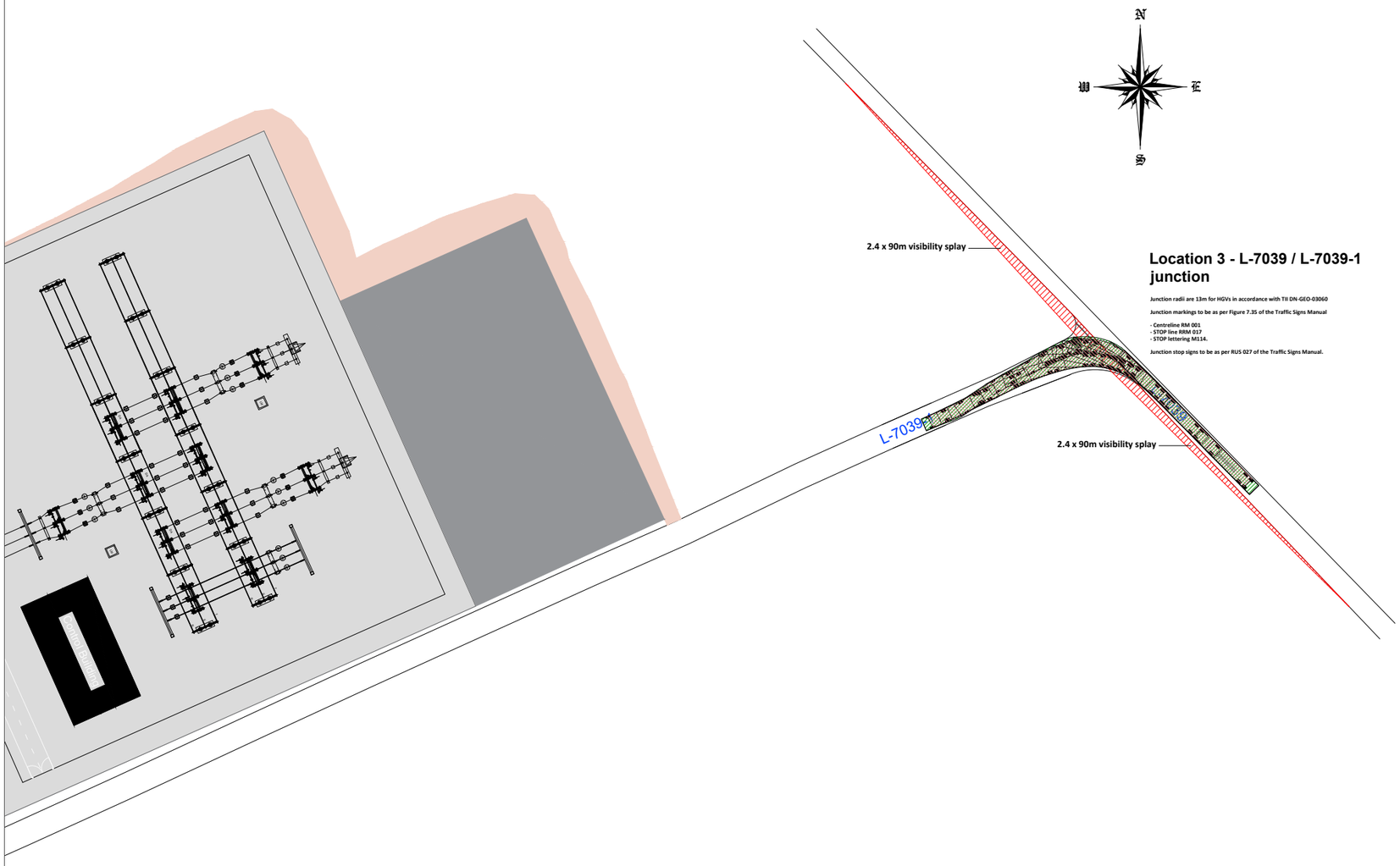
Figure 15-13 Location 3 - L-7039 / L-7039-1, visibility splays

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd		SCALE: 1:1000
PROJECT NO: 10380	DATE: 06.12.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



Location 3 - L-7039 / L-7039-1 junction

Junction radii are 13m 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.

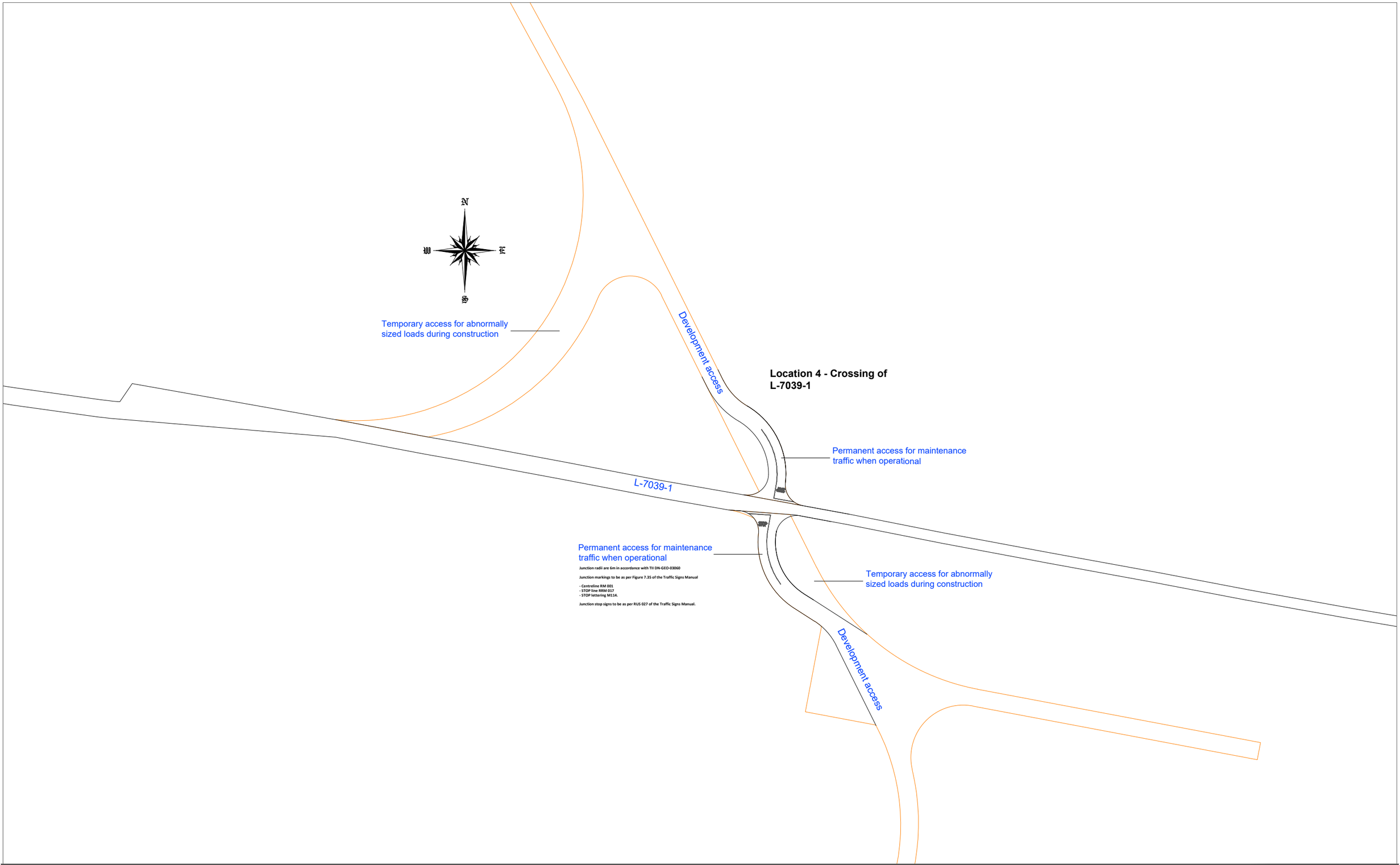
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-14 Location 3 - L-7039 / L-7039-1, large articulated HGV

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	1:1000
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



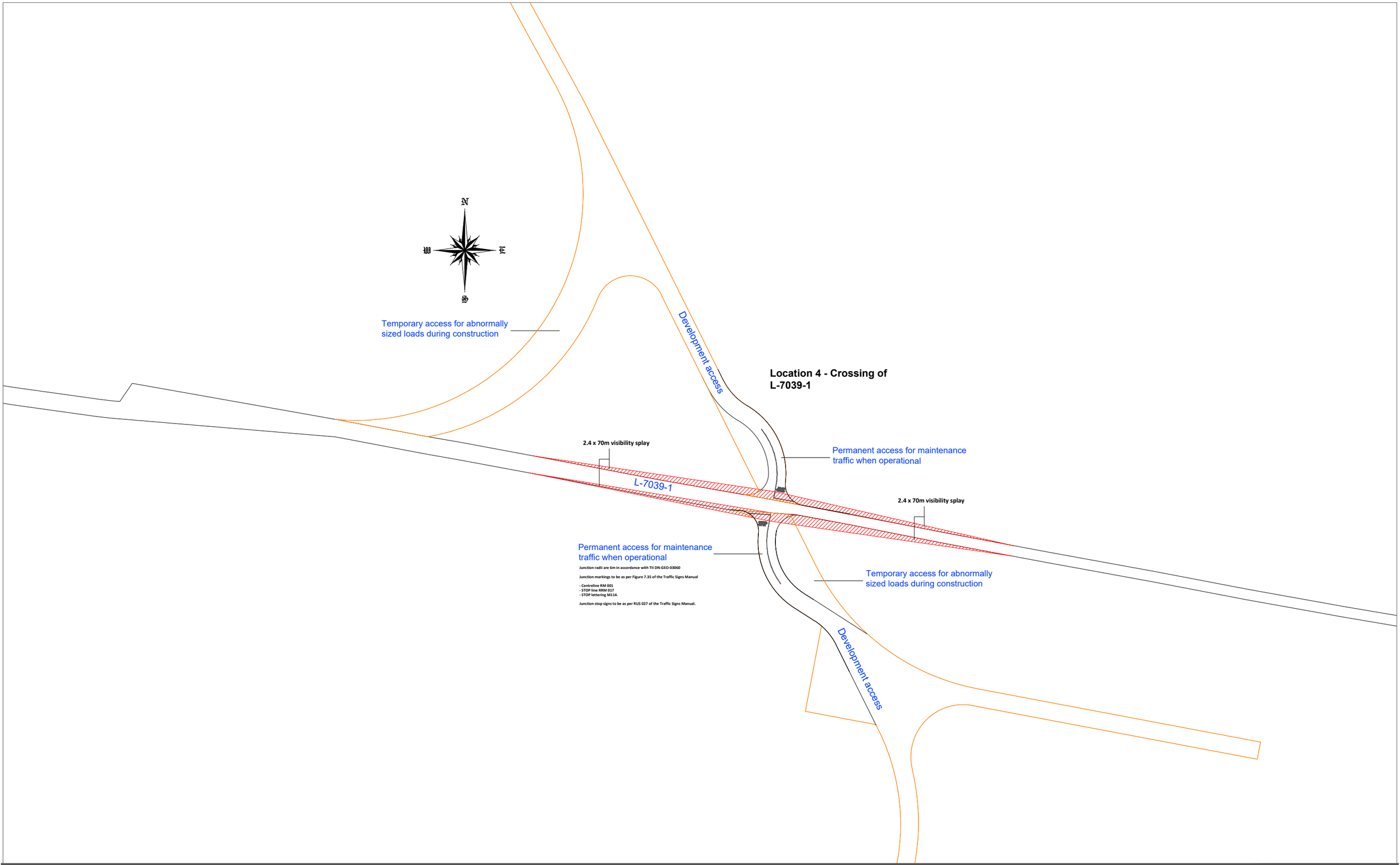
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-15 Location 4 - Crossing of L-7039-1

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	1:1000
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



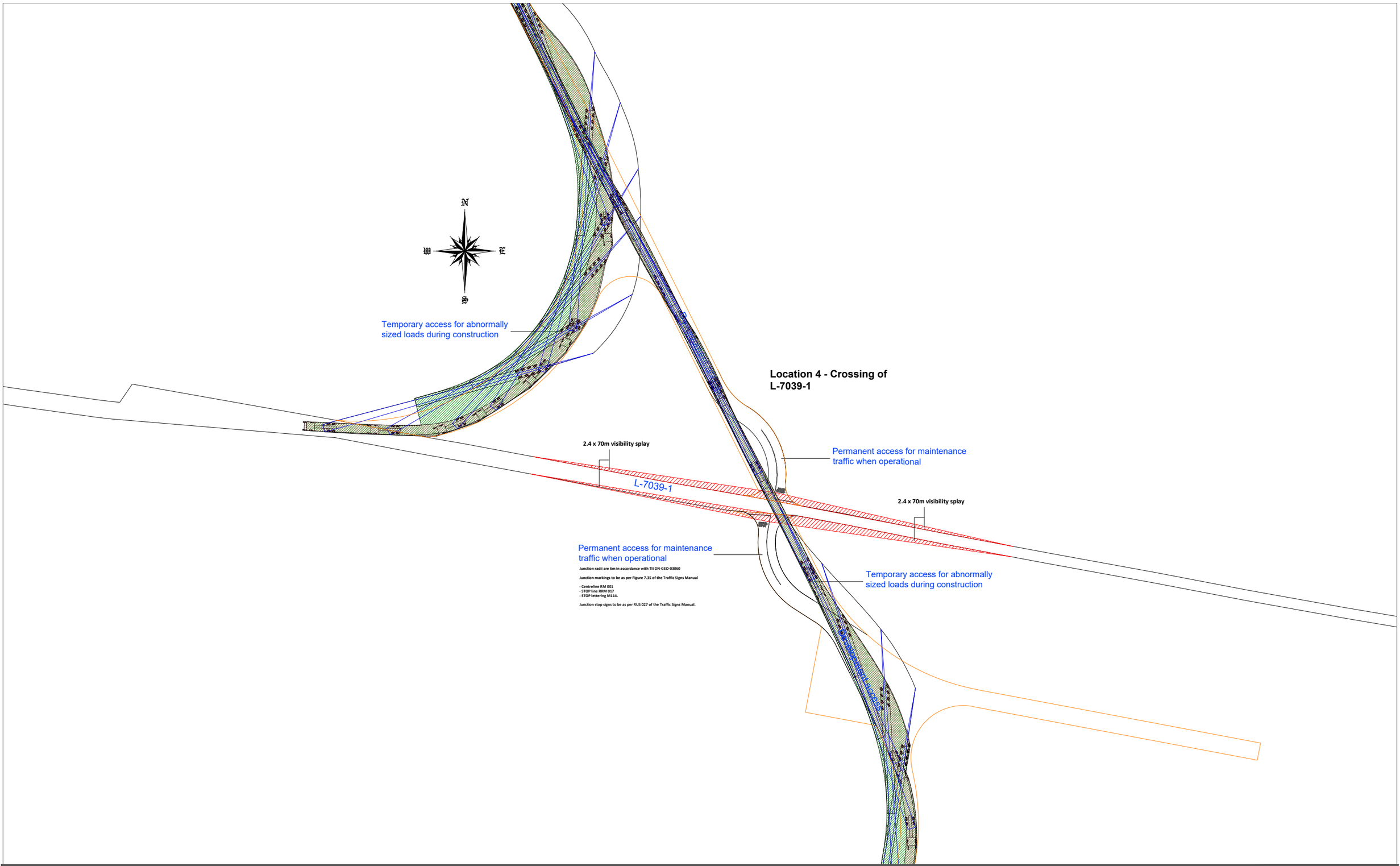
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-16 Location 4 - Crossing of L-7039-1, visibility splays

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd		SCALE: 1:1000
PROJECT NO: 10380	DATE: 06.12.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



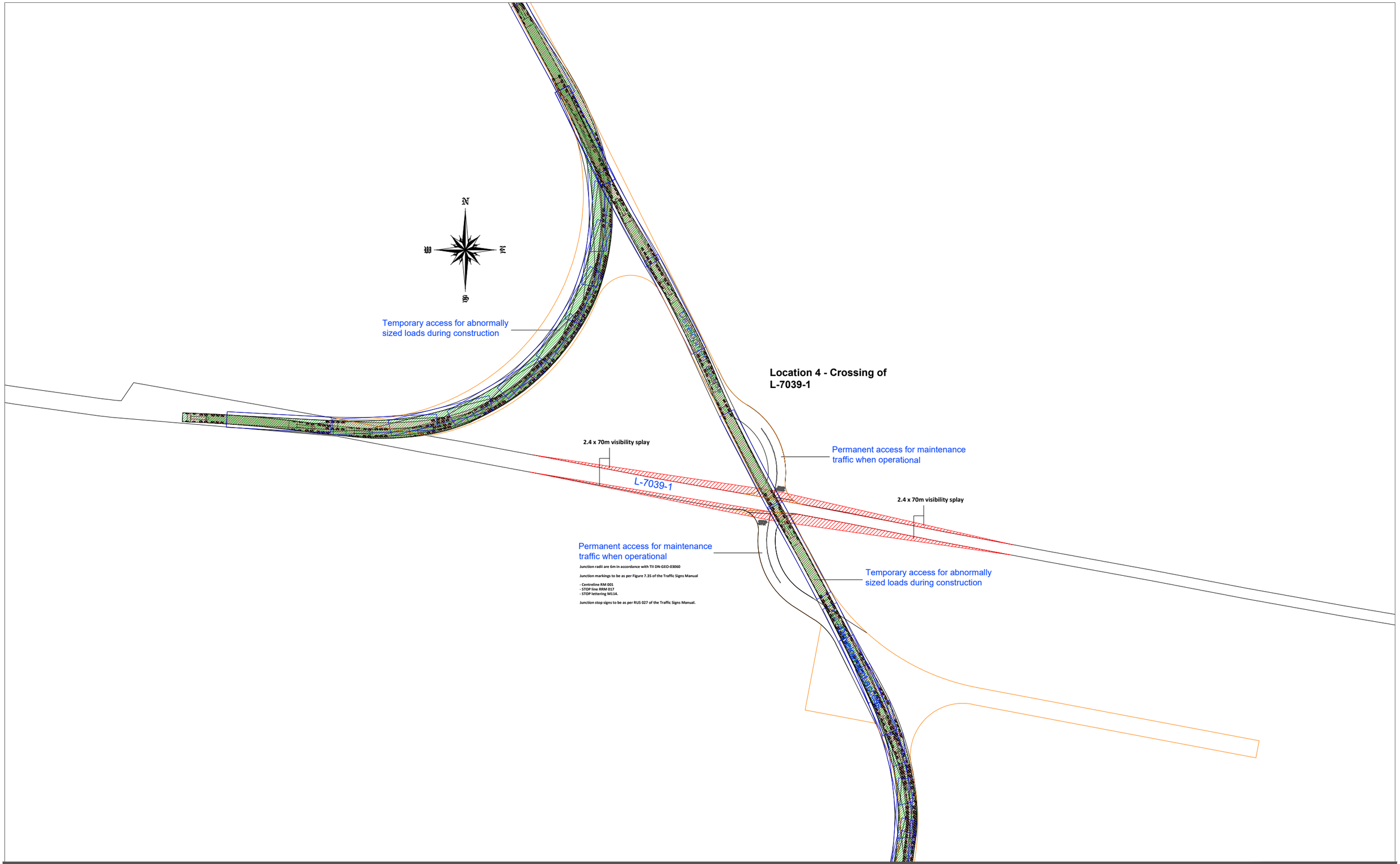
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-17 Location 4 - Crossing of L-7039-1, blade extended artic

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd		SCALE: 1:1000
PROJECT NO: 10380	DATE: 06.12.23		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-18 Location 4 - Crossing of L-7039-1, tower extended artic

PROJECT:	Borrisbeg Renewable Energy Development		
CLIENT:	Buirios Ltd	SCALE:	1:1000
PROJECT NO: 10380	DATE: 06.12.23	DRAWN BY:	AL

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TRAFFIC & TRANSPORT CONSULTANTS

15.3 Other Material Assets

This section of the EIAR assesses the likely significant effects of the Proposed Project on other material assets such as utilities, waste management, Irish Rail, telecommunications and aviation assets.

15.3.1 Introduction

The Proposed Project is located within a rural setting in north Tipperary, approximately 11km south of Roscrea Town and approximately 2.5km northeast of Templemore town centre. The N62 National Road runs north-south along the western boundary of the Site. The Site location context is shown in Figure 1-3. Landuse currently comprises a mix of agri-pastoral land, private forestry and local road use. The surrounding landuse predominantly comprises pastoral agriculture, and commercial and residential use within Templemore town and along local roads. Existing access is via farm entrances off the N62 to the west, the L-3248 to the north, the L-7039 to the east and the L-70391 to the southeast.

The purpose of this section of the EIAR is to determine the potential for impact on built services such as electricity, gas networks, water supply, Irish Rail infrastructure, waste management, telecommunication and aviation by the Proposed Project during the construction, operation and decommissioning phase and to determine the residual effects once mitigation, where required, has been implemented.

15.3.2 Statement of Authority

This section of the EIAR, has been prepared by Karen Mulryan and reviewed by Michael Watson, of MKO. Karen is a Project Environmental Scientist with MKO with over 7 years' experience in the consultancy sector. Karen holds a BA International in Archaeology from NUI Galway and a MSc in Archaeology from the University of Edinburgh. Karen's key strengths and areas of expertise are in project management, environmental impact assessment, wind energy site selection and feasibility assessment. Since joining MKO, Karen has experience managing wind farm Environmental Impact Assessment Report applications of various scales including SID applications across Ireland. Karen has experience in report writing, including EIAR Material Assets chapters, feasibility studies and EIA screening reports. Karen holds memberships with the Chartered Institute for Archaeologists (ACIfA) and the Institute of Archaeologists of Ireland (IAI).

Michael Watson is Director of Environment at MKO with over 20 years' experience in the environmental sector. Michael's professional experience includes managing and overseeing Environmental Impact Assessment Reports including Material Assets reports, EPA License applications, hydrogeological assessments, environmental due diligence and general environmental assessment on behalf of clients in the wind farm, waste management, public sector, commercial and industrial sectors nationally. Michael also has a Bachelor of Arts Degree in Geography and Economics from NUI Maynooth, is a Member of IEMA, a Chartered Environmentalist (CEnv) and Professional Geologist (PGeo).

15.3.3 Methodology

The methodology for this assessment includes:

- Legislation and guidance review;
- Scoping exercise with stakeholders
- Desk study, including review of available maps and published information, followed by mapping of constraints.
- Impact Assessment

Consultation with all statutory consultees, bodies with environmental responsibility and other interested parties is detailed in Chapter 2 of this EIAR. Scoping was undertaken in line with section 3.3 'Scoping'

of the EPA 2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports.

15.3.4 Legislation and Guidance

This section has been carried out in accordance with the 'EIA Directive' as mended by Directive 2014/52/EU and having regard, where relevant, to guidance and policy documents listed below:

- Tipperary County Development Plan 2022-2028
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022)
- Draft Air Corps Wind Farm/Tall Structures Position Paper (August 2014)
- Department of Environment, Heritage and Local Government (2006) Wind Energy Development Guidelines for Planning Authorities "*2006 WEDGs*"
- Department of the Environment, Heritage and Local Government (2019) Draft Revised Wind Energy Development Guidelines for Planning Authorities "*2019 Draft WEDGs*"
- Irish Wind Energy Association (2012) Best Practice Guidelines for the Irish Wind Energy Industry
- ESB Networks (2019) Code of Practice for Avoiding Danger from Overhead Electricity Lines.
- ESB (2017) EMF & You: Information about Electric & Magnetic Fields and the electricity network in Ireland
- Irish Rail (2018) CCE Department Technical Guidance Document CCE-TMS-310 Guidance on Third Party Works
- Irish Rail (2009) CCE Departmental and Multidisciplinary Standard I-DEP-0121 Third Party Works: Additional Details of Railway Safety Requirements.

15.3.5 Wind Farms and Telecommunications & Aviation

15.3.5.1 Background

15.3.5.1.1 *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 wind farm is directly in line with the transmitter radio path.

15.3.5.1.2 *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 rotating blades, 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.

15.3.5.1.3 *Other Signal Types*

Wind turbines have the potential to affect other signal types used for communication and navigational systems, for example telecommunication 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. These effects can be avoided through design or dealt with by detailed micro-siting of turbines to avoid alignment with signal paths or by the use of repeater relay links out of line with the wind farm.

15.3.5.2 Preventing Electromagnetic Interference

15.3.5.2.1 *National Guidelines*

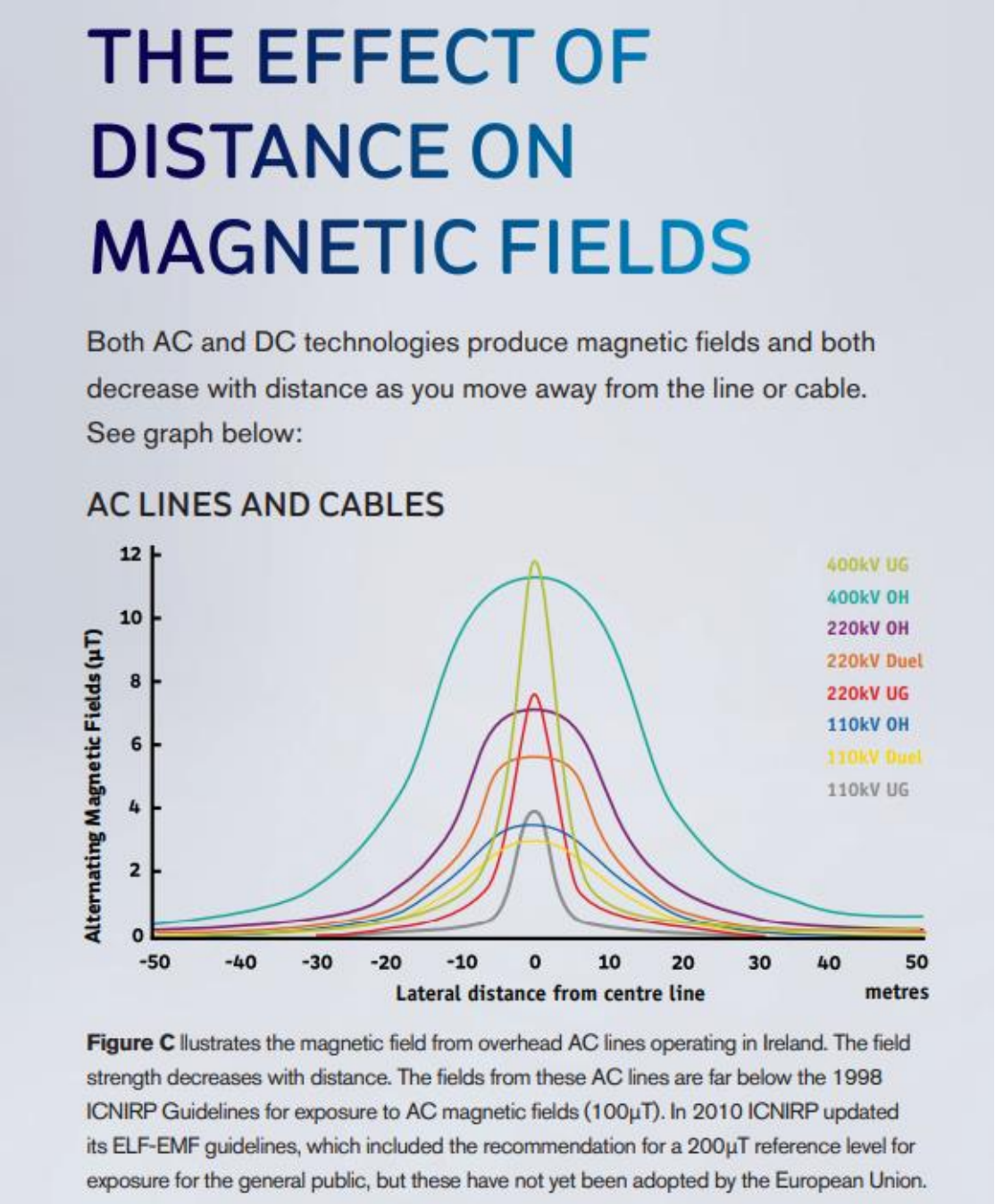
Both the 2006 WEDGs and the 2019 Draft WEDGs state that interference with broadcast communications can be overcome by the installation of deflectors or repeaters where required.

The WEDGs advise Developers 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 Project as summarised below; full details are provided in Chapter 2 of this EIAR. The layout and design of the Proposed Project has taken into account nearby telecommunications links.

15.3.5.2.2 *ESB (2017) EMF & You: Information about Electric & Magnetic Fields and the electricity network in Ireland'*

Electric and Magnetic Fields occur both naturally and from man-made sources. All electricity, both natural and man-made, produces two types of fields: electric fields and magnetic fields which are referred to as EMF. Two types of technology can be used to transmit electricity, alternating current (AC) and direct current (DC). Both AC and DC power lines produce electric and magnetic fields. AC lines produce AC electric and magnetic fields and DC lines produce static electric and magnetic fields. ESB Networks transmission and distribution networks are AC systems. Please see Figure 15-17 reproduced from the 2017 ESB information booklet which demonstrates the alternating magnetic field of AC overhead lines and underground cables. As can be seen in Figure 15-17 below, EMF from 110kV overhead lines and underground cables diminishes quickly with distance from the potential impacted receptor, with EMF from underground 110kV cables such as those proposed for the Grid Connection, diminishing from 4µT to 0.5µT at 10m away from the cable, reducing to almost 0µT at 20m.

Figure 15-17 illustrates the magnetic field from overhead AC lines operating in Ireland



15.3.6 Scoping Exercise

A 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 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 Project, as described in Chapter 3 of the EIAR.

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

15.3.6.1 Utilities

Irish Water

A scoping request was sent to Irish Water the 28th of October 2022. A response was received the 1st of November 2022 stating that they do not have the capacity to comment on individual projects, but general aspects of Water Services should be considered in the EIA where relevant. Some of the items to consider are listed below. Please see Chapter, section 2.6 for a full list of Irish Water comments. It should be noted that the Proposed Project does not intend to connect into Irish Water assets.

1. *Ensure no ensure that there will be no negative impact to Irish Waters Drinking Water Source(s) during the construction and operational phases of the development. Hydrological/hydrogeological pathways between the applicant's site and receiving waters should be identified as part of the report.*
2. *Any and all potential impacts on the nearby reservoir as public water supply water source(s)are assessed, including any impact on hydrogeology and any groundwater/ surface water interactions.*
3. *If a development requires a connection to either a public water supply or sewage collection system, the developer is advised to submit a Pre-Connection Enquiry (PCE) enquiry to Irish Water to determine the feasibility of connection to the Irish Water network.*
4. *The applicant shall identify any upgrading of water services infrastructure that would be required to accommodate the Proposed Project.*
5. *In relation to a development that would discharge trade effluent–any upstream treatment or attenuation of discharges required prior to discharging to an Irish Water collection network.*

A follow up data request for all Irish Water infrastructure in and surround the Site was sent to Irish Water on the 20th of June 2023. Data was provided by Irish Water on the 21st of June 2023 which includes all Irish Water in the vicinity of the Site.

Waterways Ireland

A scoping request was sent to Waterways Ireland on the 28th of October 2022 and a response was received on the 7th of November 2022 stating that the Proposed Project is not located on lands under their jurisdiction and therefore they have no comment to make on the proposal.

Department of the Environment, Climate and Communications

A scoping request was sent to the Department of the Environment, Climate and Communications the 18th of November 2022 and again on the 26th of April 2023. A response was received from the DECC on the 27th of April 2023 stating they will not be commenting on individual projects.

ESB

While the ESB was not included in the ComReg list of communication companies operating within 10km of the Site, a scoping request was sent to the ESB on the 9th of May 2022 and again on the 17th of November 2022. No response has been received to date.

Eirgrid

A scoping request was sent to Eirgrid on the 28th of October 2022 and again on the 16th of January 2023 and again on the 27th of April 2023. No response has been received to date.

Gas Networks Ireland (GNI)

GNI supply MKO their latest infrastructure data quarterly. The latest data share illustrating all GNI infrastructure up to and including September 2023 was provided to MKO in October 2023. The data indicates that there is no GNI infrastructure is located within or adjacent to the Site with the nearest infrastructure being approximately 28km to the west of the Proposed Project farm footprint.

15.3.6.2 Telecommunications

As part of the EIAR scoping and consultation exercise, MKO contacted ComReg (Commission for Communications Regulation) to identify licensed operators in the vicinity of the Proposed Project whose infrastructure may be impacted by the Proposed Project. ComReg responded on the 23rd of June 2022 with a list of the relevant national and regional broadcasters, fixed and mobile telephone operators within 10km of the Site. The responses received by MKO from these consultees are summarised below in Table 15-27.

Table 15-27 Telecommunications Scoping Responses

ComReg Consultee	Initial Scoping Response	Potential for Interference Following Consultation Exercise	Action Required	Final Scoping Response on Final Design	Potential for Interference Following Final Consultation Exercise- Action Required
Broadcasting Authority of Ireland	Received 09.05.2022	No	N/A	N/A	No
Eircom Ltd/Eir	Received 13.05.2022	Yes	Implement buffers at design stage. See section 15.3.6.2.1 below for details	Received 13.07.2022	No
ESB	No Response	N/A	N/A	N/A	N/A
Enet	Received 09.05.2022	Yes	Investigation of clearance	Received 24.06.2022	No

			between link and turbine undertaken. See section 15.3.6.2.1 below for details		
Imagine Networks Ltd	Received 09.05.2022	No	N/A	N/A	No
Three Ireland Ltd	Received 11.05.2022	No	N/A	N/A	No
Viatel	Received 28.10.2022	No	N/A	N/A	No
Virgin Media Ltd	Received 16.05.2022	No	N/A	No	No
Vodafone Ireland Ltd	Received 10.05.2022	Yes	Implement buffers at design stage. See section 15.3.6.2.1 below for details	21.11.2022	No
Wireless Connect Ltd	Received 23.06.2022	No	N/A	No	No
RTE Transmission Network (2rn)	Received 10.05.2022	Yes	Investigation by 2RN of clearance between link and turbine undertaken. See section 15.3.6.2.1 below for details	Received 24.05.2022	No Please see section 15.3.6.2.1 below for additional request by operator

15.3.6.2.1 *Telecom Operators with Potential for Impacts*

The full scoping responses received from all operators are provided in Appendix 2-2. As listed in the table above, four no. operators have links within the area of the Site. Further correspondence with these operators confirmed that there is no potential for impacts on their links. Details of the correspondence can be found below and in Appendix 2-2.

Eircom Ltd/Eir

Eir replied on the 13th of May 2022 to a scoping request from MKO, noting three links in the area, two of which run along the Site northwestern and southeastern boundaries where no proposed turbines are sited. The third link runs through the centre of the Site. The operator requested a 100m set back from the turbine rotor tips. A follow up correspondence was made to Eircom providing the tip height detail and enquiring if there was potential for the link to pass over the proposed turbines similar to other links in the vicinity. The operator confirmed on the13th of July 2022 that the '*max turbine height to the link still exceeds the buffer zone but only marginally, so we can allow this without any risk on our link passing through your study'.*

Enet

Enet replied on the 9th of May 2022 to a scoping request from MKO, noting one link that passes through the Site and requested a setback of 70m from the turbine rotor tips. The buffer was applied to the link in question. However, the link runs through the very northern boundary of the Site and the buffer is approximately 200m from the nearest turbine. Furthermore, a follow up email was sent to the operator enquiring as to whether the link in question passed over the proposed turbine tip heights with clearance. The operator confirmed on the 24th of June 2022 that there is sufficient clearance between a proposed tip height of 185m for this link in any event. Therefore, there is no potential for impact on this link.

Vodafone

Vodafone replied on the10th of May 2022 to a scoping request from MKO, noting one link that passes through the Site and requested a setback of 30m from the turbine rotor tips. A follow up email was sent to the operator enquiring as to whether the link in question passed over the proposed turbine tip heights with clearance. The operator confirmed the link is approx. 120m above ground and therefore does not have clearance. On the 17th of November, the coordinates and dimensions of turbines near the link were issued to the operator for comment and the operator responded on the 21st of November stating there is enough clearance of approx. 160m from the direct line of sight and therefore considers the proposed turbine locations satisfactory.

RTE/2rn

2rn replied on the10th of May 2022 to a scoping request from MKO, noting one link that passes through the Site. A follow up email was sent to the operator requesting the appropriate buffers to be imposed on the design and provided the relevant turbine dimensions. The operator confirmed on the 24th of May 2022 that '*link path passes over the windfarm profile'*. The operator stated that '*there is still the risk of interference to broadcasting services in the area, we would still request that a protocol be signed between 2rn and the developer should the site go ahead'*. A signed protocol is in place between 2rn and the Developer for the proposed Project. Please see Appendix 15-2.

15.3.6.3 Aviation

Department of Defence

The Draft Air Corps Wind Farm/Tall Structures Position Paper (August 2014) sets out the Air Corps position on the appropriate siting and management of wind farms and tall structures. The Position Paper details Air Corps assets within which tall structures such as wind farms are not recommended and/or require early engagement with the Department of Defence (DOD).

The Department of Defence was contacted by MKO on the 31st of May 2022 and a response was received on the 1st of June 2022 stating '*any determination in relation to a planning consent is solely a matter for the planning authorities and/or ABP, as appropriate. Therefore, the following observations are made on a non-prejudicial basis'. The correspondence went on to state 'As a matter of practice, the Department of Defence does not provide observations or advice in the scoping process, except where the relevant parties have been directed by a planning authority to seek the Department's views'.*

A follow-up scoping request was issued to the Department of Defence on the 19th of June 2023; however, no response was received.

Irish Aviation Authority

A scoping request was issued to the Irish Aviation Authority (IAA) on the 31st of May 2022 regarding potential for impacts from the Proposed Project on aviation assets. An email response was received on

the 7th of June 2022 stating the below requirements. A follow up scoping document was issued to the IAA on the 16th of December 2022 and the same response was reiterated via post on the 11th of January 2023.

IAA response:

'According to S.I. 215 of 2005, Irish Aviation Authority (Obstacles to Aircraft in Flight), the IAA ANSD requires any person who seeks to erect a manmade object to notify the aerodrome operator of the intended operation at least thirty days in advance if the structure is to be erected in the vicinity of the aerodrome or the areas around the aerodrome and other protected surfaces associated with the aerodrome. Aerodrome Operators can be contacted via IAA AIP AD 1.3 INDEX TO AERODROMES AND HELIPORTS, to evaluate the impact of the intended operation on the protected airspace established for the aerodrome.

Additionally, any person who seeks to erect a manmade object in excess of 45 metres anywhere within the state above ground or water surface level must also notify the IAA ANSD of the intended crane erection at least thirty days in advance, as a crane operating at or above this height may constitute an obstacle to air navigation. The IAA ANSD can be contacted via airspace@iaa.ie.

The State requires electronic terrain and obstacle data (eTOD) in accordance with International Civil Aviation Organisation (ICAO) Annex 15 requirements which shall be surveyed by Ordnance Survey Ireland (OSi). The cost of this OSi surveyed data is to be borne by the developer. Additionally, the following data is to be supplied once construction is planned or commenced or available to the airspace team via airspace@iaa.ie:

- *The WGS84 coordinates (In degrees, minutes and seconds) for each turbine?*
- *Height above ground level (to blade tip) and elevation above mean sea level (to blade tip)?*
- *Verification if it's a standalone wind farm or is merged with others. Does the wind farm have any alternative names?*
- *Horizontal extent (rotor diameter) of turbines and blade length where applicable?*
- *Lighting of the wind farm, which turbine(s) is/are lit, and what type of lighting?'*

Table 15-28 IAA lighting specifications

ICAO Light Type	*Colour*
Low-intensity Type A (fixed obstacle)	*Red*
Low-intensity Type B (fixed obstacle)	*Red*
Low-intensity Type C (mobile obstacle)	*Yellow/Blue*
Low-intensity Type D (follow-me vehicle)	*Yellow*
Low-intensity Type E	*Red*
Medium-intensity Type A	*White*
Medium-intensity Type B	*Red*
Medium-intensity Type C	*Red*
High-intensity Type A	*White*
High-intensity Type B	*White*

15.3.7 Baseline Environment

15.3.7.1 Utilities

15.3.7.1.1 *Electricity*

Grid Infrastructure

The Ikerrin to Thurles 110kV overhead transmission line traverses the Site in a northeast to southwest orientation in the townlands of Strogue and Clonmore, approximately 2km from the nearest proposed turbine (T8).

A 38kV line traverses the northwest corner of Site in the townland of Knockanroe, approximately 800m from the nearest proposed turbine (T2).

15.3.7.1.2 *Gas*

A data request was sent to Gas Networks Ireland in January 2023. The data returned in March 2023 concluded there are no gas pipelines within or near the Site.

15.3.7.1.3 *Water*

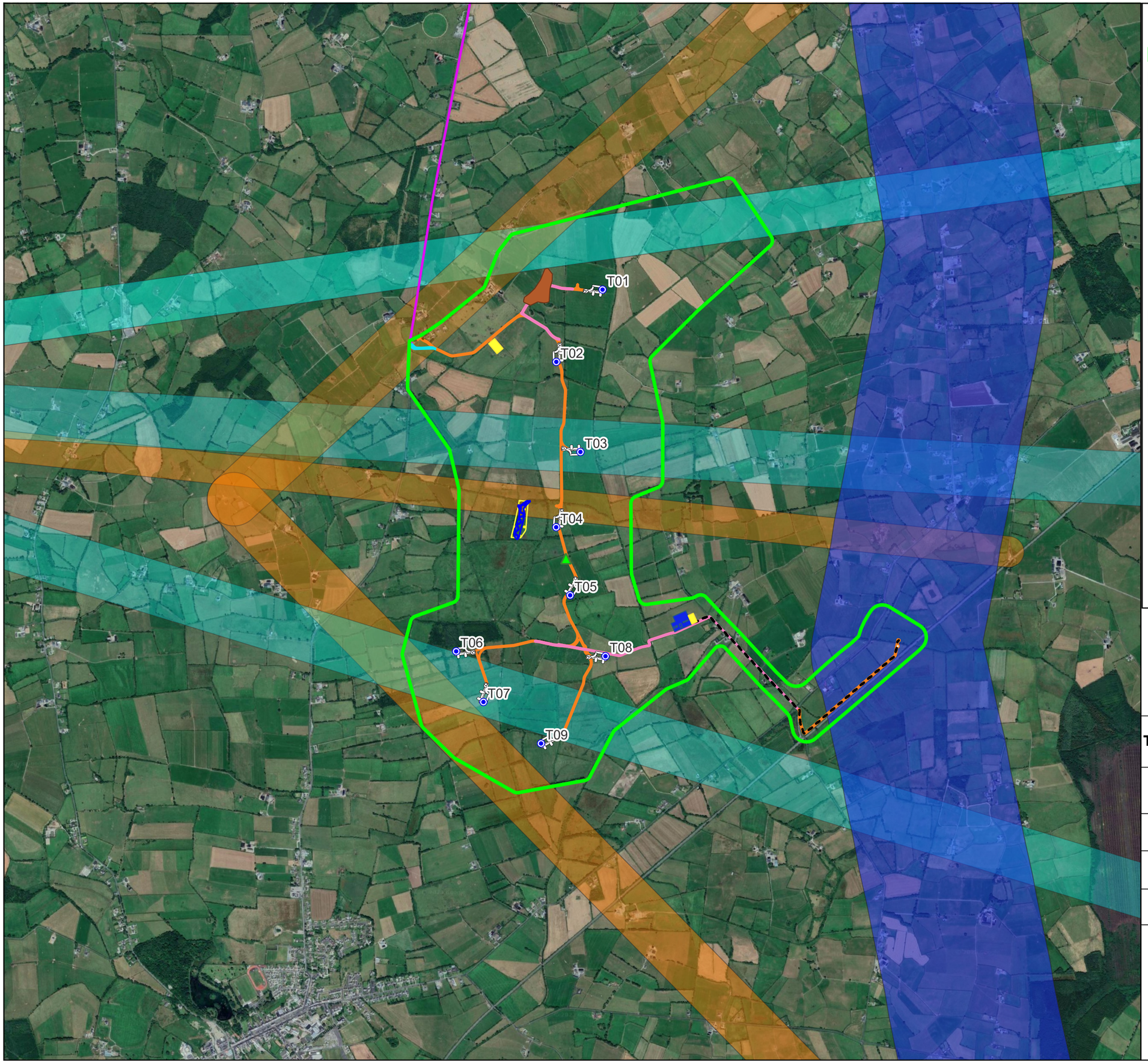
The Templemore Public Water Scheme and Source Protection Area are located approximately 1.2km west of any proposed infrastructure on the opposite side of the N62. The Site does not fall within the Templemore urban wastewater catchment. A data request sent to Irish Water on the 19th of June 2023 which indicates that a water mains runs along the R433 which will be crossed by the Proposed Grid Connection underground cable route. Mains valves are located approx. 5m from the Proposed Grid Connection underground cable route also.

15.3.7.2 Waste Management Services

There are no EPA-licensed or local authority-authorised waste facilities or activities located within the Site. The closest, authorised municipal waste facility is located approximately 18km south of the Site in Thurles, Co. Tipperary.

15.3.7.3 Telecommunications

There are four operators who have a total of 6 no. telecommunication links traversing the Site, with 3 no. links oversailing the Site, 2 no. links running along the northwestern and southeastern boundaries away from proposed infrastructure and just 1 no. link passing through the centre of the Site in the vicinity of any T04. Please see Figure 15-18 for details.



Map Legend

- EIAR Study Boundary
- Proposed Permanent 110kV Substation
- Temporary Compound
- Temporary Borrow Pit
- Proposed End Masts
- Proposed Met Mast
- Proposed Hardstands
- Proposed Turbine Locations
- Temporary Abnormal Entrance
- Proposed New Roads
- Existing Roads
- Proposed Temporary Security Cabins
- Proposed Grid Connection Cable Route
- River Enhancement Stream Concept
- River Enhancement 5m Riparian Buffer
- River Enhancement 1.8ha Natural Woodland
- Haul Route
- Transmission Links Buffer
- Transmission Links which pass over Turbine Tips
- 110kV OH Line Buffer (3.5xRD)

Drawing Title
Telecommunication Links at the Proposed Project Site

Project Title
Borrisbeg Renewable Energy Development

Drawn By	Checked By
GG	KM
Project No. 220310	Drawing No. Figure 15-
Scale 1:25,000	Date 2023-11-14

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15.3.7.4 Aviation

Department of Defence

The Site is located within MOA5. Protocol as set out in the Position Paper is to notify the Department of Defence should a developer wish to erect a structure taller than 45m in this area. Please see details of this response in section 15.3.6.3 above.

Irish Aviation Authority

There are no airports or aerodromes located within or adjacent to the Site. The nearest licenced aerodrome is located at Birr, approx. 26km north of Site.

15.3.8 Likely Significant Effects and Associated Mitigation Measures

The below assessment evaluates the impact (where there is the potential for an impact to occur) utilities, Irish Rail, waste management telecommunications and aviation during the construction, operation and decommissioning phases, as a result of the Proposed Project.

15.3.9 'Do-Nothing' Scenario

If the Proposed Project were not to proceed, the potential to impact on Material Assets would be removed.

The opportunity to capture part of Tipperary's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment and investment and to diversify the local economy would be lost.

If the Proposed Project were not to proceed, the opportunity to retore a segment of the Eastwood River by improving channel stability, instream habitat and establishing a natural wooded riparian buffer would be lost. Please see Appendix 6-5 for details.

15.3.10 Construction Phase: Utilities

15.3.10.1 Electricity Infrastructure and Supply

Identification of Impact

Proposed Wind Farm

A 38kV line traverses the northwest corner of Site in the townland of Knockanroe approximately 800m from the nearest proposed turbine (T2), and in the vicinity of proposed onsite roads. The delivery of turbine components from the N62 into the Site will be required to travel under this line. There is potential for this line to be impacted through interference or breakage during the construction phase of the Proposed Wind Farm infrastructure.

It is proposed to construct 1 no. temporary borrow pit in the townland of Knockanroe which will be located north and south of the existing access road leading to T01. The construction of the borrow pit will involve the excavation of earthworks and rock blasting and breaking to remove rock and aggregates. The construction of the borrow pit will commence at the beginning of the construction phase, only during working hours only (7am to 7pm); it will not require continuous, ongoing construction of the duration of the construction phase. The proposed borrow pit location is not located near any existing electrical infrastructure. Therefore the temporary borrow pit will have a temporary negative imperceptible effect on electricity supply and infrastructure.

It is proposed to manage any excess overburden generated through construction activities locally within the Site in identified spoil management areas, as shown in Figure 4-21, and detailed in Chapter 4. The spoil management areas have been selected based on the locations of spoil generation, areas suitable for spoil management and environmentally constrained areas. The spoil placement areas are not located near any existing electrical infrastructure. Therefore the creation of the spoil placement areas will have a temporary negative imperceptible effect on electricity supply and infrastructure.

As part of the Proposed Wind Farm design, it is proposed to restore appropriate pattern, profile and dimension to a segment of the Eastwood River channel with a view to improving stability of the channel and restoring in stream habitat. Please see Appendix 6-4 for details. The river restoration area is not located near any existing electrical infrastructure. Therefore the river restoration plan will have a temporary negative imperceptible effect on electricity supply and infrastructure.

Identification of Impact

Proposed Grid Connection

The Ikerrin to Thurles 110kV overhead transmission line (OHL) traverses the Site in a northeast to southwest orientation in the townlands of Strogue and Clonmore, approximately 2km from the nearest proposed turbine (T8).

It is intended to connect the Proposed Wind Farm via a new onsite 'loop-in' 110kV substation to the OHL via underground cabling which will run from the proposed onsite 110kV substation through a mix of local road (approx. 780m) and privately owned land (approx. 1.2km) in a south-eastward direction to the existing overhead line. The OHL will be broken by 2 no. end masts (lattice type towers) to facilitate the connection of the Proposed Wind Farm to the grid. There is potential for the OHL to be impacted through interference or breakage during the construction phase of the Grid Connection. This would have an unlikely but temporary, moderate negative impact on electricity supply.

Mitigation Measures

- Goal posts will be established under the 38kV overhead line for the entirety of the construction phase of the Proposed Project.
- The construction of the Grid Connection will be in phases along the proposed grid route, to minimise the duration of outage whilst making the connection to the OHL.
- Prior to commencing grid connection works in the agricultural fields in the townlands of Strogue and Clonmore, goal posts will be established under the 110k overhead line for the remainder of the grid connection of the construction phase. The goal posts will not exceed a height of 4.2 metres, unless specifically agreed with ESB Networks
- The suitability of machinery and equipment for use near power lines will be risk assessed.
- All staff will be trained on operating voltages of overhead electricity lines running the Site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the sites are made aware of the location of lines before they come on to site.
- Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire.
- When activities must be carried out beneath overhead lines, e.g., component delivery or end mast construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required.
- Information on safe clearances will be provided to all staff and visitors.
- Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on site.
- All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan.

- All health and safety measures as detailed in the Construction Environment Management Plan and Chapter 5 Population and Human Health will be adhered to during the construction, operation and decommissioning phases.

Residual Impact

With the implementation of the above measures, the residual impact is a temporary, slight negative impact on local electricity infrastructure and supply.

Significance of Effects

There will be a slight effect on electricity infrastructure or supply during the construction phase of the Proposed Project.

15.3.10.2 Gas Infrastructure and Supply

Identification of Impact

There is no Gas Networks Ireland infrastructure within or near the Site.

Mitigation Measures

None Proposed

Residual Impact

No residual Impact

Significance of Effects

The effects on gas infrastructure or supply during the construction phase of the Proposed Project will be imperceptible.

15.3.10.3 Water Infrastructure and Supply

Identification of Impact

Proposed Wind Farm

There are no underground water or sewerage networks within or adjacent to the Site. The nearest public water supply and source protection area is located 1.2km west of the Site on the other side of the N62.

The proposed borrow pit is not located near any existing water supply or waste infrastructure. Therefore the temporary borrow pit will have a temporary negative imperceptible effect on water supply or infrastructure. The spoil placement areas are not located near any existing electrical infrastructure. Therefore the creation of the spoil placement areas will have a temporary negative imperceptible effect on water supply or infrastructure. The river restoration area is not located near any existing electrical infrastructure. Therefore the river restoration plan will have a temporary negative imperceptible effect on water supply or infrastructure.

Identification of Impact

Proposed Grid Connection

The nearest public water supply and source protection area is located 2.6km west of the Proposed Grid Connection footprint on the other side of the N62. A water main is located in the R433 will be crossed by the underground grid connection cable route. Mains valves are located approx. 5m from the proposed underground grid connection cable route also.

Mitigation and Monitoring Measures

Chapter 9 Hydrology and Hydrogeology assess the potential for impact on public water supply and private wells during the construction phase of the Proposed Project. Prior to grid connection works, confirmatory surveys of the proposed route to confirm the presence services such as water supply will be undertaken. If encountered, the utility provider will be contacted to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works. Any works undertaken will be carried out in accordance with the specifications of the relevant utility provider.

Residual Impact

With the implementation of the proposed mitigation measures outlined in Chapter 9 and pre-commencement utility surveys, the residual impact is negative, imperceptible, indirect, short term, effect on water infrastructure and supply during the construction phase of the Proposed Project.

Significance of Effects

Based on the assessment above the effects on water infrastructure or supply during the construction phase of the Proposed Project will be imperceptible.

15.3.11 Construction Phase: Waste Management

Identification of Impact

Proposed Wind Farm

There are no EPA-licensed or local authority-authorised waste facilities or activities located within the Site boundary. The closest, authorised municipal waste facility is located approximately 18km south in Thurles, Co. Tipperary. The construction phase may give rise to hazardous wastes such as oil, diesel fuel, chemicals, paints, preservatives etc, as well as mixed municipal waste. Packaging, cables, cardboard. This is a short-term negative moderate impact on waste management facilities.

There will be no waste generated from the borrow pits; however, there may be hazardous hydrocarbon materials generated associated with the maintenance of the plant machinery used to construct the borrow pit. Therefore the potential impact is the same as that identified above for the Proposed Wind Farm.

There will be no waste generated from the creation of spoil management areas; however, there may be hazardous hydrocarbon materials generated associated with the maintenance of the plant machinery used. Therefore the potential impact is the same as that identified above for the Proposed Wind Farm.

There will be no waste generated from the river restoration proposal; however, there may be hazardous hydrocarbon materials generated associated with the maintenance of the plant machinery used to. Therefore the potential impact is the same as that identified above for the Proposed Wind Farm.

Identification of Impact

Proposed Grid Connection

The potential impact is the same as that identified above for the Proposed Wind Farm.

Mitigation Measures

- The CEMP, Appendix 4-3 of this EIAR, includes a Waste Management Plan (WMP) which outlines the best practice procedures during the construction and decommissioning phases of the project.
- Waste management will be carried out in accordance with *Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects* (2021) produced by the EPA. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort.
- All hazardous wastes will be stored in bunded containers/areas before being collected by an authorised waste contractor and brought to an EPA licensed waste facility. Hazardous wastes will be kept separate from non-hazardous wastes that contamination does not occur. Please see the CEMP for best practise measures to prevent the creation of waste materials.
- All non-hazardous waste generated on-site by the Proposed Project 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 Site. Therefore, all waste 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.
- The waste generated from the turbine erection will be limited to the associated protective covers which are generally reusable. Considering the specialist nature of this packaging material the majority will be taken back by suppliers for their own reuse. Any other packaging waste generated from the turbine supply will be deposited into the on-site skips and subsequently transferred to the MRF.
- It is not envisaged that there will be any waste material arising from the materials used to construct the site roads as only the quantity of stone necessary will be sourced from local quarries and brought on site on an 'as needed' basis.
- 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.

Residual Impact

The residual effect of the construction phase activities for the Proposed Project will have a short term slight negative effect on waste management services.

Significance of Effects

There will be a slight effect on waste management services from the Proposed Project during the construction phase.

15.3.12 Construction Phase: Telecommunications & Aviation

The potential for electromagnetic interference from the Proposed Project may only occur during the operational phase. There are no electromagnetic interference impacts for telecommunications and aviation assets or operations associated with the construction phase of the Proposed Project, and therefore no mitigation is required. Potential impacts during turbine erection (on aviation) and commissioning are assessed in the operational phase impact assessment.

15.3.13 Operational Phase: Utilities

15.3.13.1 Electricity Infrastructure and Supply

15.3.13.1.1 *Electricity Infrastructure*

Identification of Impact

Proposed Wind Farm

In the unlikely event that a replacement of turbines components or maintenance to ancillary infrastructure is required during this phase, the impacts described in section 15.3.10.1 will be the same. The proposed temporary borrow pit, proposed spoil management areas and proposed river restoration plan are only associated with the construction phase of the Proposed Project.

Proposed Grid Connection

Identification of Impact

Proposed Grid Connection

In the unlikely event that maintenance to grid connection infrastructure is required during this phase, the impacts described in section 15.3.10.1 will be the same.

Mitigation Measures

The measures listed in section 15.3.10.1 will be implemented and adhered to should replacement of turbine components or maintenance works on ancillary infrastructure and the grid connection be required during the operational phase.

Residual Impact

There will be brief, slight negative residual effect on electrical infrastructure during the operational phase of the Proposed Project should turbine components need maintenance works or replacement.

Significance of Effects

Given the infrequent occurrence of turbine component maintenance or replacement, it is considered that the residual effects on electrical infrastructure from the Proposed Project during the operational phase are not significant.

15.3.13.1.2 *Electricity Supply*

Identification of Impact

Proposed Wind Farm

The Proposed Wind Farm has the potential to supply 63MW of electricity to the national grid during the operational phase, offsetting the use of fossil fuels within the electricity generating sector. The proposed temporary borrow pit, proposed spoil management areas and proposed river restoration plan are only associated with the construction phase of the Proposed Project.

Proposed Grid Connection

It is the intention to connect the proposed on-site substation into the existing 110kV overhead line located to the southeast of the proposed onsite substation via a c. 2km underground grid connection cable route. The Proposed Project has the potential to supply approximately 47,000 Irish households with clean electricity per year.

Mitigation Measures

None are proposed.

Residual Impact

There will be a long-term slight positive residual effect on electricity supply during the operational phase of the Proposed Project.

Significance of Effects

The Proposed Project will have a long-term slight positive effect on national electricity supply.

15.3.13.2 Gas Infrastructure and Supply

Identification of Impact

There is no Gas Networks Ireland infrastructure within or near the Site.

Mitigation Measures

None Proposed

Residual Impact

No residual Impact

Significance of Effects

The effects on gas infrastructure or supply during the operational phase of the Proposed Project will be imperceptible.

15.3.13.3 Water Infrastructure and Supply

Identification of Impact

Proposed Wind Farm

There are no underground water or sewerage networks within or adjacent to the Site. The nearest public water supply and source protection area is located 1.2km west of the Site on the other side of the N62. The proposed temporary borrow pit, proposed spoil management areas and proposed river restoration plan are only associated with the construction phase of the Proposed Project.

Proposed Grid Connection

The nearest public water supply and source protection area is located 2.6km west of the Proposed Grid Connection footprint on the other side of the N62. A water main is located in the R433 will be crossed by the Proposed Grid Connection underground cable route. Mains valves are located approx. 5m from the proposed Grid Connection underground cable route also. On occasion, although rare, maintenance to underground grind connection cables may be required.

Mitigation Measures

The measures detailed in section 15.3.10.3 above will be implemented during any maintenance works along the Proposed Grid Connection cable route during the operational phase.

Residual Impact

With the implementation of the measures discussed in section 15.3.10.3, the residual impact is negative, imperceptible, indirect, long term, effect on water supply and infrastructure during the operation of the Proposed Project.

Significance of Effects

Based on the assessment above, the effects on water infrastructure or supply during the operational phase of the Proposed Project will be imperceptible.

15.3.14 Operational Phase Waste Management

Identification of Impact

Proposed Wind Farm

The Site will not be open to the public; it will continue to be used daily by private farmers with irregular site visits by wind farm maintenance crews. There will be very limited potential for waste generation pertaining to the operation of the Proposed Project; however, on occasion, the maintenance crew may

need to dispose of hydrocarbon waste such as oil that may be required during turbine maintenance procedures. The proposed temporary borrow pit, proposed spoil management areas and proposed river restoration plan are only associated with the construction phase of the Proposed Project.

Identification of Impact

Proposed Grid Connection

On occasion, the maintenance crew may need to dispose of hydrocarbon waste such as oil from the substation transformer. The on-site 110kV substation will include welfare facilities for use by Eirgrid operational and maintenance staff.

Mitigation Measures

- General waste produced at welfare facilities will be removed from site by maintenance personnel for disposal at Eirgrid and Developer headquarters.
- All hazardous wastes from the maintenance of the turbines and substation (including transformers) will be stored securely in bunded containers/areas before being collected by an authorised waste contractor and brought to an EPA licensed waste facility.
- The wastewater holding tank at the substation will be emptied when required by a licenced contractor.
- Operational personnel will be instructed at induction that under no circumstances can waste be disposed of on-site. It will also be made clear that the burning of waste material on-site is forbidden.

Residual Impact

There will be a long-term imperceptible negative effect on waste management services during the operational phase of the Proposed Project.

Significance of Effects

The effects on waste management services during the operational phase of the Proposed Project will be imperceptible.

15.3.15 Operational Phase: Telecommunications and Aviation

15.3.15.1 Telecommunications

Identification of Impact

Proposed Wind Farm

As discussed in section 15.3.7.3, there is just one link that traverses the Site. The remaining links in the area either run along the Site boundary at considerable distances away from turbines, or oversail the proposed turbines altogether with sufficient clearance or orientated away from infrastructure. The proposed temporary borrow pit, proposed spoil management areas and proposed river restoration plan are only associated with the construction phase of the Proposed Project.

Identification of Impact

Proposed Grid Connection

As illustrated in the ESB EMF booklet 2017 (section 15.3.5.2.2 above), EMF from 110kV underground cables diminishes quickly with distance from cable dropping from 4µT to 0.5µT at 10m away, reducing to almost 0µT at 20m.The proposed Grid Connection cable route will be sited at a minimum 20m from the railway track.

Mitigation Measures

- An Operator required buffer has been incorporated into the design for the link that passes through the Site, therefore no further mitigation measures during the operational phase are required.
- A signed protocol agreement between 2rn and the Developer can be found in Appendix 15-2. The protocol document ensures that in the event of any interference occurring to television or radio reception due to operation of the wind farm, the required measures, as set out in the document, will be carried out by the Developer to rectify this. The Protocol Document ensures that the appropriate mitigation is carried out in the event of unanticipated broadcast interference arising to television or radio reception as a result of the proposed Wind Farm.

Residual Impact

The Proposed Project will have no residual impact on the telecommunications link passing through the Site due to the achieved requested setback from nearby turbines. The remaining links will not be impacted due to oversail and/orientation and distance away from proposed turbines. Therefore, the residual impacts on telecommunication links during the operational phase are considered to be long term negative and imperceptible.

Significance of Effects

The effects on telecommunications from the Proposed Project during the operational phase are imperceptible.

15.3.15.1.2 *Department of Defence*

Identification of Impact

Proposed Wind Farm

The Proposed Project falls within MOA5. According to the Tall Structures Position Paper, structures above 45m proposed for this area should be referred to the Irish Air Corps for assessment of potential impact on flight operations. The proposed temporary borrow pit, proposed spoil management areas and proposed river restoration plan are only associated with the construction phase of the Proposed Project.

Proposed Grid Connection

None identified.

Mitigation Measures

None Proposed.

The Irish Air Corps have been notified of the Proposed Project. The IAA requests listed in section 15.3.6.3 will be implemented, and the same wind farm design data will be provided, where requested, to the Irish

Air Corps. The Site is located 5km east of the Devils Bit Mountain which has an elevation maximum of 458m, considerably higher than the proposed turbines. Furthermore, the minimum permitted altitude of an aircraft is 500m above sea level unless one may be operating in an Air Corps 'Low Flying Area'; however, the Site is not located in such an area. Likewise, several operational wind farms already exist within MOA5 to the southeast of the Site (7-10km from the nearest proposed turbine).

Residual Impact

With the implementation of the IAA requests listed in section 15.3.6.3 and taking surrounding terrain and existing operational wind farms into account, the residual impact is long-term imperceptible negative impact on MOA5 as referenced in the Air Corps Position Paper.

Significance of Effects

Th effects on Air Corps assets from the Proposed Project during the operational phase will be imperceptible.

15.3.15.2 Aviation

15.3.15.2.1 *Irish Aviation Authority Assets and Operations*

Identification of Impact

Proposed Wind Farm

There are no IAA assets within the Site or surrounds that may be impacted by the Proposed turbines. The proposed temporary borrow pit, proposed spoil management areas and proposed river restoration plan are only associated with the construction phase of the Proposed Project.

Identification of Impact

Proposed Grid Connection

None identified.

Mitigation Measures

None Proposed.

As no impacts were identified by IAA, no mitigation measures are required. However, the following IAA requests will be complied with should the Proposed Project be consented:

1. Notification will be given to the IAA ANSD of the intended crane erection at least thirty days in advance, as a crane operating at or above this height may constitute an obstacle to air navigation. The IAA ANSD can be contacted via airspace@iaa.ie.
2. Electronic terrain and obstacle data (eTOD) in accordance with International Civil Aviation Organisation (ICAO) Annex 15 requirements which shall be surveyed by Ordnance Survey Ireland (OSi).
3. The following will also be supplied:
    a. The WGS84 coordinates (In degrees, minutes and seconds) for each turbine
    b. Height above ground level (to blade tip) and elevation above mean sea level (to blade tip)

c. Verification it's a standalone wind farm and provision of any alternative names.
d. Horizontal extent (rotor diameter) of turbines and blade length where applicable
e. Lighting of the wind farm, which turbine(s) is/are lit, and type of lighting.

Residual Impact

With the implementation of the above, the residual impact is long-term imperceptible negative impact on aviation assets.

Significance of Effects

The effects on aviation assets from the Proposed Project during the operational phase will be imperceptible.

15.3.16 Decommissioning Phase

Where applicable, mitigation measures implemented for the construction phase will be implemented during the decommissioning phase also.

15.3.16.1 Electricity Infrastructure and Supply

Identification of Impact

Proposed Wind Farm

During the decommissioning phase, the removal of turbine components from the Site will be required. Therefore, the potential for impacts during the decommissioning phase on existing electrical infrastructure (38kV line) will be the same as the construction phase.

The decommissioning of the wind farm will result in the removal of approx.. 63MW of renewable energy to the grid annually.

Proposed Grid Connection

The 110kV substation and connection to the existing 110kV line will be under the management and ownership of Eirgrid. Therefore this will not be decommissioned.

Should the Proposed Wind Farm be decommissioned and not be repowered this will have long term, slight negative impact on the national electricity supply.

Identification of Impact

Proposed Temporary Borrow Pits, Proposed Spoil Management Areas, Proposed River Restoration Plan

These are only associated with the construction phase of the Proposed Project.

Mitigation Measures

The measures outlined for the construction phase are considered applicable for the decommissioning phase. Mitigation measures pertaining to the Proposed Grid Connection will not be required as this will not be decommissioned.

Residual Impact

The residual impact is a temporary, slight negative impact on local electricity infrastructure and supply.

Significance of Effects

There will be a slight negative effect on electricity supply with the decommissioning of the Proposed Wind Farm.

15.3.16.2 Water Infrastructure and Supply

The impact assessment outcome of the decommissioning phase on water infrastructure and supply will be the same as the construction phase, albeit having less ground disturbance works required. The effect on water supply during this phase are not significant.

15.3.16.3 Waste Management Services

Identification of Impact

Proposed Wind Farm

The CEMP, Appendix 4-3 of this EIAR, includes a Waste Management Plan (WMP) which outlines the best practice procedures during the decommissioning phases of the project. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of decommission of the Proposed Project. Disposal of waste will be seen as a last resort. Please see the CEMP for best practise measures to prevent the creation of waste.

Proposed Grid Connection

The Proposed Grid Connection will not be decommissioned. It will remain part of the national grid infrastructure under the operation of Eirgrid.

Mitigation Measures

- Measures listed in section 15.3.11 during the construction phase will be adhered to during the decommissioning phase.
- The Waste Management Plan will be updated prior to decommissioning and implemented during the decommissioning phase.

Residual Impact

The residual effect of the decommissioning phase activities on waste management services will have a short term slight negative effect.

Significance of Effects

The effects on waste management services from the Proposed Project during the decommissioning phase are not significant.

15.3.16.4 Telecommunications and Aviation

There are no electromagnetic interference impacts on telecommunications and aviation assets or operations associated with the construction or decommissioning phases of the Proposed Project, and therefore no mitigation required.

15.3.17 Cumulative and In Combination Effects

The potential for impact between the Proposed Project, and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Project (Proposed Wind Farm and Proposed Grid Connection combined) will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans in the vicinity of the Site, as set out in Chapter 2 of this EIAR. Please see Section 2.8 of Chapter 2 for cumulative assessment methodology.

Included within proposed projects and plans, the potential for cumulative impacts with other wind farms is considered. There are 7 no. operational wind farms (Lisheen I, II, III, Bruckana, Ballinlough, Ballinaveny and Monaicha) within 20 kilometres of the Site. There will be a significant positive cumulative effect on electrical supply with the commissioning of the Proposed Project along with the existing operational wind farms within the area.

As determined above, the effects on utilities, assets, waste management services, telecommunications, aviation operations/assets or Air Corps assets during the construction, operation or decommissioning phases of the Proposed Project will be not significant. Therefore, no significant cumulative effects are foreseen. 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 the relevant Aviation Authorities to ensure that the proposal 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 mitigatory measures are in place. Therefore, as each project is designed and built to avoid impacts arising, a cumulative impact cannot arise.

There will be a long term slight positive residual cumulative effect on electrical supply with the commission of the Proposed Project in combination with the operational wind farms listed above.