Planning and Environmental Consultants

Environmental Impact Assessment Report (EIAR)

Lackareagh Wind Farm, Co. Clare

Chapter 15 – Material Assets

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15. MATERIAL ASSETS

Material Assets are defined in the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022) as '*built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure'.* They may be either of human or natural origin. The cultural assets of Archaeology and Cultural Heritage are addressed in Chapter 14 of this Environmental Impact Assessment Report (EIAR). Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are addressed in Chapter 8: Land, Soils and Geology, Chapter 9: Water, and Chapter 10: Air Quality, and Chapter 11: Climate. Tourism and amenity resources, which are also considered material assets, are addressed in Chapter 5 on Population and Human Health. The Population and Human Health chapter also addresses existing land-uses (economic assets), including forestry and agriculture.

This chapter of the EIAR addresses the likely significant effects of the Proposed Project on transportation infrastructure (Section 15.1 Traffic and Transport), on Telecommunications and Aviation (Section 15.2) and Other Material Assets (Section 15.3), which are economic assets of human origin. Waste Management is also considered within the EPA 2022 Guidelines as part of Material Assets. EPA Waste Management pertaining to the construction, operation and decommissioning of the Proposed Project is summarised in Section 4.4.11.6 of Chapter 4 of the EIAR. Traffic volumes generated by the removal of waste from the Proposed Project to fully authorised waste facilities, is considered in Section 15.1 below.

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

15.1 Traffic and Transport

15.1.1 Introduction

15.1.1.1 Background and Objectives

The purpose of this section is to assess the effects on roads, 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 both the additional traffic volumes that will be generated, and the geometric requirements of the abnormally large loads that will deliver the wind turbine components to the Proposed Wind Farm site. 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 Proposed Wind Farm site. Locations where remedial measures are required to accommodate the abnormal loads on the proposed Turbine Delivery Route (TDR) 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 summary of the preliminary traffic management plan is also provided in Section 15.1.7 aimed at minimising the traffic impact on the local highway network. Refer also to Appendix 15-2 of this EIAR, for the Traffic Management Plan (TMP).

15.1.1.2 Statement of Authority

This section of the EIAR has been prepared by Alan Lipscombe of Alan Lipscombe Traffic and Transport Consultants Ltd. Alan is a competent expert in traffic and transport assessments. In 2007

Alan set up a traffic and transportation consultancy providing advice for a range of clients in the private and public sectors. Prior to this Alan was a founding member of Colin Buchanan's Galway office having moved there as the senior transportation engineer for the Galway Land Use and Transportation Study. Since the completion of that study in 1999, Alan has worked throughout the West of Ireland on a range of projects including: major development schemes, the Galway City Outer Bypass, Limerick Planning Land-Use and Transportation Study, Limerick Southern Ring Road Phase II, cost benefit analyses (COBA) and various studies for the 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; Ardderroo, 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.

An independent Stage 1 Road Safety Audit was undertaken by Traffico Road Safety Engineering Ltd., this document is provided as Appendix 15-4 to the EIAR.

15.1.1.3 Guidance on Assessment of Effects

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

15.1.1.4 Scoping and Consultation

Transport Infrastructure Ireland

Transport Infrastructure Ireland (TII) responded to the scoping request issued by MKO by email on the 23rd of December 2022, in which it provided a list of recommendations to be followed when preparing the EIAR. All relevant TII guidelines and policies have been 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.
- GE-STY-01024, Road Safety Audits, Transport Infrastructure Ireland, December 2017

Specific issues raised by TII include the following, as set out in Table 15-1.

Table 15-1 Issues raised by TII in relation to the Proposed Project and Responses

ID	TII Scoping Item	Response
1	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 consultation has been undertaken with Clare County Council. While scoping responses were received by Clare County Council, no information was provided in relation to existing and future national roads schemes.
2	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 development.	The impacts of the Proposed Project on the delivery routes in terms of link flows are set out in Section 15.1.4 and 15.1.5 of the EIAR, while an assessment of the capacity of the R466 / L-3037 leading to the site is set out in Section 15.1.9. An assessment of the impacts during the construction of the Proposed Grid Connection Route is set out in Section 15.1.6 while a swept path analysis undertaken for the abnormally large loads on the proposed TDR is set out in Section 15.1.7 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.
3	The developer should assess visual impacts from existing national roads.	The visual impacts of the Proposed Project are set out in Chapter 13 of this EIAR.
4	The developer should have regard to any EIAR / EIS and all conditions and or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should, in particular, have regard to any potential cumulative impacts.	It is confirmed that all Planning Authority conditions will be adhered to, and the cumulative traffic related impacts are assessed in Section 15.1.12.7 of this EIAR.
5	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 the access junctions is in accordance with TII guidelines, and the requirements set out in the Clare County Development Plan 2023 to 2029.
6	The developer, in preparing an EIAR, should have regard to TII's Environmental Assessment and Construction Guidelines, including the "Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes' (NRA, 2006).	It is confirmed that the impacts of the Proposed Project with regards air quality is set out in Chapter 10 of this EIAR.

ID	TII Scoping Item	Response
7	The EIAR should consider the "Environmental Noise Regulations 2006' (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see "guidelines for the Treatment of Noise and Vibration in National Road Schemes' (1st Rev, NRA 2004).	It is confirmed that the impacts of the Proposed Project with regards noise are set out in Chapter 12 of this EIAR.
8	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 Proposed Wind Farm site and traffic routes to/from the Proposed Wind Farm 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 promoters are 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).
9	The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required.	It is confirmed that an independent Stage 1 Road Safety Audit has been undertaken with respect to the proposed access junctions for the Proposed Project. The Road Safety Audit is included in full as Appendix 15-4 and is summarised in Section 15.1.10 of this EIAR.
10	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).

ID	TII Scoping Item	Response
11	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. 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 in Section 15.1.12.5. and Appendix 15-2 (TMP).
12	In addition, 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 15.1.9 of this EIAR.
13	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 and these companies will be consulted.
14	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 15.1.10 of this EIAR.
15	It is noted that grid connection routing is proposed to Ardnacrusha. 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. In that regard, consideration should be given to route options, use of existing crossings, depth of cable laying etc.	The applicant agrees with this condition.

Department of Transport

A response to scoping was received from the Department of Transport on the 22nd December 2022. The response refers to issues relating to the Proposed Grid Connection 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 Grid Connection 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 Proposed 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,
- 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 Grid Connection Route as set out in Chapter 4 of this EIAR.

The Department of Transport requires that the following be considered when applying conditions to any approval;

- A condition requiring the specific approval of the local authority to the detail of the final route of cables through the public road space. If during construction, there is a need to deviate from the detailed design then the approval of the local authority would again be sought. This would assist in minimising the impact on the public road.
- A condition requiring the developer to comply with all appropriate standards and, inter alia the Guidelines for Managing Openings in Public Roads, 2017 in order to ensure orderly development.
- A condition requiring that the location of the cables would be recorded as exactly as possible (maybe using BIM type technology) so as to facilitate the further use of road space for utilities and the maintenance/construction of the public road by the Roads authority. This record should be lodged with the local authority and with the ESB Networks for retention on their records.
- A condition requiring the developer to route cables away from bridge structures and specifically preventing the developer from attaching cables to road bridges. This would allow for the future maintenance of bridges without interruption of the electricity supply along the cables.

- A condition requiring the developer to notify the Roads Authority of the owner of the cables (Owner) and the controller (Power Controller) of the power transmitted along the cables. In addition, the condition should require Owner and Power Controller to notify the Roads Authority of any change in ownership of the cables or change of Power Controller transmitting power along the cables. In all instances the Owner and Power Controller should be required to maintain an agreed contacts list with the Roads Authority.

It is confirmed that the Applicant will accept the above conditions set out by the Department of Transport.

15.1.1.5 Pre-planning Meetings

Clare County Council

At present there has been no response to scoping received from Clare County Council.

3 no. onsite meetings were held between members of the Clare County Council Roads Department and the EIAR project team (EDF, MKO, TLI and Tobar Archaeology) in relation to the Blackwater Bridge, located along the Proposed Grid Connection Route. Further details of these meetings are included in Chapter 2 of this EIAR, however matters relating to traffic and transport were not discussed at these meetings.

15.1.1.6 Methodology and Section Structure

The report adopts the guidance for such assessments set out by Transport Infrastructure Ireland (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 TDR, an assessment of 2024 traffic flows and traffic forecasts during an assumed construction period of 2028 to 2030 (Section 15.1.2 Receiving Environment and 15.1.3 – 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 15.1.4 – Proposed Project and Traffic Generation),
- A description of the abnormally large loads and vehicles that will require access to the Proposed Wind Farm (Section 15.1.5 Construction Traffic Vehicles),
- An assessment of the effects during the Proposed Grid Connection Route (Section 15.1.6 – Effect on Network of Proposed Grid Connection Route),
- 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 15.1.7 – Traffic Management of Large Deliveries and Section 15.1.8 – Abnormal Load Route Assessment),
- The design of the Proposed Wind Farm access junctions is addressed (Section 15.1.9 Design of access junctions on L-7080), with the findings of an independent Stage 1 Road Safety Audit set out in Section 15.1.10 – Road Safety,
- An assessment of the provision for sustainable modes of travel (in this case primarily with respect to the transport of construction staff) (Section 15.1.11 – Provision for Sustainable Modes of Travel),
- A description of potential significant effects on Roads and Traffic (Section 15.1.12) – Likely and Significant Effect and Associated Mitigation Measures).

15.1.2 Receiving Environment

15.1.2.1 Site Location

The Proposed Wind Farm is located in County Clare approximately 6km west of Killaloe and just to the east of the village of Kilbane in the townlands listed in Table 1-1 of Chapter 1. The site location is shown in Figure 15-1.

It is proposed to access the Proposed Wind Farm site via the L7080 Local Road, which bisects the site, during both the construction and operational phases of the Proposed Project. It is proposed that the section of the L7080 within the Proposed Wind Farm site will be widened, where necessary, during the construction phase of the Proposed Project and then restored to a running width slightly larger than it exists currently. It is proposed that there will be 4 access junctions off the L7080 that will provide access to the 7 turbines, BESS and proposed onsite 38kV substation. The provision of 1 no. existing site entrance off the L7080 ('The Gap Road') for construction and operational access, 3 no. new permanent site entrances off the L7080 for construction and operational access, and 3 no. new temporary site entrances off the L7080 for construction access, will be provided as part of the Proposed Project. Further details on site entrances are provided in Section 4.5.1 in Chapter 4 of this EIAR with the junction designs discussed in Section 15.1.9. The site location of the Proposed Project and proposed delivery routes are presented in Figure 15-1 below.

The Proposed Grid Connection Route linking the proposed onsite 38kV substation to the existing Ardnacrusha 110kV substation is 14.7km in length and is located in County Clare traversing the townlands listed in Table 1-1 of Chapter 1.

15.1.2.2 Proposed Abnormal Size Load Delivery Route

The proposed port of entry for the large wind turbine components is the Foynes Port in County Limerick. The proposed TDR from Foynes Port to the Proposed Wind Farm site, together with the location of the pinch points included in the autotrack assessment, are shown in Figure 15-2 below.

The proposed TDR is as follows;

- From the access road serving Foynes Port the route turns left (south) onto the N69 National Secondary Road at the existing priority junction (Location 1).
- From this point the route heads east on the N69 for approximately 32kms, passing through the roundabout at Ballbrown (Location 2).
- The route then turns right from the N69 onto the N18 at Location 3 accessing the motorway via the double roundabouts followed by the eastbound access ramp.
- From this point the N18 heads east for approximately 3.2 km to Rossbrien where the route continues from Junction 1 of the M7 in a northeast direction for a further 20.8 km to Junction 27of the M7 at Coolderry. At his point the route exits the motorway via the exit ramp and turns left at the roundabout onto the R494, which is indicated as Location 4.
- From this point the route heads north on the R494 for approximately 5.4km to the junction with the R496 and the new crossing of the River Shannon to the south of Killaloe and Ballina passing through the roundabout at Birdhill (Location 5).
- After crossing the new bridge which is approximately 0.9km long, the route turns left at the new junction between the bridge and the R463. The junction on the eastern side of the bridge is shown as Location 6 with the junction on the western side of the River Shannon onto the R463 shown as Location 7.
- The route then travels southwest for approximately 6.8km, passing through a bend at Knockadrohid (Location 8) before turning right onto the R466 at Location 9. At this location it is proposed that there will be a temporary blade transition area constructed on the northeastern corner of the R463 / R466 junction for the purpose of transferring

the blades, which up to this point, will travel using standard Super Wing Carrier trailers, onto blade adapters, where the blades will be lifted to an angle of 60º.

- The route then travels northwest on the R466 for approximately 7.6km, passing through Bridgetown (Location 10) and a sharp bend (Location 11) to the junction of the L-3022 where the route turns right onto the L-3022 (Location16). On this section of the R466 the route passes through the crossroads near Glenomeara (Location 12), a right hand bend on the R466 near Glenomeara (Location 13), a left hand bend at the junction with the L-3033-8 (Location 14), and at a location in Clonycory, shown as Location 15, where the raised blades will require to be lowered to a horizontal position in order to pass under overhead HV cables.
- On turning right at the R466 / L-3022 junction (Location 16) the route travels northeast on the L-3022 for approximately 1.3km before continuing on the L-7080 for a further 1.9km from which the Proposed Wind Farm will be accessed via 4 separate junctions as discussed subsequently in Sections 15.1.4.1 and 15.1.9 of this EIAR.

An assessment of the turning requirements of the abnormally large loads transporting the turbine components was undertaken at the various pinch points along the TDR, as identified in Figure 15-2. The swept path assessment undertaken for these locations is discussed in Section 15.1.8.

15.1.2.3 Proposed Construction Traffic Haul Route

In order to facilitate the construction of the Proposed Project, most rock and hardcore materials will be sourced from the cut exercise and onsite borrow pit. All ready-mix concrete that will be required during the construction will be sourced from local, appropriately authorised quarries. The most likely quarries for the supply of concrete are located to the west of the Proposed Wind Farm site and east of Broadford, such as Stone Director Pat Moloney Ltd as shown on Figure 4-22. The potential routes for general construction materials for the purposes of this assessment, is as per the route considered for the turbine components (as described in Section 15.1.2.2 above) with the additional route from the west also shown in Figure 15-1.

15.1.2.4 Proposed Grid Connection Route

The Proposed Grid Connection Route is a 38kV underground cabling route connecting to the existing Ardnacrusha 110kV Substation. The Proposed Grid Connection Route measures approximately 14.7km with the associated traffic related impacts are discussed in Section 15.1.6 of this EIAR. The Proposed Grid Connection Route is shown below on Figure 15-1.

Proposed Wind Farm

Proposed Grid Connection Route

Ardnacrusha 110kV Substation

Foynes Port

KEY

Turbine delivery route

Crushed stone / concrete haul route

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-1 Site location and delivery routes

PROJECT:	Lackareagh Wind Farm, Co Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 10350	DATE: 25.06.24	DRAWN BY:	AL

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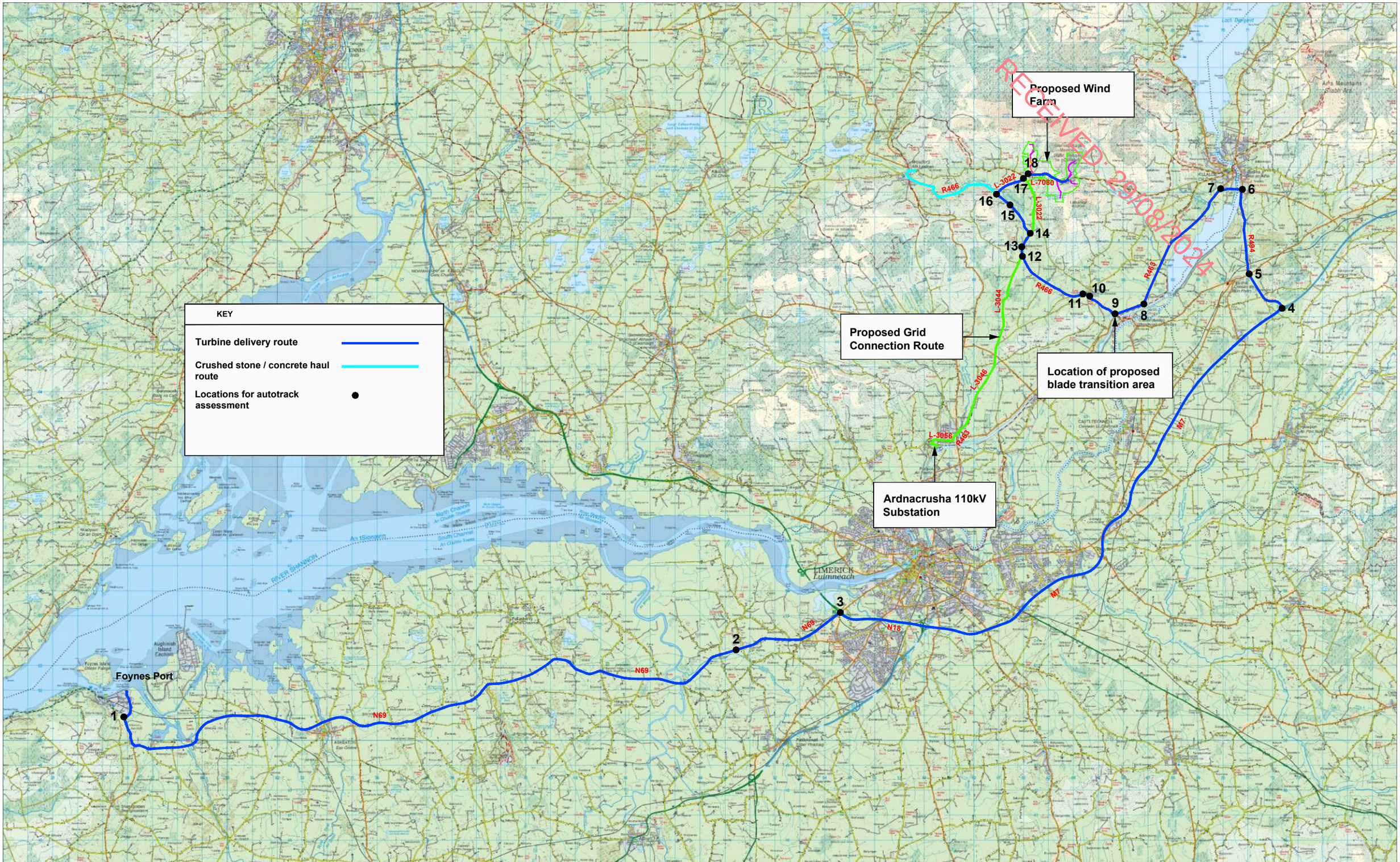

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-2 Turbine delivery route autotrack assessment locations

PROJECT:	Lackareagh Wind Farm, Co Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 10350	DATE: 25.06.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

15.1.3 Existing Traffic Volumes

Traffic volumes are discussed in terms of either vehicle numbers, or Passenger Car equivalent Units (PCUs), where each vehicle is expressed in terms of its demand on the network relative to the equivalent number of cars. For example, an articulated Heavy Goods Vehicles (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. Locations where the traffic count data was collected is provided below in Figure 15-3.

15.1.3.1 Background Traffic Flows

The 4 locations included in the link flow assessment and for which base year 2023 or 2024 traffic count data was collated are shown in Figure 15-3. The locations included in the assessment are as follows,

- Link 1 – N69 east of Foynes.
- Link 2 – M7 between Ballysimon and Rossbrien.
- Link 3 – R494 south of Killaloe.
- Link 4 – R463 east of O'Briensbridge.
- Link 5 – R446 west of O'Briensbridge
- Link 6 – East of L-3022
- Link 7 – L-3022 leading to site

For locations 1 and 2 the traffic counts were collated for the base year 2023 from automatic traffic count (ATC) sites maintained by TII. For the remaining 5 sites the traffic volumes were obtained from all day traffic counts undertaken on the R494 (Link 3) and at the R463 / R466 junction (Links 4 and 5) and the R446 / L-3022 junction (Links 6 and 7), as indicated in Figure 15-3 to provide 2-way links flows and junction turning count data. The traffic counts were undertaken by Traffinomics Ltd on Wednesday 15th May 2024. All base year traffic count data is included as Appendix 15-1.

The all-day traffic flows observed for the base years 2023 and 2024 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 TDR and construction traffic routes, ranging from 6,374 (Link 1) vehicles per day on the N69 to the east of Foynes up to 45,656 (Link 2) on the M7 Motorway between Ballysimon and Rossbrien to 6,885 vehicles per day on the R494 south of Killaloe (Link 3). Once the route crosses over then proposed bridge the traffic volumes reduce travelling towards the site from 3,996 (Link 4) on the R446 to the east of O'Briensbridge to 1,979 vehicles on the R446 west of O'Briensbridge (Link 5). A total of 272 vehicles in one day were observed on the L-3022 section of the proposed TDR approaching the site (Link 6).

Table 15-2 All day traffic flows by location, year 2023 / 2024 (2-way vehicles) and data source

Link	2023	2024	Source
1 – N69 – East of Foynes	6,374	NA	TII ATC
2 – M7 – Between Ballysimon and Rossbrien	45,656	NA	TII ATC
3 – R494 – South of Killaloe	NA	6,885	Classified link count
4 – R463 – East of O'Briensbridge	NA	3,996	Classified turning count
5 – R446 – West of O'Briensbridge	NA	1,979	Classified turning count

Link	2023	2024	Source
6 – R446 – East of L-3022	NA	1,169	Classified turning count
7 – L-3022 – Leading to site	NA	272	Classified turning count

Proposed Wind Farm

Proposed Grid Connection Route

Location of proposed blade transition area

Ardnacrusha 110kV Substation

Foynes Port

KEY

- Turbine delivery route
- Crushed stone / concrete haul route
- Link locations for traffic impact assessment

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-3 Link count locations for traffic impact assessment

PROJECT:	Lackareagh Wind Farm, Co Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 10350	DATE: 25.06.24	DRAWN BY:	AL

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15.1.3.2 Background Traffic Volumes for the Assumed Construction Year 2030

This section describes the process adopted to produce background traffic forecasts for an assumed construction period of 2028 to 2030, with an assessment year of 2030.

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 Clare 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 11.4% during the period from 2023, when the base ATC data was collected for Links 1 and 2, and the 2030 construction year, and by 9.7% from the year 2024 when the traffic surveys were undertaken for Links 3 to 7, to the construction year 2030. Base years 2023 and 2024 and 2030 all day traffic flows on the study area network are compared in Table 15-5.

It should be noted that while the assumed construction completion year of 2030 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 1.56% by the year 2030 (as shown in Table 15-5 as 1.0156) and the traffic volumes generated by the Proposed Project will remain unchanged regardless of construction year, as presented subsequently in Section 15.1.4. For example, in the event that the construction completion year is 2032 rather than 2030, background traffic volumes will increase from the base year of 2024 by 14.9% rather than 11.4%, as also shown in Table 15-3.

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 2.3% observed on the R494 south of Killaloe (Link 3), to a maximum of 9.7% observed on the R446 approaching the site (Link 7).

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

Year	Lights – Annual Factor			Lights – Cumulative Factor		
	Low	Medium	High	Low	Medium	High
2023	1.0139	1.0156	1.0191	1.000	1.000	1.000
2024	1.0139	1.0156	1.0191	1.014	1.016	1.019
2025	1.0139	1.0156	1.0191	1.028	1.031	1.039
2026	1.0139	1.0156	1.0191	1.042	1.048	1.058
2027	1.0139	1.0156	1.0191	1.057	1.064	1.079
2028	1.0139	1.0156	1.0191	1.071	1.080	1.099
2029	1.0139	1.0156	1.0191	1.086	1.097	1.120
2030	1.0139	1.0156	1.0191	1.101	1.114	1.142
2031	1.0139	1.0156	1.0191	1.117	1.132	1.163
2032	1.0139	1.0156	1.0191	1.132	1.149	1.186

Table 15-4 TII traffic growth rates by growth scenario

Period	New Factors		
	Low	Medium	High
2023 - 2030	1.101	1.114	1.142
2024 - 2030	1.086	1.097	1.120

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

Link	2023	2024	2030
1 – N69 – East of Foynes	6,374	NA	7,101
2 – M7 – Between Ballysimon and Rossbrien	45,656	NA	50,861
3 – R494 – South of Killaloe	NA	6,885	7,553
4 – R463 – East of O'Briensbridge	NA	3,996	4,384
5 – R446 – West of O'Briensbridge	NA	1,979	2,171
6 – R446 – East of L-3022	NA	1,169	1,282
7 – L-3022 – Leading to site	NA	272	298

Table 15-6 All day flows, percentage HGVs and flows by vehicle type, year 2030.

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / lgvs	HGVs	Cars / lgvs	Total
1 – N69 – East of Foynes	7,101	8.4%	596	6,504	1,431	6,504	7,936
2 – M7 – Between Ballysimon and Rossbrien	50,861	5.1%	2,594	48,267	6,225	48,267	54,492
3 – R494 – South of Killaloe	7,553	2.3%	174	7,379	417	7,379	7,796
4 – R463 – East of O'Briensbridge	4,384	3.3%	145	4,239	347	4,239	4,586
5 – R446 – West of O'Briensbridge	2,171	6.6%	143	2,028	344	2,028	2,372
6 – R446 – east of L-3022	1,282	9.7%	124	1,158	299	1,158	1,457

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / lgvs	HGVs	Cars / lgvs	Total
7 – L-3022 – Leading to site	298	7.4%	22	276	53	276	329

15.1.4 Proposed Project and Traffic Generation

15.1.4.1 Proposed Access Junctions

While the design of the junctions that will provide access to the Proposed Wind Farm site is discussed in Section 15.1.9, a summary is provided below. The locations of the 1 no. existing site entrance off the L7080 ('The Gap Road') for construction and operational access, 3 no. new permanent site entrances off the L7080 for construction and operational access, and 3 no. new temporary site entrances off the L7080 for construction access that will provide access off the L-7080 to the 7 wind turbines are shown in Figure 15-4 below. It is proposed that the 2 km section of the L-7080 between the junction of the L-3022 to the west and the most easterly access junction (Junction D) will be widened and improved as set out in Chapter 4 of this EIAR for the duration of the construction phase. On completion of the construction of the Proposed Project the L-7080 will be returned to an alignment slightly wider than it currently exists.

Junction A on L-7080 (T1 and T2)

All construction and operational traffic associated with Turbines T1 and T2 will gain access from Junction A. There is an existing local access road serving an existing property to the north of the site which it is proposed will be widened and improved to provide access for all vehicle types during the construction phase. For the delivery of the abnormally sized turbine delivery vehicles it is proposed that these vehicles will continue on the L-7080 past Junction A for approximately 1.43km to a temporary compound on the southern side of the L-7080. The abnormally sized loads will undertake a U-turn in the temporary compound and then travel back down the L-7080 to turn right into the site at Junction A. The purpose of this is to make use of the more generous geometry on the eastern corner of Junction A.

At this location general construction traffic associated with T1 and T2 will turn left off the L-7080, as will maintenance traffic once the Proposed Wind Farm is operational. On completion of the construction phase, the site entrance will be gated for security and opened only by maintenance staff. Please see Figure 15-4 below.

Junction B on L-7080 (T6 and T7)

Junction B is located approximately 0.86km east of Junction A on the L7080 Local Road. Junction B will serve as a construction phase and operational phase entrance, serving access to T6 and T7 to the southeast of the Proposed Wind Farm site. Similarly, on completion of the construction phase, the site entrance will be gated for security and opened only for maintenance staff. Please see Figure 15-4 below.

Junction C on L-7080 (T3 and T4)

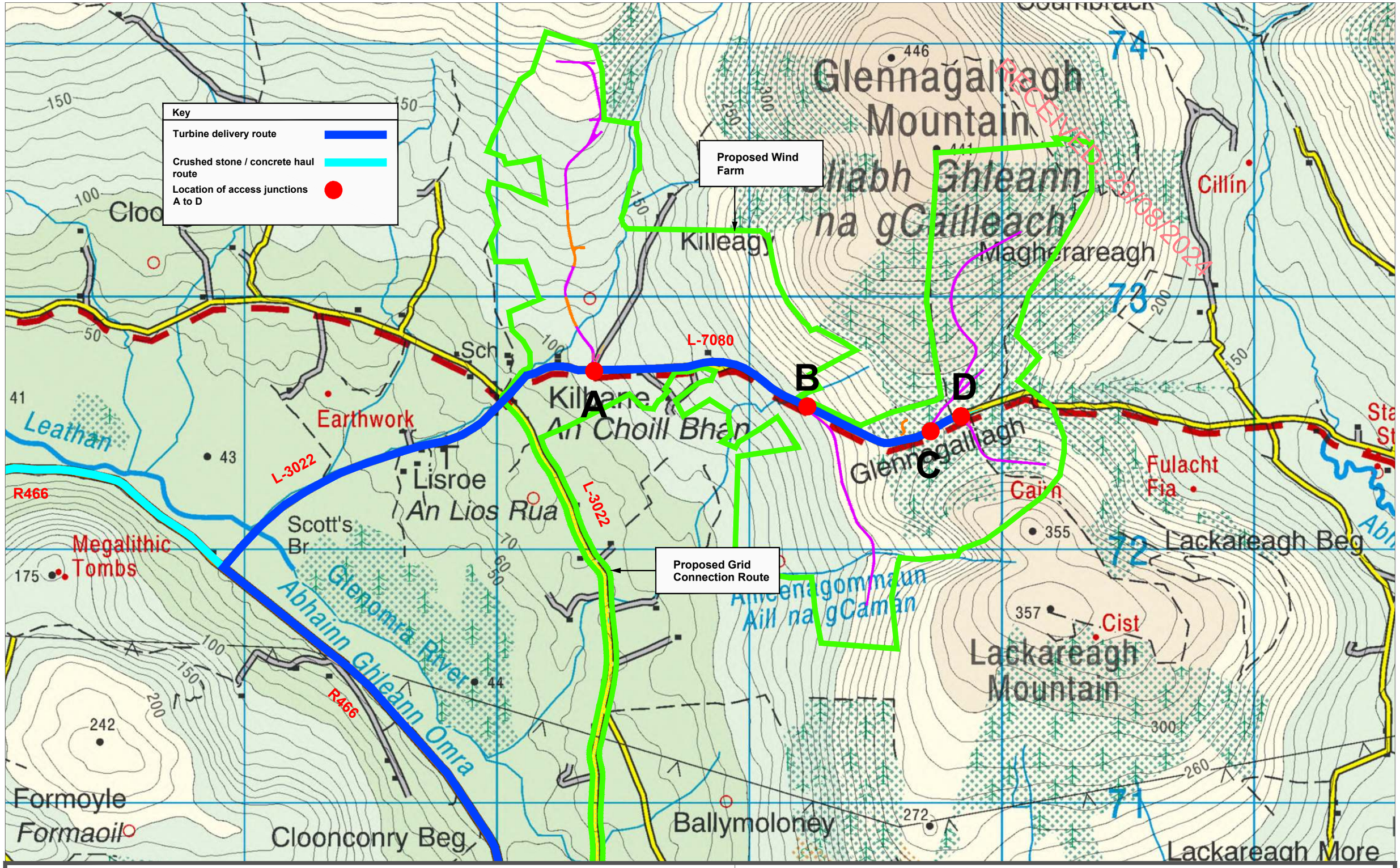
A further 0.57km east of Junction B on the northern side of the L7080 Local Road, a new access junction (Junction C) will provide access to T3 and T4 during the construction and operational phases.

Access to the proposed onsite 38kV substation and the BESS is also provided via Access Junction C. On completion of the construction of the Proposed Project the junction will be gated and opened only

for maintenance visits to T3 and T4, the proposed onsite 38kV substation and the BESS. Please see Figure 15-4 below.

Junction D on L-7080 (T5)

There are 2 components of Access Junction D – a temporary component and a permanent component. Approximately 80m east of Junction C a temporary access road is proposed off the southern side of the L-7080 that will provide access for the abnormally sized loads to and from T5. Approximately 60m further to the east it is proposed that a standard priority junction with provide access for T5 to and from the L-7080 for all general construction traffic, and maintenance traffic during the operational stage. On completion of the construction stage the temporary access road for abnormally sized loads will be closed, with the access at the standard junction gated and opened by maintenance staff only. This access will be opened only for the purpose of replacing large turbine components if required during the operational phase of the Proposed Wind Farm. Please see Figure 15-4 below.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-4 Wind farm access junctions

PROJECT:	Lackareagh Wind Farm, Co Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 10350	DATE: 25.06.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

15.1.4.2 Development Trip Generation – During Construction

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

- Stage 1 – Proposed Project construction: groundworks, construction of temporary construction compounds, turbine foundations, met mast foundations, proposed onsite 38kV substation, Battery Energy Storage System, internal electrical cabling and construction of the Proposed Grid Connection 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 7 turbines, the length of the construction phase and work periods etc. were made to inform the assessment. These projections allow for an 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 Construction and Environmental Management Plan (CEMP), included as Appendix 4-3 of this EIAR, which will be agreed, where required, with the relevant Local Authority.

The traffic generation estimates set out in the following paragraphs are 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 an 18-month construction period. The total number of deliveries made to the Proposed Wind Farm site during Stage 1 of the construction period is shown in Table 15-7. It is estimated that a total of 4,732 deliveries by truck or standard articulated HGVs will be made to the Proposed Wind Farm site during this period.

The numbers of deliveries made to the Proposed Project site is further split in Tables 15-8 and 15-9 between materials delivered for the 7 turbine foundations (Concrete) and the construction of the Proposed Wind Farm, as discussed further below.

15.1.4.2.1 *Stage 1 – Site Preparation, Groundworks and General Construction Works*

For assessment purposes, this stage of the Proposed Project construction, which includes the groundworks, construction of temporary construction compounds, turbine foundations, met mast foundations, proposed onsite 38kV substation, Battery Energy Storage System (BESS), internal electrical cabling and construction of the Proposed Grid Connection Route underground electrical cabling is estimated to last approximately 11 months (357 days), during which a total of 4,732 deliveries will be made to the Proposed Wind Farm site. During this construction phase there will be two distinct types of days with respect to trip generation. A total of 7 days will be used to pour the 7 concrete wind turbine foundations. Foundations will likely be poured one per day, with circa 80 concrete loads required for each turbine delivered to the Proposed Wind Farm site over a 12-hour period, resulting in 7 HGV trips to and from the Proposed Project site per hour.

On the remaining 350 working days for this stage other general materials will be delivered to the Proposed Wind Farm 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 7 days that concrete will be delivered to the Proposed Wind Farm site, an additional 384 two-way PCUs will be added to the network (comprising

80 two-way HGV trips with 2.4 PCUs per movement), as shown in Table 15-8. Similarly, on the 350 days when other materials will be delivered to the Proposed Wind Farm site, traffic volumes on the local network will increase by an average of 57 PCUs, as set out in Table 15-9. The construction of the of the Proposed Grid Connection Route is discussed further in Section 15.1.6 of the EIAR.

Table 15-7 Trip generation - Stage 1 - Site preparation, groundworks and general construction works – total loads

Material	Total no. Truck Loads	Truck type
Concrete (foundations)	560	Concrete mixers
Concrete (other)	128	Concrete mixers
Delivery of plant	27	Large artic
Fencing & gates	3	Large artic
Compound setup	28	Large artic
Steel	19	Large artic
Sand / binding	197	Trucks
Ducting and cabling (internal)	205	Large artic
Tree felling	138	Large artic
Crane (to lift steel)	1	Large artic
Stone for Proposed Wind Farm	816	Trucks
All materials for Proposed Grid Connection Route	2,058	Large artics / Trucks
proposed onsite 38kV substation and mast	120	Large artic
BESS	100	Large artic
Cranes for turbines	12	Large artic
Refuelling for plant	145	Large artic
Site maintenance	105	Large artic
Miscellaneous	70	Large artic
Total	**4,732**	

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	560	Concrete mixers	2.4	1,344	192.0	384.0
* Estimation based on 7 concrete pouring days						

Table 15-9 Trip generation - Stage 1 – Site preparation, groundworks and general construction works – 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 (other)	128	Concrete mixers	2.4	307.2	0.88	1.76
Delivery of plant	27	Large artic	2.4	64.8	0.19	0.37
Fencing & gates	3	Large artic	2.4	7.2	0.02	0.04
Compound setup	28	Large artic	2.4	67.2	0.19	0.38
Steel	19	Large artic	2.4	45.6	0.13	0.26
Sand / binding / stone / pile foundation	197	Trucks	2.4	472.8	1.35	2.70
Ducting and cabling (internal)	205	Large artic	2.4	492.0	1.41	2.81
Tree felling	138	Large artic	2.4	331.2	0.95	1.89
Crane (to lift steel)	1	Large artic	2.4	2.4	0.01	0.01
Stone for Proposed Wind Farm	816	Trucks	2.4	1,958.4	5.60	11.19
All materials for Proposed Grid Connection Route	2,058	Large artic	2.4	4,939.2	14.11	28.22

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
proposed onsite 38kV substation and mast	120	Large artic	2.4	288.0	0.82	1.65
BESS	100	Large artic	2.4	240.0	0.69	1.37
Cranes for turbines	12	Large artic	2.4	28.8	0.08	0.16
Refuelling for plant	145	Large artic	2.4	348.0	0.99	1.99
Site maintenance	105	Large artic	2.4	252.0	0.72	1.44
Miscellaneous	70	Large artic	2.4	168.0	0.48	0.96
Total	4,172			10,012.8	28.61	57.2

15.1.4.2.2 Stage 2 – Turbine Construction

During the turbine construction stage, including delivery and assembly, there will be deliveries to the Proposed Wind Farm site made by abnormally large vehicles, referred to in this section as *extended artics*, transporting the component parts of the turbines (nacelles, blades and towers). There will 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 Proposed Wind Farm site during the turbine construction period are shown in Table 15-10, which summarises that a total of 56 trips will be made to and from the Proposed Wind Farm site by extended artics, with a further 28 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	7	1	7	1	7	Extended Artic
Blades	7	3	21	1	21	Extended Artic
Towers	7	4	28	1	28	Extended Artic
Sub total					*56*	
Transformer	7	1	7	1	7	Large Artic
Drive train and blade hub	7	1	7	1	7	Large Artic

Material	Units	Quantity per Unit	Total Quantity	Quantity per Truck	Total Truck Loads	Truck type
Base and other deliveries	7	2	14	1	14	Large Artic
Sub total					*28*	
Total					84	

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 Proposed Wind Farm site on 5 days per week, which is a common delivery frequency for large turbine components from the port of entry to the Proposed Wind Farm site. This will result in this stage taking 19 days spread over a 4-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 4 weeks, the remaining equipment required during this phase will be delivered to the Proposed Wind Farm 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 19 days, while an additional 19.2 PCUs are forecast to be on the network on 7 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
*Estimation based on 3 abnormal sized loads being delivered per day on 5 days per week (total 56 loads will take 19 nights spread over 4 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

Material	Quantity per Unit	PCU Value	2-way PCUs / day
Total	4		19.2
*Estimation based on equipment for 2 turbines being moved per week spread over 2 days for 3 weeks			

Construction Employee Traffic

During the construction of the Proposed Project, it is estimated that 100 jobs will be created. Of this total it is estimated that up to 70 staff members will be employed 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).

15.1.4.3 Development Trip Generation – During Operation

The Proposed Grid Connection Route will be unmanned once operational and then Proposed Wind Farm will be remotely monitored. The only traffic associated with the operational phase of the Proposed Project will be from maintenance personnel. While there will be no scheduled trips required for the Proposed Grid Connection Route, maintenance may be required, although this will occur rarely generating a modest number of trips.

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 Proposed Wind Farm site at any time. The impact on the network of these trips during the operational stage is discussed in Section 15.1.4.4.

15.1.4.4 Development Trip Generation – During Decommissioning

Traffic generation to the Proposed Project during decommissioning will be similar but significantly less than the trip generation estimates for the construction phase presented above. This is because much of the materials brought into the Proposed Wind Farm site during construction will be left in-situ during the decommissioning stage. A Decommissioning Plan is included as Appendix 4-7 and includes further information relating to the decommissioning phase of the Proposed Project.

There will be no traffic generation as a result of the Proposed Grid Connection Route as it will not be decommissioned.

15.1.5 Construction Traffic Vehicles

The delivery of turbine components including blades, tower sections and nacelles is a specialist operation owing to the oversized loads involved. As detailed in Section 1.7.3 in Chapter 1 of this EIAR, a range of turbine dimensions is proposed. With respect to the geometric requirements of the road network, the turbine blades are the longest turbine component, and the traffic assessment is concerned with the longest blade being proposed. The maximum blade length of the proposed turbines is 77.5 metres and has been assessed as the precautionary scenario for the turbine delivery assessment for the Proposed Project.

The critical vehicles in terms of size and turning geometry requirements and used in the detailed route assessment discussed in Section 15.1.2.2 are the blade transporter, the blade transporter with the blade lifted at the tip and the tower transporter vehicles.

The key dimensions are as follows:

Transport of Blades – Standard articulated HGV with 10m blade overhang at rear

Total length	83.5 m
Length of blade	77.5 m

Transport of Tower – Using low-bed or drop deck trailers

Total length (with load)	49.5 m
Length of load	40.8 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 Proposed Wind Farm 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, regional and local road networks and access the Proposed Wind Farm site off the permanent upgrade of 1 no. existing site entrance off the L7080 ('The Gap Road') for construction and operational access, 3 no. new permanent site entrances off the L7080 for construction and operational access, and 3 no. new temporary site entrances off the L7080 for construction access.

15.1.5.1 Traffic Effects During Construction, Operation and Decommissioning of the Proposed Wind Farm

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 Wind Farm site have been assumed to do so from one of 2 no. directions , that is via either the TDR, or in the case of general construction materials and concrete, via the R466 from the west in the direction of Broadford. The assessment is therefore based on a precautionary scenario, where all traffic generated by the Proposed Project travels to/from the Proposed Wind Farm site on the same route with the maximum increase in traffic volumes assessed on each link shown in Figure 15-3 above.

15.1.5.2 Effect on Link Flows – During Construction

Background traffic volumes and Proposed Wind Farm generated traffic volumes are shown for the four typical construction stage scenarios, discussed in Section 15.1.5 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 7 days when the concrete foundations are poured an additional 454 PCUs will travel to/from the Proposed Wind Farm site.

During the delivery of the concrete, it is forecast that the increase in traffic volumes will range from +5.7% on the N69 east of Foynes (Link 1) down to +0.8% on the M7 (Link 2), followed by +5.8% on the R494 south of Killaloe (Link 3). On the west of the River Shannon the percentage differences increase as background traffic flows decrease, with the forecast differences ranging from +9.9% on the R463 east of O'Briensbridge (Link 4), to +31.2% on the R446 (Link 6) and + 137.9% on the L-3022 (Link 7) approaching the site.

During Stage 1 – Site Preparation, Groundworks and General Construction

For 350 days when the general construction, groundworks and general construction are undertaken an additional 127 PCUs will travel to/from the Proposed Project.

On these days it is forecast that the increase in traffic volumes will range from +1.6% on the N69 east of Foynes (Link 1) down to +0.2% on the M7 (Link 2), followed by +1.6% on the R494 south of Killaloe (Link 3). On the west of the River Shannon the percentage differences are forecast to range from +2.8% on the R463 east of O'Briensbridge (Link 4), to +8.7% on the R446 (Link 6) and + 38.6% on the L-3022 (Link 7) approaching the site.

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

On the 19 days when the abnormally sized loads will deliver the large turbine components to the site an additional 105 PCUs will travel to/from the Proposed Project.

On these days it is forecast that the increase in traffic volumes will range from +1.3% on the N69 east of Foynes (Link 1) down to +0.2% on the M7 (Link 2), followed by +1.3% on the R494 south of Killaloe (Link 3). On the west of the River Shannon the percentage differences are forecast to range from +2.3% on the R463 east of O'Briensbridge (Link 4), to +7.2% on the R446 (Link 6) and + 31.9% on the L-3022 (Link 7) approaching the site.

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

For 7 days an additional 64 PCUs will travel to/from the Proposed Wind Farm site.

On these days it is forecast that the increase in traffic volumes will range from +0.8% on the N69 east of Foynes (Link 1) down to +0.1% on the M7 (Link 2), followed by +0.8% on the R494 south of Killaloe (Link 3). On the west of the River Shannon the percentage differences are forecast to range from +1.4% on the R463 east of O'Briensbridge (Link 4), to +4.4% on the R446 (Link 6) and + 19.4% on the L-3022 (Link 7) approaching the site.

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

Link	Background PCUs			Proposed Wind Farm PCUs			Total PCUs (Background + Proposed Wind Farm)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N69 – East of Foynes	6,504	1,431	7,936	70	384	454	6,574	1,815	8,390
2 – M7 – Between Ballysimon and Rossbrien	48,267	6,225	54,492	70	384	454	48,337	6,609	54,986

Link	Background PCUs			Proposed Wind Farm PCUs			Total PCUs (Background + Proposed Wind Farm)		
3 – R494 – South of Killaloe	7,379	417	7,796	70	384	454	7,449	801	8,250
4 – R463 – East of O'Briensbridge	4,239	347	4,586	70	384	454	4,309	731	5,040
5 – R446 – West of O'Briensbridge	2,028	344	2,372	70	384	454	2,098	728	2,826
6 – R446 – east of L-3022	1,158	299	1,457	70	384	454	1,228	683	1,911
7 – L-3022 – Leading to site	276	53	329	70	384	454	346	437	783

Table 15-14 Daily Traffic volumes during site preparation, groundworks and general construction works – background, Proposed Wind Farm generated and total (PCUs)

Link	Background PCUs			Proposed Wind Farm PCUs			Total PCUs (Background + Proposed Wind Farm)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N69 – East of Foynes	6,504	1,431	7,936	70	57	127	6,574	1,488	8,063
2 – M7 – Between Ballysimon and Rossbrien	48,267	6,225	54,492	70	57	127	48,337	6,282	54,619
3 – R494 – South of Killaloe	7,379	417	7,796	70	57	127	7,449	474	7,923
4 – R463 – East of O'Briensbridge	4,239	347	4,586	70	57	127	4,309	404	4,713
5 – R446 – West of O'Briensbridge	2,028	344	2,372	70	57	127	2,098	401	2,499
6 – R446 – West of L-3022	1,158	299	1,457	70	57	127	1,228	356	1,584
7 – L-3022 – Leading to site	276	53	329	70	57	127	346	110	456

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

Link	Background PCUs			Proposed Wind Farm PCUs			Total PCUs (Background + Proposed Wind Farm)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N69 – East of Foynes	6,504	1,431	7,936	45	60	105	6,549	1,491	8,041
2 – M7 – Between Ballysimon and Rossbrien	48,267	6,225	54,492	45	60	105	48,312	6,285	54,597
3 – R494 – South of Killaloe	7,379	417	7,796	45	60	105	7,424	477	7,901
4 – R463 – East of O'Briensbridge	4,239	347	4,586	45	60	105	4,284	407	4,691
5 – R446 – West of O'Briensbridge	2,028	344	2,372	45	60	105	2,073	404	2,477
6 – R446 – East of L-3022	1,158	299	1,457	45	60	105	1,203	359	1,562
7 – L-3022 – Leading to site	276	53	329	45	60	105	321	113	434

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

Link	Background PCUs			Proposed Wind Farm PCUs			Total PCUs (Background + Proposed Wind Farm)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N69 – East of Foynes	6,504	1,431	7,936	45	19	64	6,549	1,450	8,000
2 – M7 – Between Ballysimon and Rossbrien	48,267	6,225	54,492	45	19	64	48,312	6,244	54,556
3 – R494 – South of Killaloe	7,379	417	7,796	45	19	64	7,424	436	7,860
4 – R463 – East of O'Briensbridge	4,239	347	4,586	45	19	64	4,284	366	4,650

Link	Background PCUs			Proposed Wind Farm PCUs			Total PCUs (Background + Proposed Wind Farm)		
5 – R446 – West of O'Briensbridge	2,028	344	2,372	45	19	64	2,073	363	2,436
6 – R446 – East of L-3022	1,158	299	1,457	45	19	64	1,203	318	1,521
7 – L-3022 – Leading to site	276	53	329	45	19	64	321	72	393

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

Link	Background	Proposed Wind Farm	Total	% increase	Estimated No. of days
1 – N69 – East of Foynes	7,936	454	8,390	5.7%	7
2 – M7 – Between Ballysimon and Rossbrien	54,492	454	54,946	0.8%	7
3 – R494 – South of Killaloe	7,796	454	8,250	5.8%	7
4 – R463 – East of O'Briensbridge	4,586	454	5,040	9.9%	7
5 – R446 – West of O'Briensbridge	2,372	454	2,826	19.1%	7
6 – R446 – East of L-3022	1,457	454	1,911	31.2%	7
7 – L-3022 – Leading to site	329	454	783	137.9%	7

Table 15-18 Summary daily effect of Proposed Wind Farm traffic – site preparation, ground works and general construction work - % increase and number of days

Link	Background	Proposed Wind Farm	Total	% increase	Estimated No. of days
1 – N69 – East of Foynes	7,936	127	8,063	1.6%	350
2 – M7 – Between Ballysimon and Rossbrien	54,492	127	54,619	0.2%	350

Link	Background	Proposed Wind Farm	Total	% increase	Estimated No. of days
3 – R494 – South of Killaloe	7,796	127	7,923	1.6%	350
4 – R463 – East of O'Briensbridge	4,586	127	4,713	2.8%	350
5 – R446 – West of O'Briensbridge	2,372	127	2,499	5.4%	350
6 – R446 – East of L-3022	1,457	127	1,584	8.7%	350
7 – L-3022 – Leading to site	329	127	456	38.6%	350

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

Link	Background	Proposed Wind Farm	Total	% increase	Estimated No. of days
1 – N69 – East of Foynes	7,936	105	8,041	1.3%	19
2 – M7 – Between Ballysimon and Rossbrien	54,492	105	54,597	0.2%	19
3 – R494 – South of Killaloe	7,796	105	7,901	1.3%	19
4 – R463 – East of O'Briensbridge	4,586	105	4,691	2.3%	19
5 – R446 – West of O'Briensbridge	2,372	105	2,477	4.4%	19
6 – R446 – West of L-3022	1,457	105	1,562	7.2%	19
7 – L-3022 – Leading to site	329	105	434	31.9%	19

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

Link	Background	Proposed Wind Farm	Total	% increase	Estimated No. of days
1 – N69 – East of Foynes	7,936	64	8,000	0.8%	7
2 – M7 – Between Ballysimon and Rossbrien	54,492	64	54,556	0.1%	7
3 – R494 – South of Killaloe	7,796	64	7,860	0.8%	7
4 – R463 – East of O'Briensbridge	4,586	64	4,650	1.4%	7
5 – R446 – West of O'Briensbridge	2,372	64	2,436	2.7%	7
6 – R446 – East of L-3022	1,457	64	1,521	4.4%	7
7 – L-3022 – Leading to site	329	64	393	19.4%	7

15.1.5.3 Link Capacity Assessment

An assessment of the impact on link capacity on the delivery routes 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 11,600 vehicles per day on the N69 (Link 1), up to 55,000 vehicles per day on the M7 (Link 2), down to 5,000 vehicles per day for most of the Regional roads on the route (Links 3, 4 ,5 and 6). 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. There is no capacity specified for the L-3022 leading to the site, which is a single lane road with passing opportunities, so a capacity of 3000 was adopted for the purpose of this assessment.

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 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, the following is forecast with respect to link capacity on the TDR;

- The N69 (Link 1), the R466 (Link 5), the R466 (Link 6) and the L-3022 leading to the site (Link 7) are all forecast to operate well within link capacity by the year 2030 for all construction days scenarios.

- For the M7 (Link 2) it is forecast that the M7 will operate at its link capacity although the traffic generated by the Proposed Project will have an imperceptible impact, with a maximum of +1 percentage point on concrete pouring days in the unlikely event that the concrete is delivered from quarries this remote from the site.
- The R494 south of Killaloe (Link 3) is forecast to operate over capacity by the year 2030 with background traffic alone at 156%. Again in the unlikely event that the concrete pours will be delivered from quarries this remote from the site, it is forecast that this would increase to +165% on these 7 days, reducing to a maximum of 158%, (or 2% points above base) for the remainder of the construction period.
- The R463 to the east of O'Briensbridge (Link 4) is forecast to operate at 92% capacity by the year 2030 with background traffic. In the event that the concrete pours will be delivered from this direction, it is forecast that this will increase to +101% on these 7 days, reducing to a maximum of 94%, (or 2% points above base) for the remainder of the construction period.

Table 15-21 Delivery route link type and link capacity (at Level of Service D)

Link	Link type	Link capacity (Level of Service D)
1 – N69 – East of Foynes	Type 1 single	11,600
2 – M7 – Between Ballysimon and Rossbrien	Type 3 single	55,000
3 – R494 – South of Killaloe	Type 3 single	5,000
4 – R463 – East of O'Briensbridge	Type 3 single	5,000
5 – R446 – West of O'Briensbridge	Type 3 single	5,000
6 – R446 – East of L-3022	Type 3 single	5,000
7 – L-3022 – Leading to site	Less than Type 3 single	3,000

Table 15-22 Delivery route link capacity and summary of link flows by construction delivery stage , year 2030

Link	Link capacity (Level of Service D)	Construction delivery stage				
		Background traffic	Concrete pour	Site Preparation, Groundworks and General Construction	Turbine plant	Turbine equipment
1 – N69 – East of Foynes	11,600	7,936	8,390	8,063	8,041	8,000
2 – M7 – Between Ballysimon and Rossbrien	55,000	54,492	54,946	54,619	54,597	54,556
3 – R494 – South of Killaloe	5,000	7,796	8,250	7,923	7,901	7,860

4 – R463 – East of O'Briensbridge	5,000	4,586	5,040	4,713	4,691	4,650
5 – R446 – West of O'Briensbridge	5,000	2,372	2,826	2,499	2,477	2,436
6 – R446 – East of L-3022	5,000	1,457	1,911	1,584	1,562	1,521
7 – L-3022 – Leading to site	3,000	329	783	456	434	393

Table 15-23 Delivery route link capacity and % of link capacity by construction delivery stage, year 2030

Link	Link capacity (Level of Service D)	Construction delivery stage				
		Background traffic	Concrete pour	Site Preparation, Groundworks and General Construction	Turbine plant	Turbine equipment
1 – N69 – East of Foynes	11,600	68%	72%	70%	69%	69%
2 – M7 – Between Ballysimon and Rossbrien	55,000	99%	100%	99%	99%	99%
3 – R494 – South of Killaloe	5,000	156%	165%	158%	158%	157%
4 – R463 – East of O'Briensbridge	5,000	92%	101%	94%	94%	93%
5 – R446 – West of O'Briensbridge	5,000	47%	57%	50%	50%	49%
6 – R446 – East of L-3022	5,000	29%	38%	32%	31%	30%
7 – L-3022 – Leading to site	3,000	11%	26%	15%	14%	13%

15.1.5.4 Effect on Link Flows – During Operation

Once the Proposed Wind Farm 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 Wind Farm 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.

15.1.5.5 Effect on Junctions – During Construction

Advice relating to the extent of the road network that should be included in a traffic impact assessment for a proposed development are set out in Table 2.2 of Traffic and Transport Assessment Guidelines (PE-PDV-02045), TII, May 2014. One of the thresholds in the document is that locations where the Proposed Project is forecast to result in a +10% increase in traffic flows on an adjoining road should be included, or +5% for locations that are already congested.

While the R466 west of O'Briensbridge (Link 5) is forecast to increase by 19.2% during then 7 concrete pouring days, it is forecast that flows will increase by a maximum of +5.4% for the rest of the construction period. As the 10% threshold is reached on just 7 days where the impacts will be short term and on the local road network, it was determined that a detailed assessment was not required at the R466 / R463 junction.

With traffic flows on the R446 / L-3022 junction forecast to increase by 8.7% on the R466 and by 38.6% on the L-3022 during general construction days, in accordance with TII guidelines a junction capacity test was undertaken at this junction.

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.

15.1.5.5.1 *Scenarios Modelled*

The greatest effect in terms of traffic 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 Proposed Wind Farm 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.

R466 / L-3022 Junction Capacity Test Results

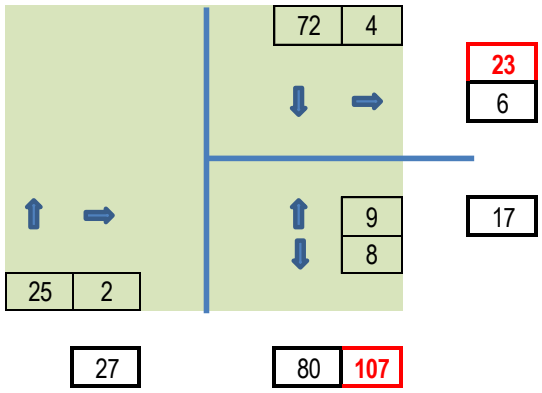
The AM and PM peak hour traffic flows at the R466/ L-3022 junction are shown for the base year 2024 and the proposed construction year of 2030 in Figures 15-5a and 15-5b respectively. The additional traffic movements that are forecast to be generated through the junction by construction workers are shown in Figure 15-5c, with proposed construction year 2030 traffic flows including the additional construction traffic shown in Figure 15-5d. The results of the junction capacity tests are set out in Table 15-24 and show that the additional car trips passing through the junction will have a slight effect on the operation of the junction, increasing the maximum ratio of flow to capacity (RFC) at the movements most impacted from 0.4% to 4.1% for the right turn from the R466 onto the L-3022 during the AM peak hour, and from 3.6% to 11.9% for the exit from the L-3022 onto the R466 during the PM peak hour. The assessment shows that the junction is forecast to operate well within the acceptable limit of 85% as specified by TII in the Traffic and Transport Assessment Guidelines.

Table 15-24 Junction capacity test results, R466 / L-3022 junction, AM and PM peak hours, without and with construction traffic, year 2030.

Period	Location	Without construction traffic			With construction traffic		
AM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From L-3022	4.5%	0.05	0.13	4.5%	0.05	0.14
	Right turn from R466	0.4%	0.00	0.11	4.1%	0.05	0.12
PM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From L-3022	3.6%	0.04	0.14	11.9%	0.13	0.15
	Right turn from R466	3.5%	0.05	0.10	3.5%	0.05	0.10

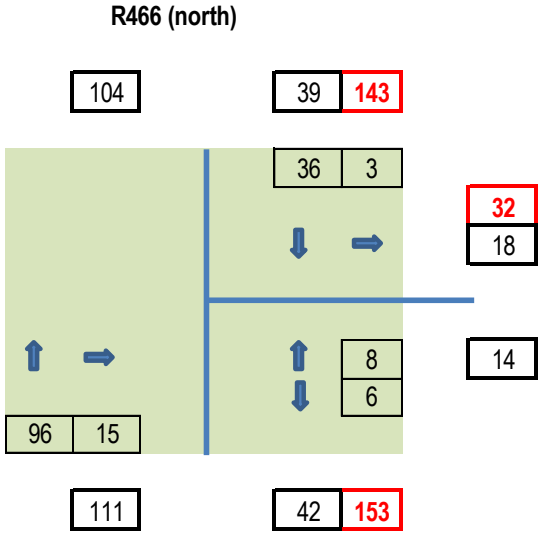
15.1.5.6 Effect on Junctions – During Operation

As discussed in Section 15.1.4.3 it is forecast that once operational, the Proposed Wind Farm is expected to generate 1 to 2 trips per day for maintenance purposes. It is therefore concluded that the Proposed Wind Farm will have an imperceptible effect on the local network once constructed.



Observed traffic flows
Wednesday 15th May 2024
AM peak hour (07:00 - 08:00)
All flows in pcus

R466 / L-3022 junction



Observed traffic flows
Wednesday 15th May 2024
PM peak hour (17:00 - 18:00)
All flows in pcus

R466 / L-3022 junction

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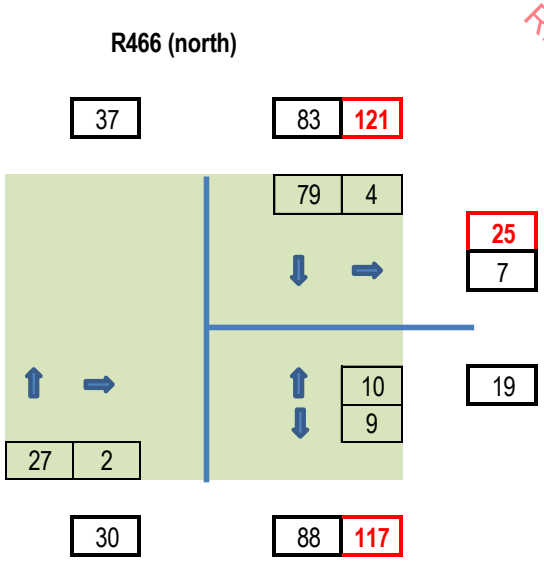
Figure 15-5a Observed traffic flows, R466 / L-3022 junction
Year 2024 - pcus



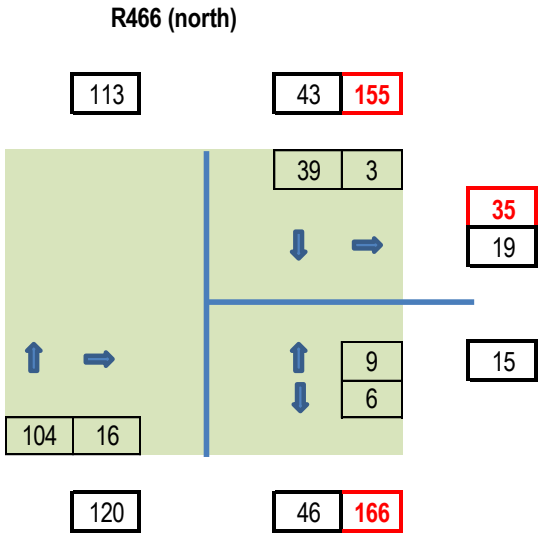


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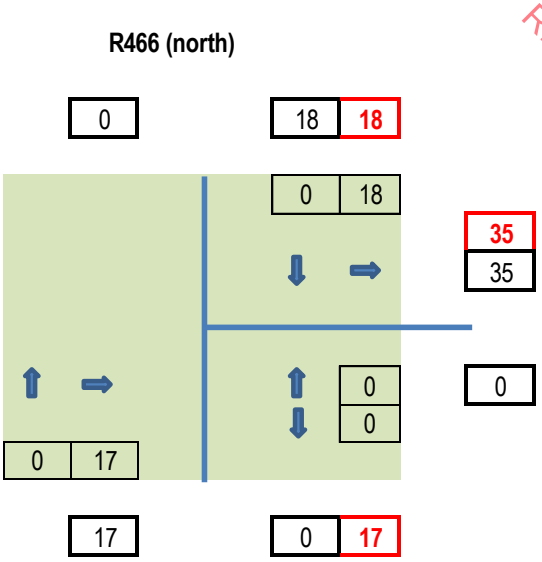
Figure 15-5b Background traffic flows, R466 / L-3022 junction
Year 2030 - pcus

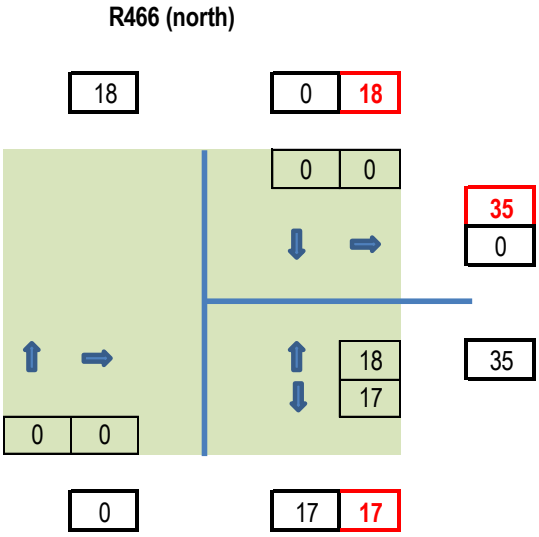


Construction traffic

AM peak hour (07:00 - 08:00)

R466 / L-3022 junction

PCUs



Construction traffic

PM peak hour (17:00 - 18:00)

R466 / L-3022 junction

PCUs

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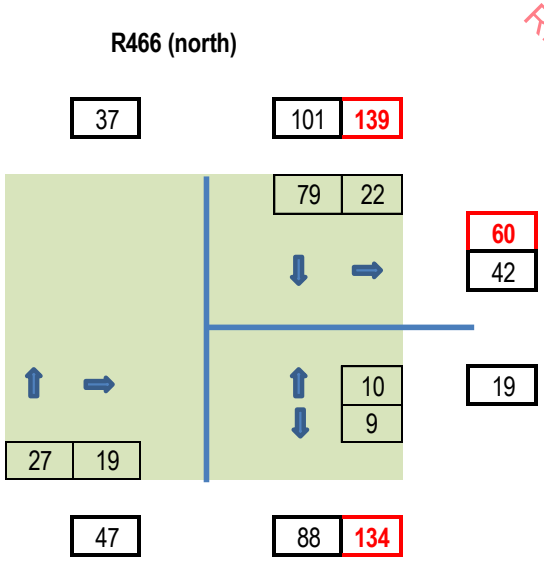
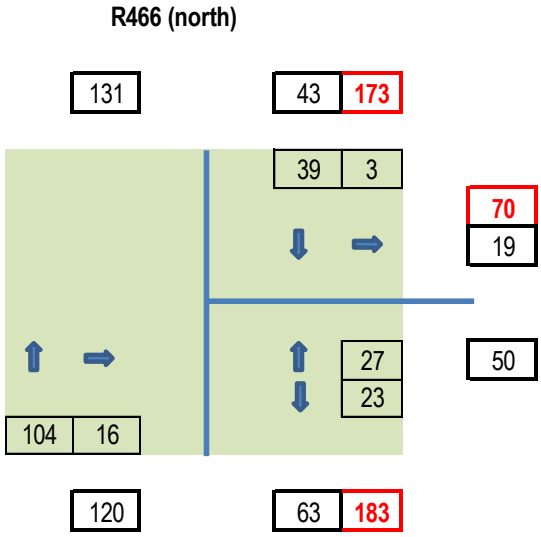
Figure 15-5c Construction traffic flows, R466 / L-3022 junction pcus



Observed traffic flows
Wednesday 15th May 2030
AM peak hour (07:00 - 08:00)
All flows in pcus

R466 / L-3022 junction



Observed traffic flows
Wednesday 15th May 2030
PM peak hour (17:00 - 18:00)
All flows in pcus

R466 / L-3022 junction

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Figure 15-5d With construction traffic flows, R466 / L-3022 junction
Year 2030 - pcus

15.1.6 Effect on Network of Proposed Grid Connection Route

A detailed description of the Proposed Grid Connection Route is provided in Chapter 4 of this EIAR. It is proposed that the proposed onsite 38kV substation is connected by means of a 14.7km in length underground 38kV electricity cable to the existing Ardnacrusha 110kV substation.

The majority of the Proposed Grid Connection Route, approximately 14.0km of the total length of 14.7 km is located within the public road corridor, with the remaining 0.7km being located within private lands in the Proposed Wind Farm site and the private lands within the existing 110kV Ardnacrusha substation compound. The total length of the underground electrical cabling route is located within County Clare within the townlands set out in Table 1-1 of Chapter 1.

The traffic generation that is forecast to be generated during the construction of the Proposed Grid Connection Route, including, material excavated from the trench, cabling and other components of the Proposed Grid Connection Route, stone for infill and plant delivery, are included in the impact assessment set out in Section 15.1.6 of this EIAR. All traffic for the construction of the Proposed Grid Connection Route will be delivered to the location of construction along the Proposed Grid Connection Route.

For the extent of the Proposed Grid Connection Route that will impact on the public road network, this is considered in the following 6 on-road sections, as indicated in Figure 15-6a and summarised in Tables 15-25 and 15-26.

Off road at 110 kV Ardnacrusha Substation – off road (length 0.6 kms) – As this section is off road, there will be no impacts to general traffic on the 6 days required to construct this section of the cable route.

Section 1 – L-3056 (length 1.0 kms) – The Proposed Grid Connection Route continues east on the L-3025 for approximately 1.0 km. During the approximately 10 days that this section will take to construct local traffic will require to divert onto the proposed diversion route shown in Figure 15-6b, resulting in an increase in trip length of 5.5km.

Section 2 – R463 (length 0.2 kms) – This section of the Proposed Grid Connection Route heads northeast on the R463 regional road for approximately 0.2 kms. During the 2 days required to construct this section of the underground cabling route, the road will require to be closed and local traffic will be diverted onto the route shown in Figure 15-6c, which will result in a diversion of 8.2kms.

Section 3 – L-3046 (length 3.4 kms) – The Proposed Grid Connection Route then continues northeast on the L3046 for approximately 3.4kms. During the 34 days required to construct this section of the Proposed Grid Connection Route, the road will require to be closed and local traffic will require to divert onto the route shown in Figure 15-6d, resulting in a diversion of +1.8kms.

Sections 4 – L-3044 (length 4.3 km) – The Proposed Grid Connection Route continues on the L3044with the construction taking 43 days, with a diversion to local traffic of 7.3 kms as shown in Figure 15-6e.

Sections 5 – L-3022 (length 3.3 km) – The Proposed Grid Connection Route continues on the L3022 for 3.3 kms with the construction taking approximately 33 days. The diversion route for Sections 5 is shown in Figure 15-6f with a local diversion of +14.2km.

Section 6 – L-7080 (length 1.8 kms) – For this final section of the route on the public road network the L-7080 heads east for approximately 1.8kms taking approximately 18 days to construct. The proposed diversion route for local traffic is shown in Figure 15-6g resulting in an increased trip length of 17.3 km.

At this point the Proposed Grid Connection Route heads north for approximately 0.1 km with no impacts on general traffic flow.

Table 15-25 Proposed Grid Connection Route link summary, link length (km), grid construction and water crossing construction duration (days)

Proposed Grid Connection Route Section	Length (kms)	Grid construction days (100m / day)	Total construction days
Off road at Ardnacrusha substation	0.6	6	6
Section 1 – L3056	1.0	10	10
Section 2 – R463	0.2	2	2
Section 3 – L3046	3.4	34	34
Section 4 – L3044	4.3	43	43
Section 5 – 3022	3.3	33	33
Section 6 – L7080	1.8	18	18
Off road in Proposed Wind Farm Site	0.1	1	1
Total	14.7	147	147

Table 15-26 Proposed Grid Connection Route link summary, link length (km), construction duration (days) and diversion during construction

Proposed Grid Connection Route Section	Traffic management	Length (kms)	Diversion route length (kms)	Increase in trip length (kms)
Off road at Ardnacrusha substation	NA	0.6	NA	NA
Section 1 – L3056	Closure with diversion	1.0	6.5	5.5
Section 2 – R463	Closure with diversion	0.2	8.4	8.2
Section 3 – L3046	Closure with diversion	3.4	5.2	1.8
Section 4 – L3044	Closure with diversion	4.3	11.6	7.3
Section 5 – L3022	Closure with diversion	3.3	17.5	14.2

Proposed Grid Connection Route Section	Traffic management	Length (kms)	Diversion route length (kms)	Increase in trip length (kms)
Section 6 – L7080	Closure with diversion	1.8	19.1	17.3
Off road in Proposed Wind Farm Site	NA	0.1	NA	NA
Total		14.7		

In summary, it is estimated that the Proposed Grid Connection Route will take a total of approximately 147 days to construct during which a road closure will be required at one point on the network on all of these days. The diversions incurred will be a maximum of 17.3 km and a minimum of 1.8 km. It is noted that the diversions will be incurred by very few trips, as the L3056, L3046, L3044, L3022 and L7080 are all lightly trafficked.

With respect to the traffic volumes that will be generated during the construction of the Proposed Grid Connection 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 point of construction. By its nature the impacts of these additional trips on the network will be transient and will therefore be negative, 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 TMP, incorporating all the mitigation measures, is included as Appendix 15-2 of this EIAR, and will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the road's authority and An Garda Síochána prior to construction works commencing on the Proposed Project site. It is noted that local access will be maintained to all properties during the construction of the Proposed Grid Connection Route, as included in the TMP.

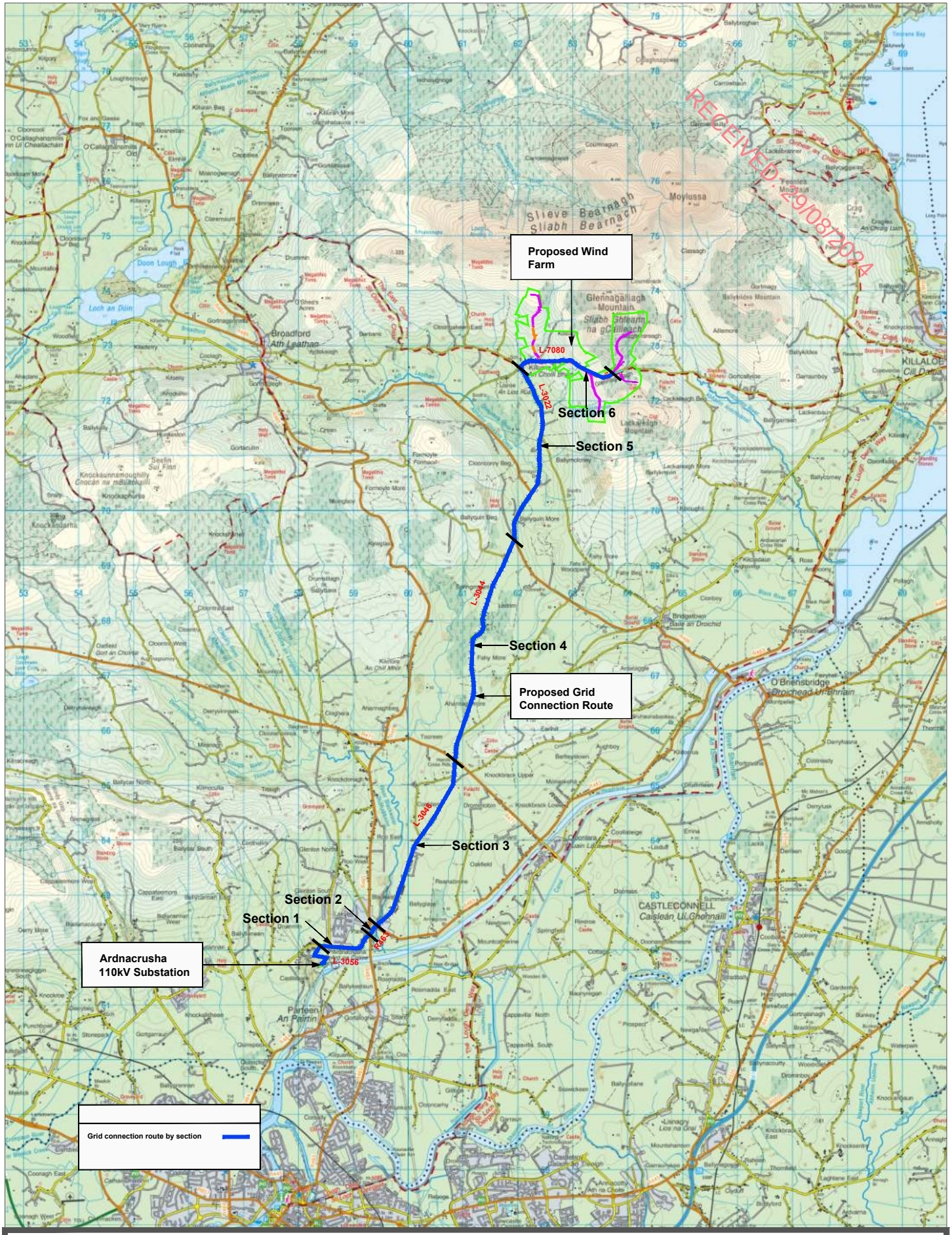

Figure 15-6a Proposed Grid Connection Route

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 10350	DATE: 12.06.24	DRAWN BY:	AL

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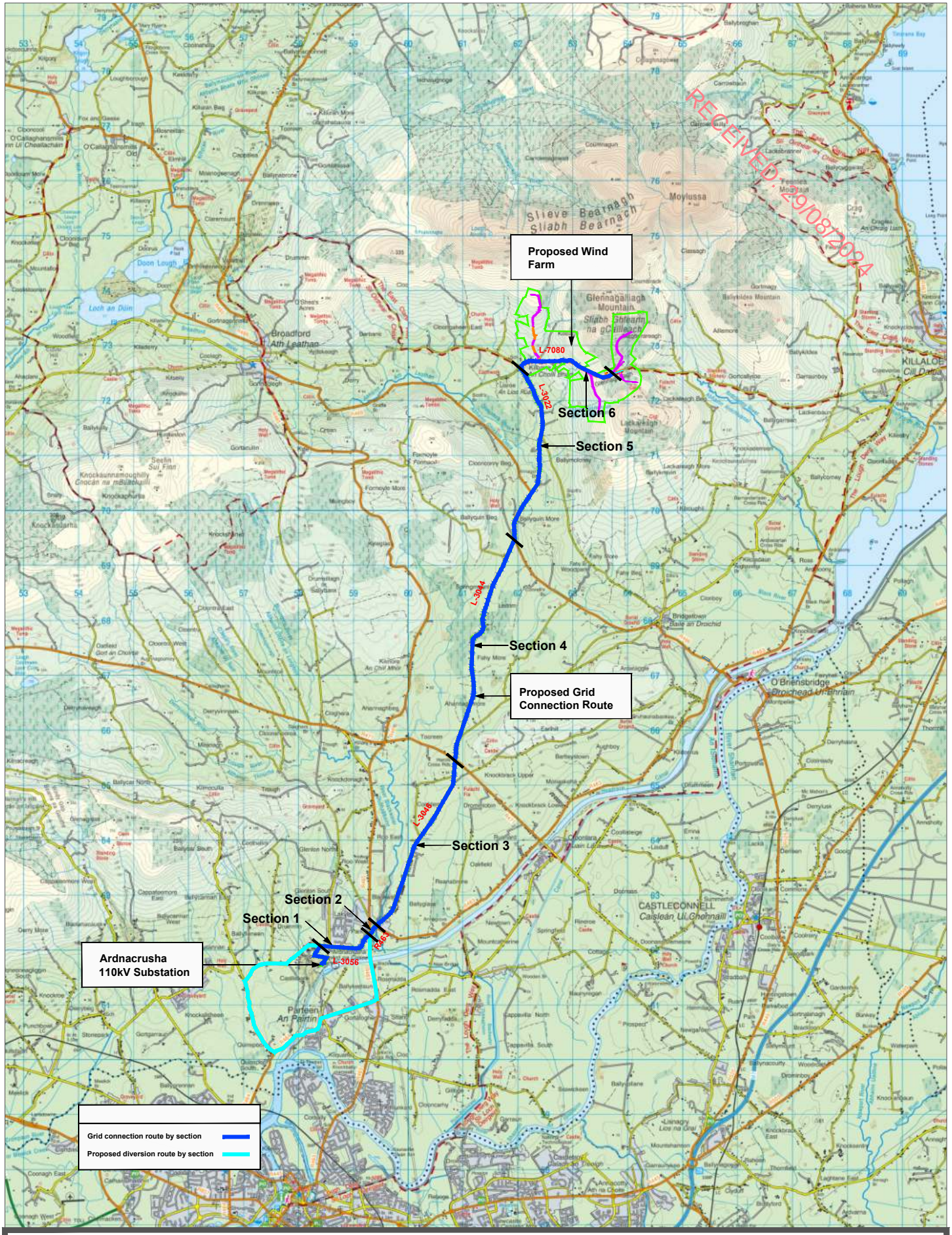

Figure 15-6b Proposed Grid Connection Route - Diversion for Section 1

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 10350	DATE: 12.06.24	DRAWN BY:	AL

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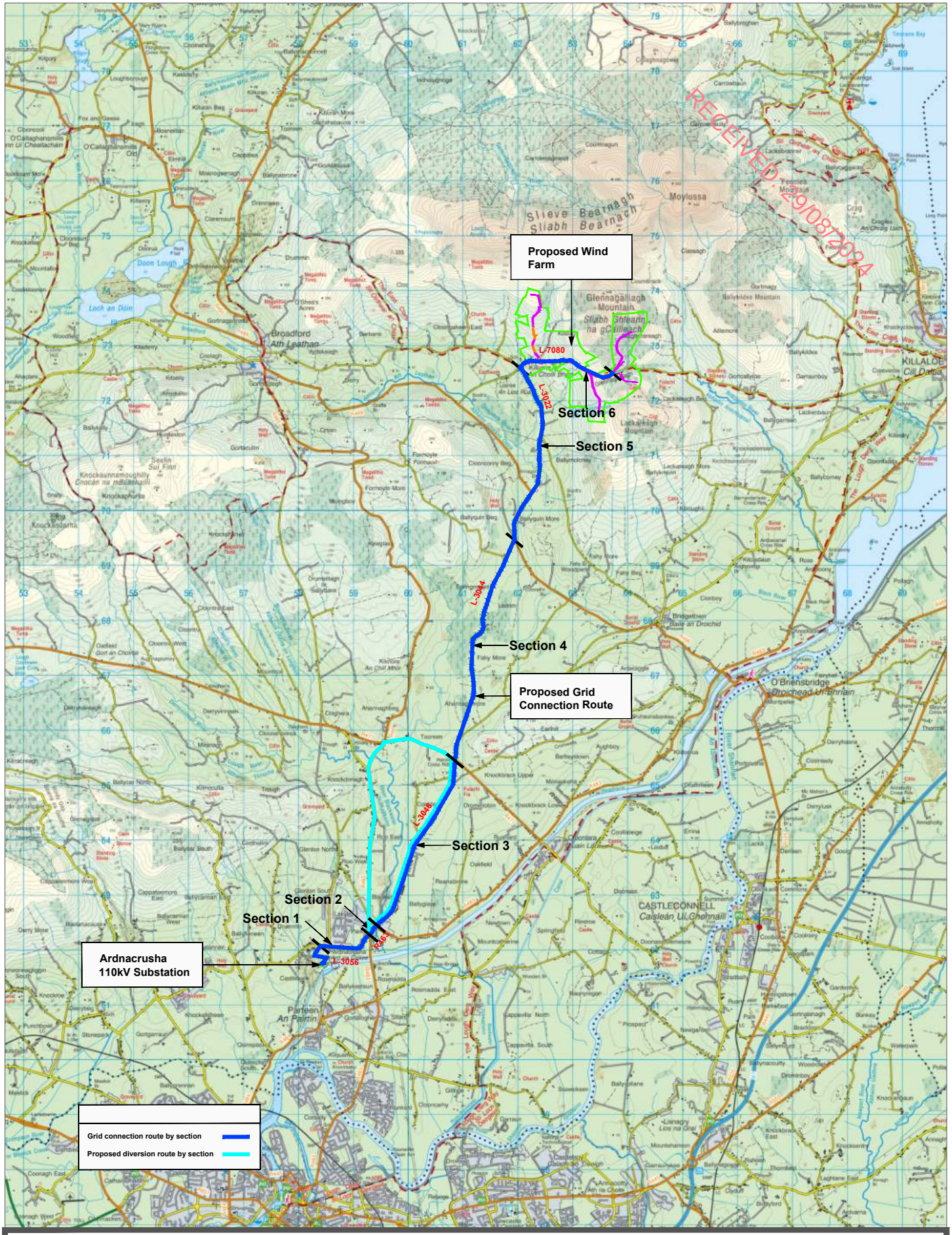

Figure 15-6c Proposed Grid Connection Route - Diversion for Section 2

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 10350	DATE: 12.06.24	DRAWN BY:	AL

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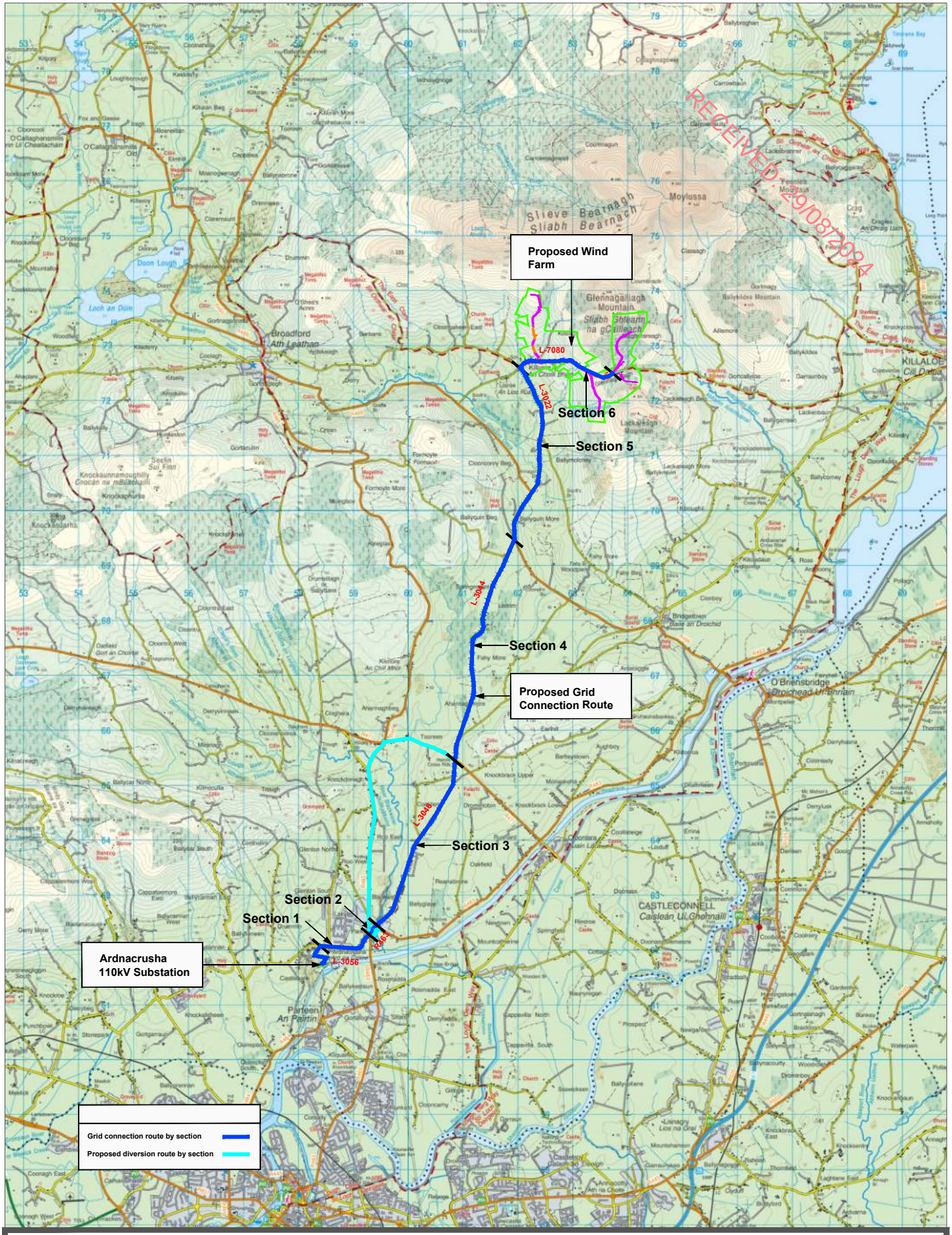

Figure 15-6d Proposed Grid Connection Route - Diversion for Section 3

PROJECT:	Lackereagh Wind Farm, Co. Clare		ALAN LIPSCOMBE TRAFFIC & TRANSPORT CONSULTANTS
CLIENT:	EDF Renewables Ireland Ltd	SCALE: NTS	
PROJECT NO: 10350	DATE: 12.06.24	DRAWN BY: AL	

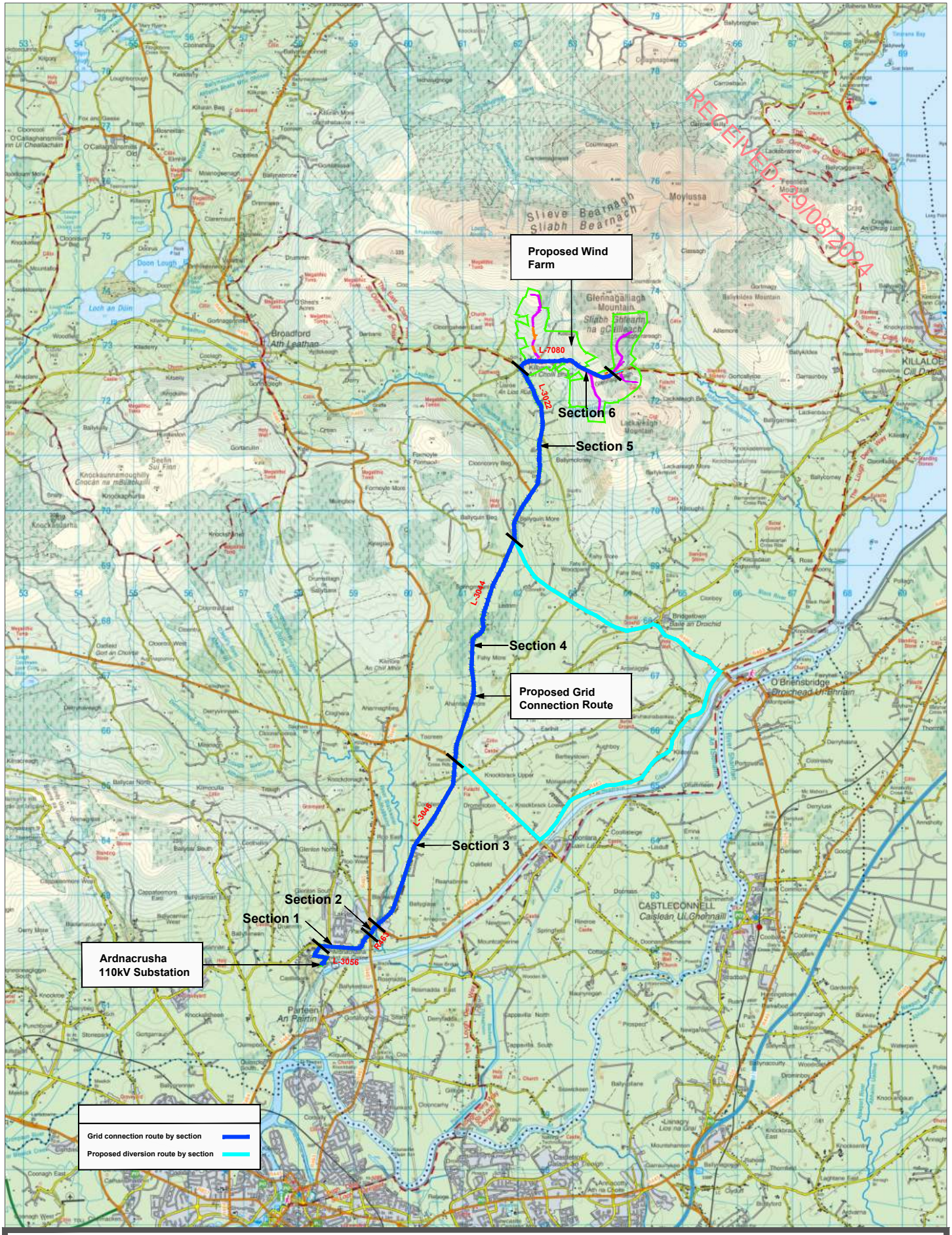

Figure 15-6e Proposed Grid Connection Route - Diversion for Section 4

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 10350	DATE: 12.06.24	DRAWN BY:	AL

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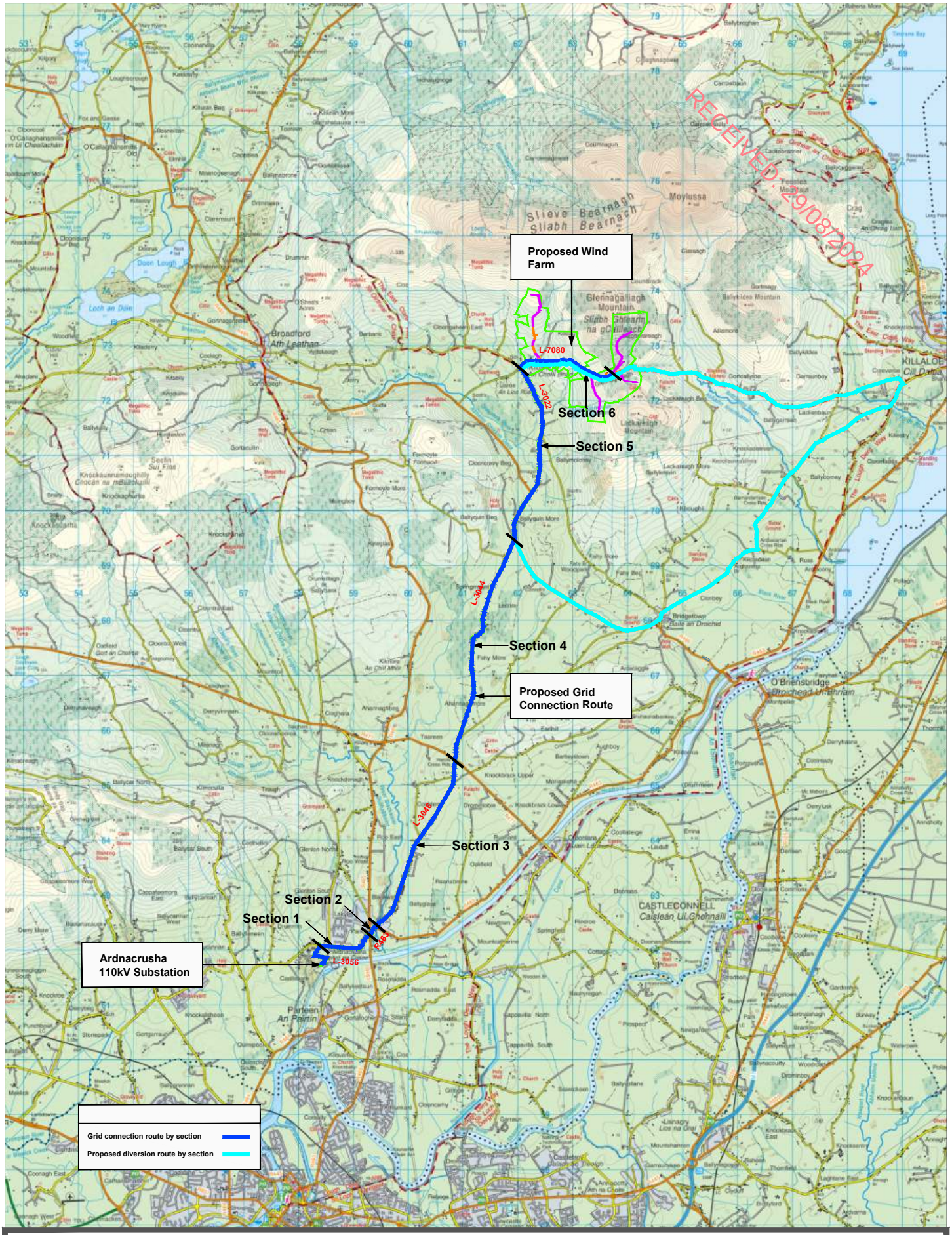

Figure 15-6f Proposed Grid Connection Route - Diversion for Section 5

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 10350	DATE: 12.06.24	DRAWN BY:	AL

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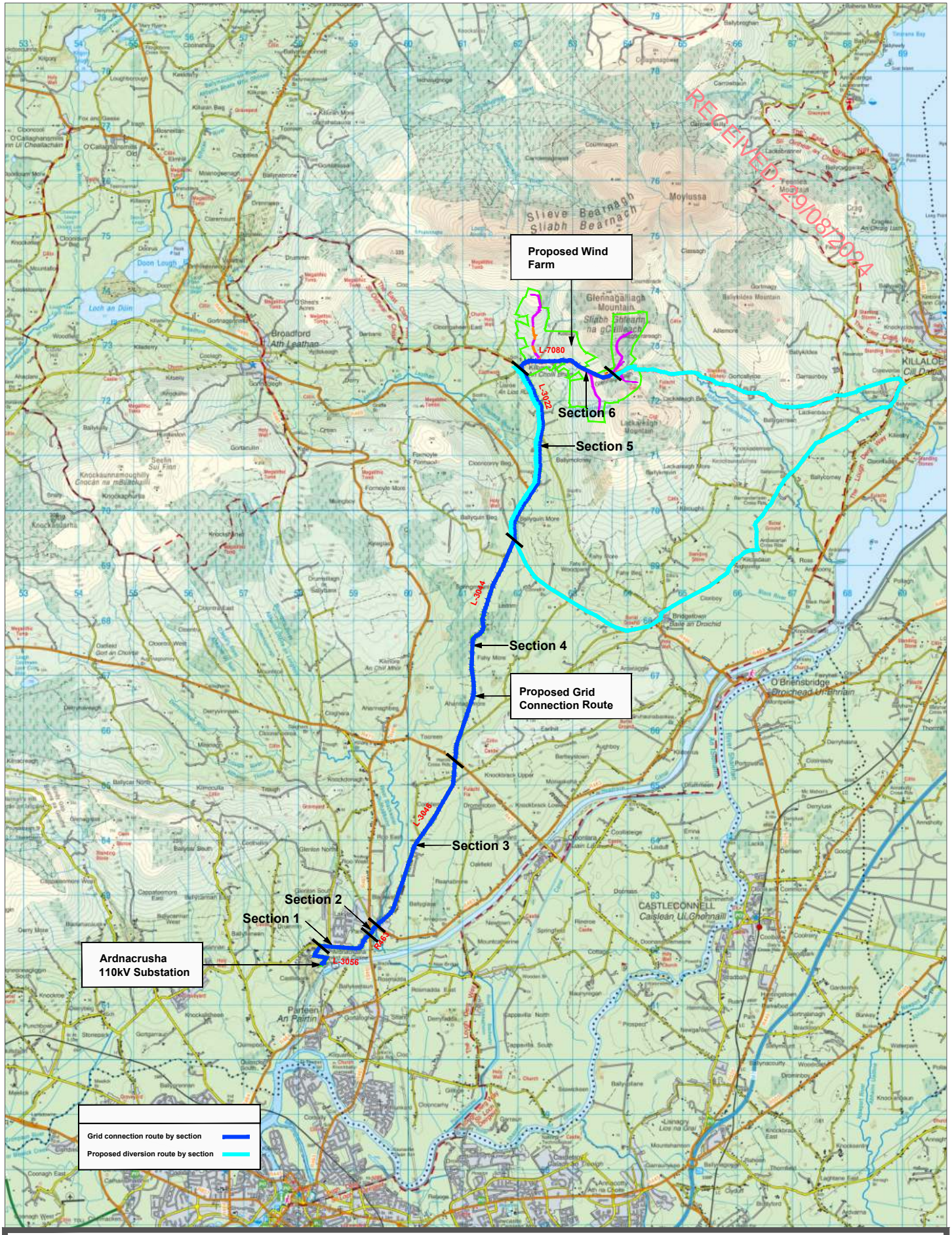

Figure 15-6g Proposed Grid Connection Route - Diversion for Section 6

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 10350	DATE: 12.06.24	DRAWN BY:	AL

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15.1.7 Traffic Management for Delivery of Abnormally Sized Loads

Traffic management measures 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 road's authorities, An Garda Síochána Traffic Corp and special permits are generally required.

In some cases, minor accommodation works are required along the proposed TDR 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 CEMP, Appendix 4-3 of this EIAR, and the TMP, Appendix 15-2 of this EIAR.

15.1.8 Abnormal Load Route Assessment

A route assessment was undertaken covering the proposed TDR, with the route and the autotrack assessment locations shown in Figure 15-2.

The route assessment discussed in this section, undertaken by Collett & Sons Ltd, indicates that the optimum route to the Proposed Wind Farm site would be from the port of entry at Foynes which is a well-established point of arrival for wind turbine components of similar scale into the State on a regular basis.

The route is described in Section 15.1.2.2 and is shown in Figure 15-2. A swept path analysis was then undertaken using Autotrack in order to establish the locations where the wind turbine transport vehicles will be accommodated, and the locations where some form of remedial measure may be required.

The swept path analysis drawings for locations 1 to 18 are included in Appendix 15-3 and are summarised below.

For location 1 to 7 the assessment is based on the turning requirements of the blade being transported by the Super Wing Carrier as this has the largest turning envelope.

Location 1 – Port of Foynes / N69 junction

Appendix 15-3 – Collett Drawing No. 371606-070D0.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-070E0.1 – Blade – Super Wing Carrier

- Third party land will be required on both sides of the L-6188.
- Road widening is required on both sides of the N69.
- A boundary wall is to be removed.
- Street furniture is to be removed.

- Trees and vegetation are to be pruned.

Location 2 – Roundabout junction on N69, Ballbrown

Appendix 15-3 – Collett Drawing No. 371606-080D0.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-080E0.1 – Blade – Super Wing Carrier

- Oversail will occur on both sides of the exit roundabout island and nearside entry.
- Street furniture is to be removed.
- Existing area of overrun is to be utilised across the roundabout island

Location 3 – N18 junction 2 – Straight through

Appendix 15-3 – Collett Drawing No. 371606-100D0.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-100E0.1 – Blade – Super Wing Carrier

- Road widening is required on the nearside entry to the roundabout cut through road.
- Oversail will occur on both sides of the cut through road, entry and nearside exit.
- Vegetation is to be removed / pruned on the roundabout island.

Location 3 – N18 junction 2 – Right turn contra flow

Appendix 15-3 – Collett Drawing No. 371606-101D0.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-101E1.1 – Blade – Super Wing Carrier

- Road widening is required on the offside of the slip road entry.
- Oversail will occur on both sides of the road.
- Street furniture to be removed.
- Vegetation is to be pruned on the offside of the slip road.

Location 4 – M7 junction 27 near Applegreen Service Station

Appendix 15-3 – Collett Drawing No. 371606-110D0.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-110E0.1 – Blade – Super Wing Carrier

- Road widening is required on the roundabout island.
- Oversail will occur on both sides of the entry, exit and roundabout island.
- Roads signs to be removed.

Location 5 – Birdhill Roundabout, R494

Appendix 15-3 – Collett Drawing No. 371606-120D0.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-120E1.1 – Blade – Super Wing Carrier

- Road widening is required through the roundabout.
- Oversail will occur on both sides of the R494.
- Roads signs to be removed.

Location 6 – Proposed Roundabout and River Crossing, Ballina

Appendix 15-3 – Collett Drawing No. 371606-130D1.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-130E1.1 – Blade – Super Wing Carrier

Note – The blade vehicle will travel north through the roundabout and then reverse back onto the R496 before turning left onto the proposed new bridge.

- Road widening / over-run is required through the roundabout and on the entry splitter island on the R496 approach to roundabout.
- Oversail will occur on the R494 north and south of the roundabout, the R496, on the roundabout centre island and on all splitter islands.

Location 7 – Proposed Roundabout and River Crossing, Killaloe

Appendix 15-3 – Collett Drawing No. 371606-140D1.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-140E1.1 – Blade – Super Wing Carrier

- Third party land is required on the nearside of the entry to allow for oversail.
- Road widening is required at the roundabout centre island.
- Further oversail will occur on the offside of the entry and the exit and entry splitter islands.

Location 8 – Right Bend on R463, Knockadrohid

Appendix 15-3 – Collett Drawing No. 371606-150D1.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-150E0.1 – Blade – Super Wing Carrier

- Road widening is required on the northside of the R463.
- Oversail will occur on both sides of the road.
- Trees and vegetation are to be pruned.

Location 9 – O'Briensbridge Cross R463 / R466

Appendix 15-3 – Collett Drawing No. 371606-160C0.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-160E1.1 – Blade – Super Wing Carrier

Appendix 15-3 – Collett Drawing No. 371606-160C0.1 – Blade – Blade Adapter

Note: At this location the blade will be delivered on a standard Super Wing Carrier and transferred on to a blade adapter at a proposed blade transition area on the northern corner of the junction.

For the tower

- Road widening is required on the northside of the R466.
- Oversail will occur on the southside of the R463.
- Roads signs are to be removed.
- Trees and vegetation are to be pruned.

For the Blade arriving on Super Wing Carrier

- Third party land is required on the north side of the R463 to provide for the temporary transition zone.
- Boundary hedging / wall to be removed on northside of the R463.
- Oversail will occur on south side of R463.
- A telegraph pole on the northside of the R463 is to be removed.
- Overhead wires are to be removed from temporary transition zone.
- Trees and vegetation are to be pruned.

For the Blade leaving on Blade Adapter

- Third party land is required on the north side of the R463 to provide for the temporary transition zone.
- Overrun area is required on north side of R466.
- Oversail will occur at the northern corner and the southern side of the R466.
- Overhead wires are to be removed from temporary transition zone.
- Boundary hedging / wall to be removed on northside of the R466.
- Trees and vegetation are to be pruned.

Location 10 – Left bend on the R466 at junction with the L-3082, Bridgetown

For location 10 to 18 the assessment is based on the turning requirements of the blade being transported using the blade adapter with the blade lifted to 60º, and for the tower transporter, which has the greater turning envelope of the 2 vehicles.

Appendix 15-3 – Collett Drawing No. 371606-170C1.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-170C0.1 – Blade – Blade Adapter

For the blade on blade adapter

- Trim trees including overhangs.
- Overhead wires crossing the road are to be removed.

For the tower

- Trees and vegetation to be pruned.

Location 11 – Left bend on the R466 at junction with Riverdale, Bridgetown

Appendix 15-3 – Collett Drawing No. 371606-171D0.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-171C0.1 – Blade – Blade Adapter

For the blade on blade adapter

- Oversail will occur on both sides of the R466.
- Trim trees including overhangs.
- Overhead wires crossing the road are to be removed.

For the tower

- Oversail will occur on both sides of the R466.
- Trees are to be pruned.

Location 12 – Crossroads on R466 near Glenomeara

Appendix 15-3 – Collett Drawing No. 371606-173D1.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-173C1.1 – Blade – Blade Adapter

For the blade on blade adapter

- Trees to have overhanging branches cut.
- Hedgerows are to be pruned.

For the tower

- Hedgerows are to be pruned.

Location 13 – Right bend on R466 near Glenomeara

Appendix 15-3 – Collett Drawing No. 371606-174D1.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-174C1.1 – Blade – Blade Adapter

For the blade on blade adapter

- Hedgerows are to be pruned.
- Overhead wires crossing the road are to be removed.

For the tower

- Hedgerows are to be pruned.

Location 14 – Left bend on R466 at junction with L3022-8, Glenomeara

Appendix 15-3 – Collett Drawing No. 371606-180D0.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-180C1.1 – Blade – Blade Adapter

For the blade on blade adapter

- Road widening is required on north side of R466.
- Oversail will occur on eastern side of R466.
- A telegraph pole on the northside of the R466 is to be removed.
- Overhanging trees are to be cut.

For the tower

- Road widening is required on north side of R466.
- Oversail will occur on western side of R466.
- A telegraph pole on the northside of the R466 is to be removed.
- Vegetation is to be pruned.

Location 15 – Overhead HV Cables, Clonyconry

Appendix 15-3 – Collett Drawing No. 371606-185C01.1 – Blade – Blade Adapter

For the blade on blade adapter

- The blade will be lowered to a horizontal position to pass underneath the HV cables

Location 16 – R466 / L3022-0 junction

Appendix 15-3 – Collett Drawing No. 371606-190C1.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-190C1.1 – Blade – Blade Adapter (both drawings have same number)

For the blade on blade adapter

- Third party land is required on the north side of the R466 and the east side of the L3022-0.
- Boundary hedging / wall to be removed on northside of the R463.
- Oversail will occur on both sides of the R466.
- Street furniture is to be removed.
- Overhead wires crossing the junction are to be removed.
- Boundaries to be removed.
- Trees and vegetation are to be pruned.

For the tower

- As above

Location 17 – Crossroad junction, Kilbane

Appendix 15-3 – Collett Drawing No. 371606-200C1.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-200C1.1 – Blade – Blade Adapter (both drawings have same number)

For the blade on blade adapter

- Third party land is required on the west side of the north side of the L-3022-0.
- Road widening is required on both sides of road.
- Oversail will occur on both sides of the L-3022-0.
- Overhead wires crossing the road are to be removed.
- Street furniture is to be removed.
- Boundaries to be removed.
- Trees and vegetation are to be cut and pruned.

For the tower

- Third party land is required on the west side of the north side of the L-3022-0.
- Road widening is required on both sides of road.
- Oversail will occur on both sides of the L-3022-0.
- Street furniture is to be removed.
- Boundaries to be removed.
- Trees and vegetation are to be removed / pruned.

Location 18 – Right bend on L-7080 north of crossroads at Kilbane

Appendix 15-3 – Collett Drawing No. 371606-201C1.1 – Tower

Appendix 15-3 – Collett Drawing No. 371606-201C1.1 – Blade – Blade Adapter (both drawings have same number)

For the blade on blade adapter

- Third party land is required on the south side of the L-7080.
- Road widening is required on both sides of road.
- Oversail will occur on both sides of the L-7080.
- Overhead wires crossing the road are to be removed.
- Trees and vegetation are to be removed and pruned.

For the tower

- Third party land is required on the south side of the L-7080.
- Road widening is required on both sides of road.
- Oversail will occur on both sides of the L-7080.
- A telegraph pole on the northside of the road to be removed.
- Trees and vegetation are to be removed and pruned.

15.1.9 Design of access junctions on L-7080

The locations of the 4 access junctions A to D that will provide access to all 7 no. turbines are shown in Figure 15-4 . The nature and extent of the proposed works at these locations are described in Chapter 4 - Description of the Proposed Project.

Access Junction A on L-7080 – For all traffic generated during construction and operation for T1 and T2)

The proposed upgrade of an existing junction on the L-7080 will provide access to T1 and T2 for all traffic during the construction phase, including the abnormally sized loads, standard HGV deliveries and construction staff. When the Proposed Project is operational, the junction will provide for all maintenance trips.

The proposed junction layouts for the construction phase and for the operational phase is shown in Figure 15-7. The temporary widening required at the junction to accommodate the abnormally sized loads and general construction traffic is shown at the junction on both the L-7080 and on the existing minor arm of the junction. The extent of the widening is based on the swept path analysis undertaken for the abnormally sized loads, as shown in Appendix 15-3. During the delivery phase the junction will be managed by temporary signage and a Flagman as described in Section 15.1.12.5 below.

On completion of the construction phase it is proposed to return this junction to as close to the existing condition as is practical, whilst still retaining access for maintenance vehicles. The proposed alignment at the junction for the operational phase, which is also shown in Figure 15-7, includes the L-7080 returned to a slightly wider running width than currently exists, and the provision of a 5m carriageway width for the minor road providing access to T1, T2. The junction design in accordance with TII Junction Design Guidelines (TII DN-GEO-03060) for junctions with HGV turning movements, with junction radii of 9m proposed. STOP Junction markings and signage are proposed in accordance with Figure 7.35 of the Traffic Sign Manual.

While this location will be managed by site staff during the construction phase, visibility splays that will be available for the reduced junction design for the operational stage are shown in Figure 15-8. The available visibility splay to the west is 50m taken from a minimum setback of 2.0m. It is noted that this represents an improvement to the existing visibility available and is appropriate for a design speed of 42 kph. It is considered that this is adequate based on the S-Bend on the L-7080 just to the west of the junction that provides a speed reducing feature for traffic approaching from the west. To the east a

visibility splay of 90m is available in accordance with a design speed of 60 kph, as set out in the Clare County Council Development Plan 2023 – 2029, Appendix 1 Development Management Guidelines, Table A2.

Access Junction B on L-7080 – For all traffic generated during construction and operation for T6 and T7)

The proposed new junction off the south side of the L-7080 will provide access for all traffic to T06 and T07 during the construction and operational phases pf the Proposed Project.

The proposed junction layouts for the construction phase and for the operational phase are shown in Figure 15-9. The temporary widening required at the junction to accommodate the abnormally sized loads and general construction traffic is shown at the junction on both the L-7080 and the minor arm of the junction. Again, the total area at the junction required at the junction during the construction phase is based on the swept path analysis undertaken for the abnormally sized loads shown in Appendix 15-3. During the delivery phase of all materials for the Proposed Project the junction will be managed by temporary signage and a Flagman.

On completion of the construction phase, it is proposed to reduce the geometry of the junction, as is also shown in Figure 15-10. The junction is designed in TII Junction Design Guidelines (TII DN-GEO-03060) for junctions with HGV turning movements, with junction radii of 9m proposed. STOP Junction markings and signage are proposed in accordance with Figure 7.35 of the Traffic Sign Manual.

Givin the acute angle at which this junction connects into the existing L-7080, which is a requirement based on existing topography, the following points are noted;

- During the construction stage when the junction geometry is wide to permit access for abnormal loads, it is essential that this junction is managed with all movements accessing the L-7080 at the new junction controlled by a flagman. Measures will be put in place severely restricting vehicle speeds on the approach to the junction from the site access. With the exception of the delivery period during which time the junction is managed, access to the site should be closed by means of a security gate.
- Once operational the junction geometry should be reduced in accordance with the lane boundaries shown in Figure 15-10, in order to provide a 90° approach to the L-7080, which will in turn ensure that traffic accessing the L-7080 from the development areas are required to stop at the stop line.

The visibility splays that will be provided at this junction during the operational stage are shown in Figure 15-10. The figure shows that 2.4m x 70m visibility splays in accordance with a 60 kph design speed are available.

Access Junction C on L-7080 – For all traffic generated during construction and operation for T3 and T4)

A new junction off the northern side of the L-7080 will provide access for all traffic to T3 and T4, and the proposed onsite 38kV substation during the construction and operational phases pf the Proposed Project.

The proposed junction layouts for the construction phase and for the operational phase are shown in Figure 15-11. Similar to Access Junction B, the temporary widening required at the junction to accommodate the abnormally sized loads and general construction traffic is shown at the junction on both the L-7080 and the minor arm of the junction with the area at the junction required during the construction phase based on a swept path analysis undertaken for the abnormally sized loads shown in included in Appendix 15-3. During the delivery phase the junction will be managed by temporary signage and a Flagman. On completion of the construction phase, it is proposed to reduce the geometry

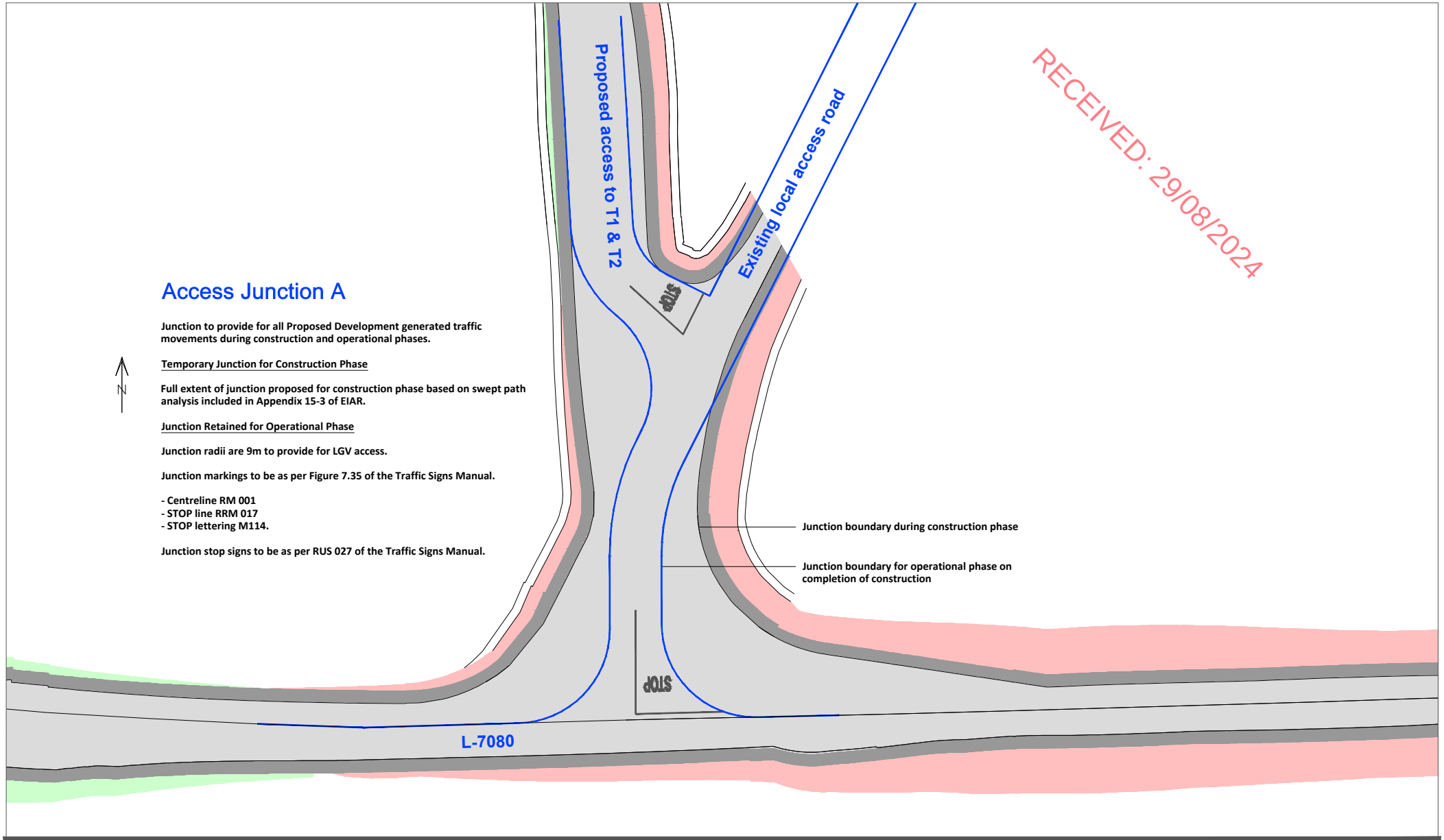
of the junction, as is also shown in Figure 15-11. The junction is designed in TII Junction Design Guidelines (TII DN-GEO-03060) for junctions with HGV turning movements, with junction radii of 9m proposed. STOP Junction markings and signage are proposed in accordance with Figure 7.35 of the Traffic Sign Manual. As this junction also has acute angle for the purpose of the delivery of abnormally sized loads the same recommendations that apply for Access Junction B also apply for this location once operational, that is that the junction is managed by flagmen during the construction stage, closed by means of security gate when not being managed, and once operational, that the junction is reduced in geometry as set out in Figure 15-11.

The 2.4m x 70m visibility splays that will be provided at this junction during the operational stage are shown in Figure 15-12.

Access Junction D on L-7080 – For all traffic generated during construction and operation for T5)

At this location it is proposed that access will be provided for abnormally sized loads to T5 via a temporary access road, as shown in Figure 15-13. This access will be closed at all times during the construction phase by means of a security gate and opened only during the nights the abnormal loads will be delivered to the site accompanied by a Garda escort providing transient traffic management, with the access manned during this time. During the operational phase this access will be permanently closed and opened only for the delivery of a replacement turbine component. The geometry of the road was based on the turning requirements of the abnormally sized loads.

Approximately 60m to the east it is proposed that there is a standard priority junction designed in accordance with TII Junction Design Guidelines (TII DN-GEO-03060) for junctions that will provide access for a general construction traffic and also maintenance traffic during the operational stage. The proposed junction layout is shown in Figure 15-13 while the 2.4m x 70m visibility splays that will be available during both the construction and the operational phases of the Proposed Project are shown in Figure 15-14



Access Junction A

Junction to provide for all Proposed Development generated traffic movements during construction and operational phases.

Temporary Junction for Construction Phase

Full extent of junction proposed for construction phase based on swept path analysis included in Appendix 15-3 of EIAR.

Junction Retained for Operational Phase

Junction radii are 9m to provide for LGV access.

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 15-7 Access Junction A on L-7080 (T1 and T2) - Proposed junction layout during construction and operational phases

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:500
AL PROJECT NO: 10350	DATE: 13.08.24	DRAWN BY:	AL

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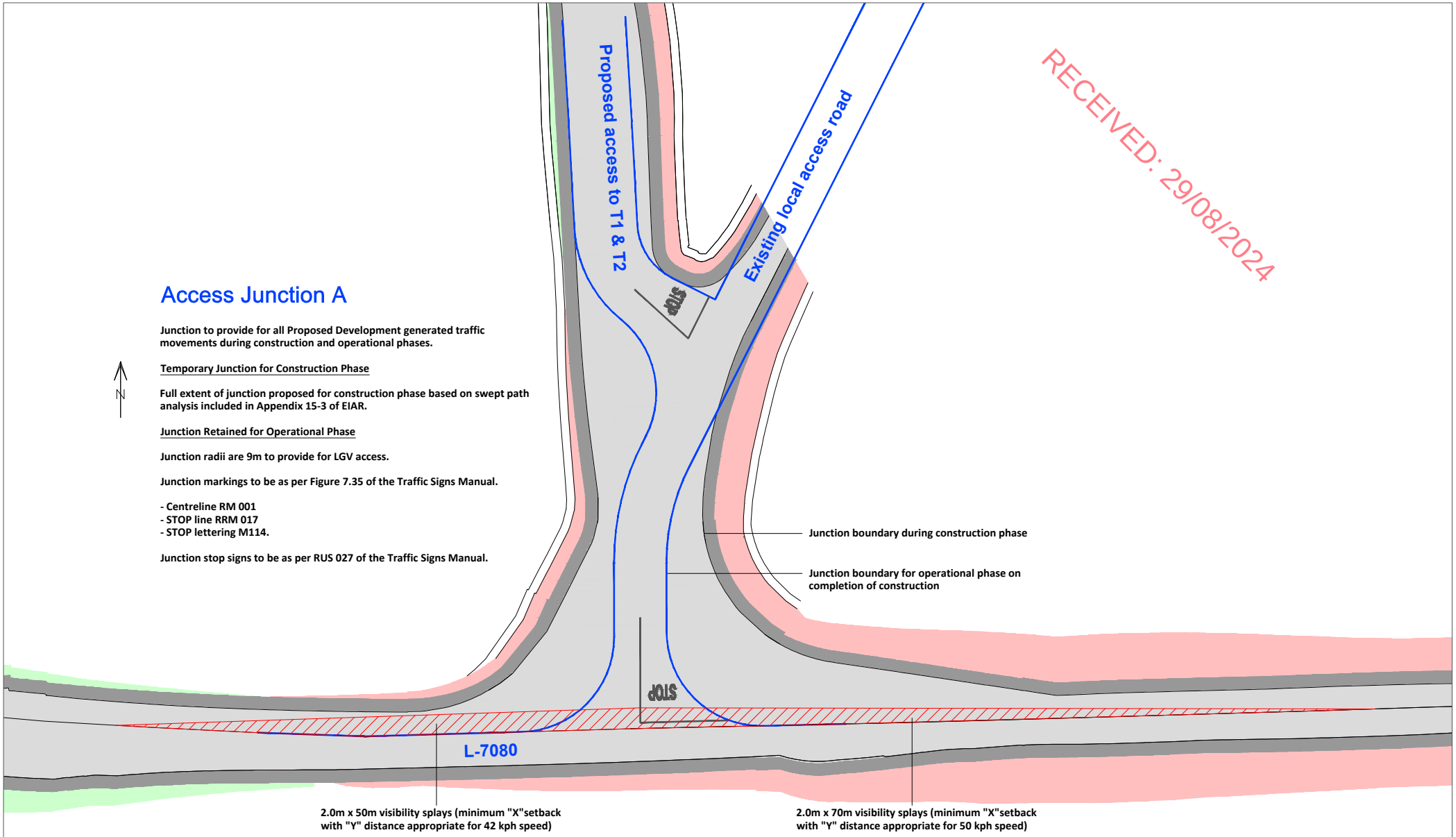

Access Junction A

Junction to provide for all Proposed Development generated traffic movements during construction and operational phases.

Temporary Junction for Construction Phase

Full extent of junction proposed for construction phase based on swept path analysis included in Appendix 15-3 of EIAR.

Junction Retained for Operational Phase

Junction radii are 9m to provide for LGV access.

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.

N

NOTES:

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Figure 15-8 Access Junction A on L-7080 (T1 and T2) - Visibility Splays

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:500
AL PROJECT NO: 10350	DATE: 13.08.24	DRAWN BY:	AL

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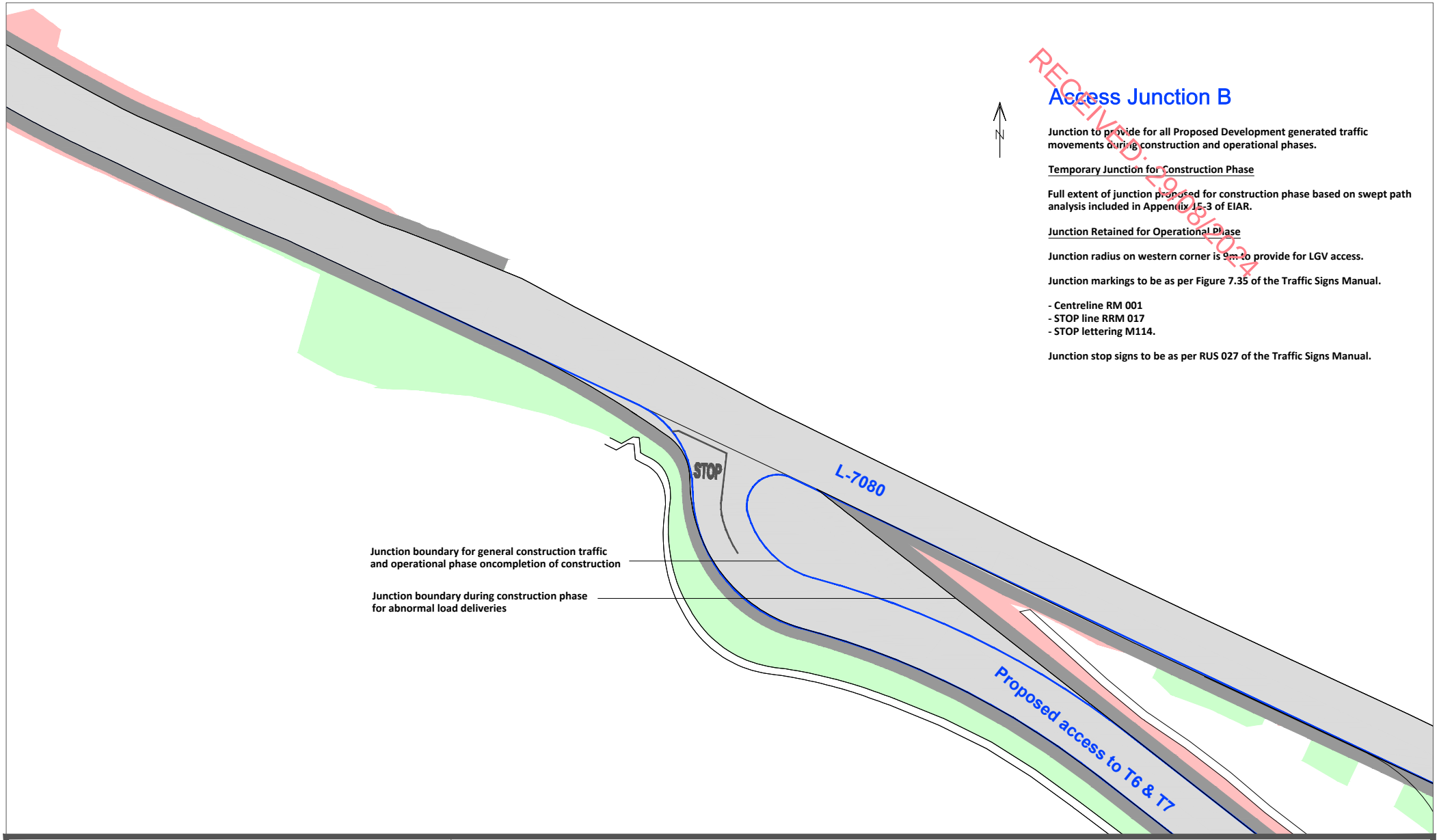

NOTES:

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Figure 15-9 Access Junction B on L-7080 (T6 and T7) - Proposed junction layout during construction and operational phases

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:500
AL PROJECT NO: 10350	DATE: 13.08.24	DRAWN BY:	AL

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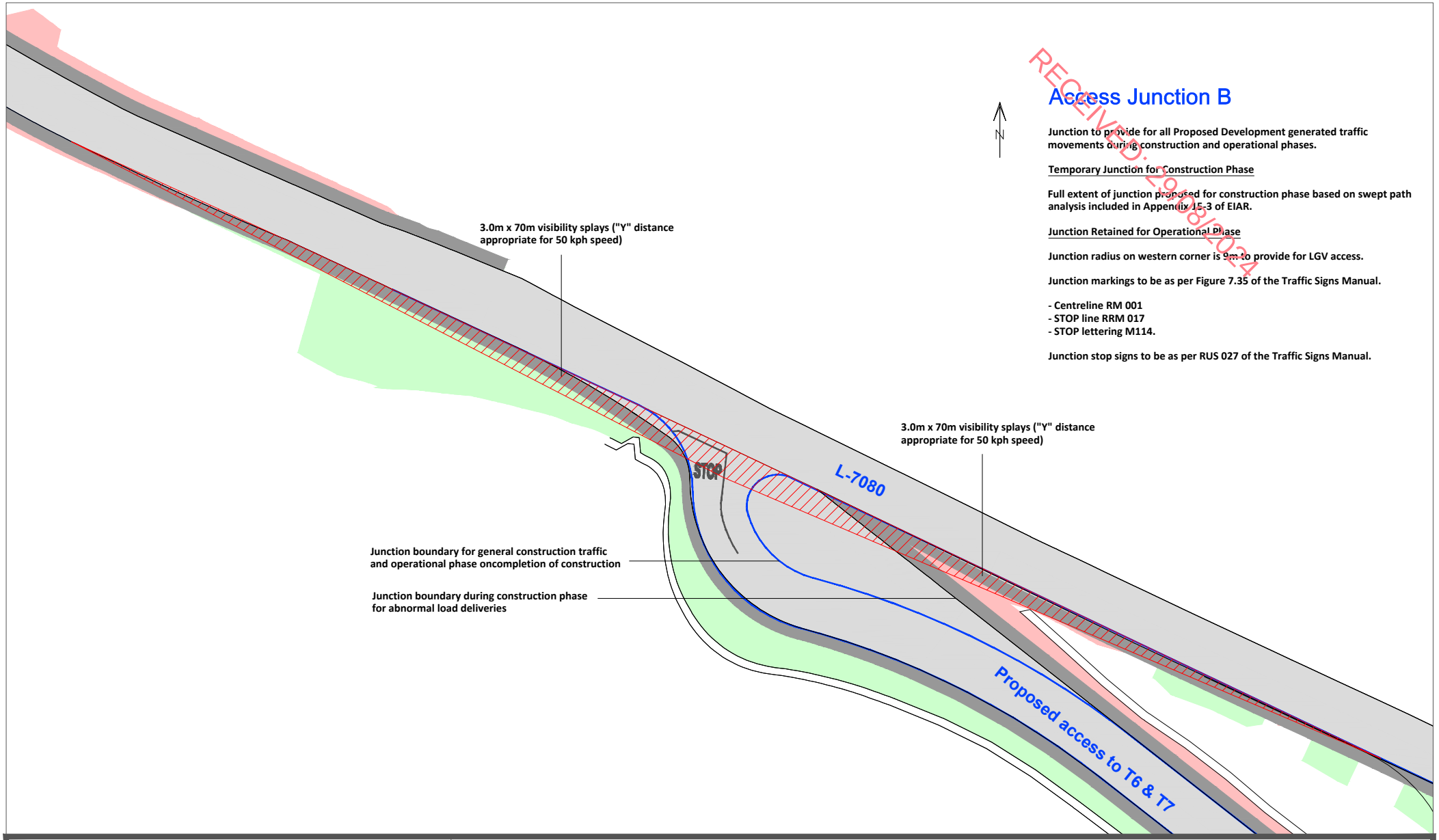

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-10 Access Junction B on L-7080 (T6 and T7) - Visibility Splays

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:500
AL PROJECT NO: 10350	DATE: 13.08.24	DRAWN BY:	AL

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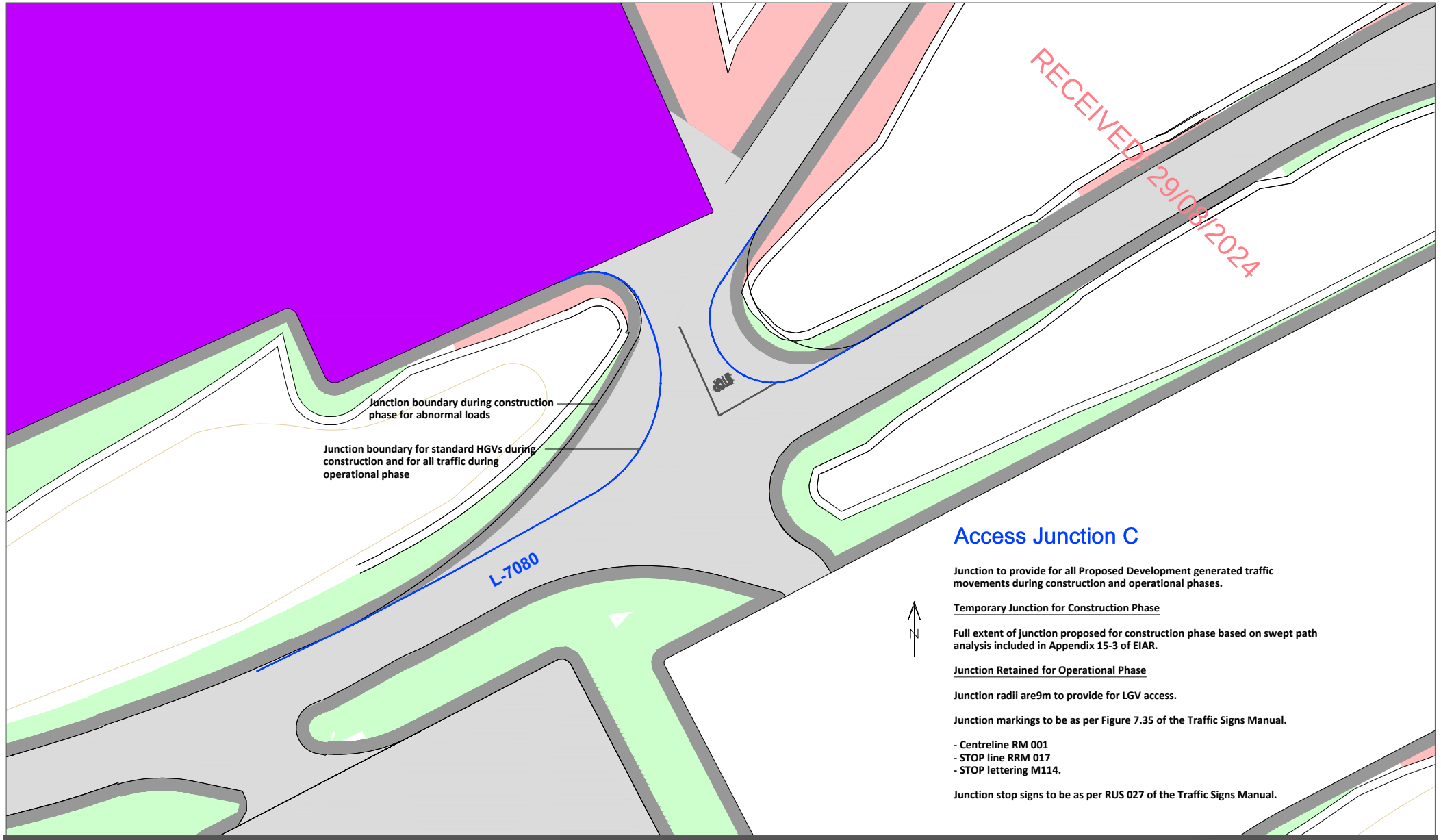


Access Junction C

Junction to provide for all Proposed Development generated traffic movements during construction and operational phases.

Temporary Junction for Construction Phase

Full extent of junction proposed for construction phase based on swept path analysis included in Appendix 15-3 of EIAR.

Junction Retained for Operational Phase

Junction radii are9m to provide for LGV access.

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.

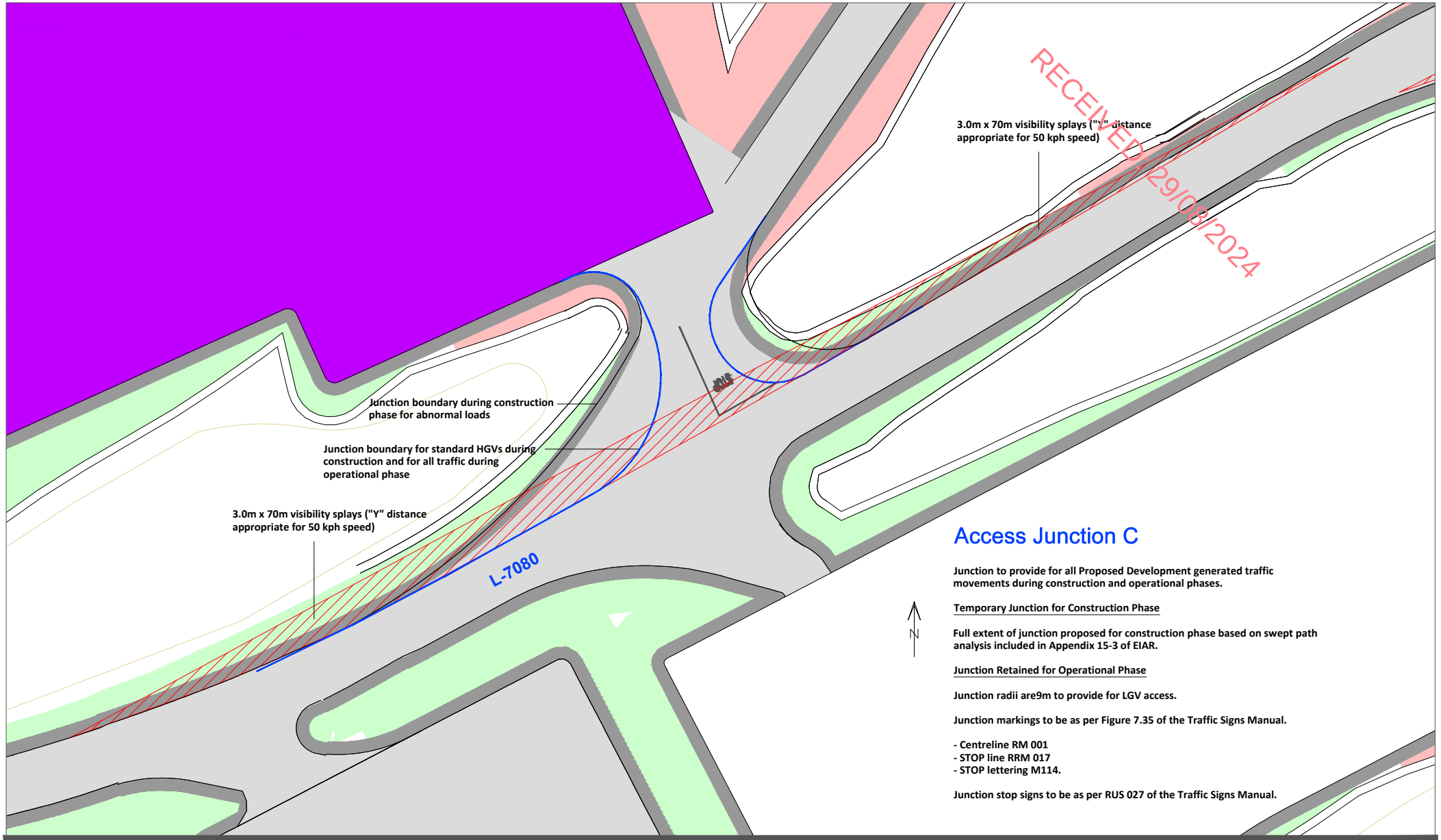
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-11 Access Junction C on L-7080 (T3 and T4) - Proposed junction layout during construction and operational phases

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:500
AL PROJECT NO: 10350	DATE: 13.08.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



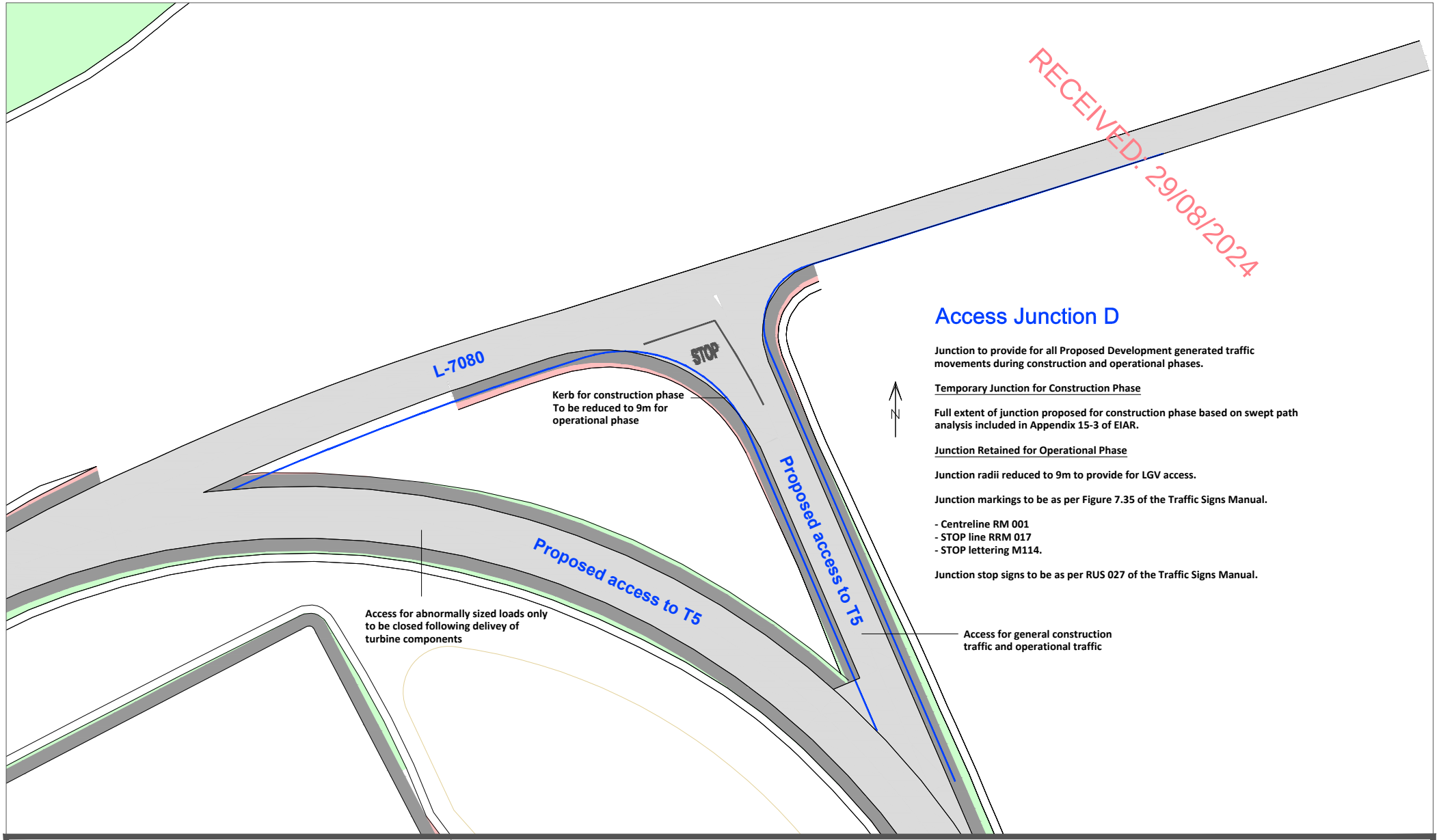
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-12 Access Junction C on L-7080 (T3 and T4) - Visibility Splays

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:500
AL PROJECT NO: 10350	DATE: 13.08.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



Access Junction D

Junction to provide for all Proposed Development generated traffic movements during construction and operational phases.

Temporary Junction for Construction Phase

Full extent of junction proposed for construction phase based on swept path analysis included in Appendix 15-3 of EIAR.

Junction Retained for Operational Phase

Junction radii reduced to 9m to provide for LGV access.

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.

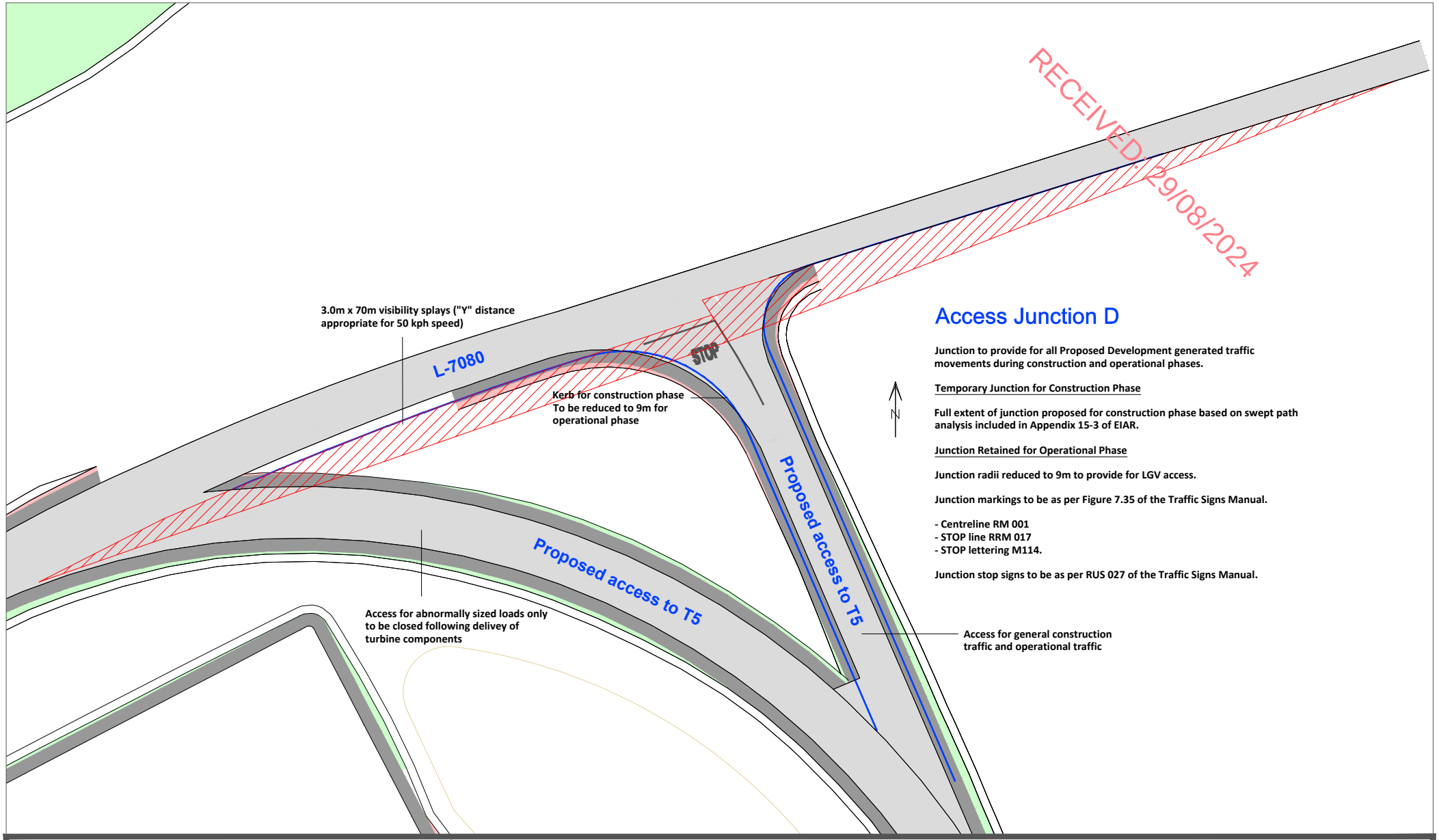
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-13 Access Junction D on L-7080 (T5) - Proposed junction layout during construction and operational phases

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:500
AL PROJECT NO: 10350	DATE: 13.08.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



Access Junction D

Junction to provide for all Proposed Development generated traffic movements during construction and operational phases.

Temporary Junction for Construction Phase

Full extent of junction proposed for construction phase based on swept path analysis included in Appendix 15-3 of EIAR.

Junction Retained for Operational Phase

Junction radii reduced to 9m to provide for LGV access.

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 Access Junction D on L-7080 (T5) - Visibility Splays

PROJECT:	Lackereagh Wind Farm, Co. Clare		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:500
AL PROJECT NO: 10350	DATE: 13.08.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

15.1.10 Road Safety

At the Applicants request, Traffico Road Safety Engineering Consultants Ltd were commissioned to undertake a Stage 1 Road Safety Audit for the access arrangements for the Proposed Wind Farm site, in accordance with GE-STY-01024 Road Safety Audit Guidelines, TII, December 2017. The Stage 1 Road Safety Audit Report is included as Appendix 15-4 of the EIAR.

As documented in the Audit Report, the Audit Team identified 4 potential Problems. For each Problem identified the Design Team are required to provide a response, as documented in Appendix A, Road Safety Audit Feedback Form of the Stage 1 Road Safety Audit Report. The 4 problems identified, together with the Design Teams response and whether the response was accepted by the Audit Team are set out below.

Problem 2.1 – Turbin delivery route traversing walking trail, turbine delivery route along local road L-7080 – The Audit Team state: '*The turbine delivery route follows the (narrow) L7080 which coincides with a posted walking trail. This could increase the risk of walkers (and other local traffic) coming into conflict with construction vehicles.*'

The Audit Team recommends that appropriate (rigorous) temporary traffic management measures should be set in place to minimise risk of conflicts between construction vehicles and other local traffic (especially walkers) along the turbine delivery route.

The Design Team Response is as follows: '*It is confirmed that a comprehensive set of traffic management measures, including signage and the presence of "Flagmen" will be put in place on the L-7080 during the construction of the Proposed Wind Farm.*'

The Design Team response in accepted by the Audit Team in the RSA Feedback form.

Problem 2.2 – Sightlines partially obscured by field boundary, Access junction A, field boundaries along local road L-7080 – The Audit Team state: '*The Junction sightlines appear to be partially obscured by the existing field boundaries, which includes ditch foliage and some trees. This could lead to side impact type collisions within the access junction's conflict zone.*'

The Audit Team recommends the field boundaries should be modified to ensure that appropriate sightlines are provided at the access junction.

The Design Team Response is as follows: '*As shown in Figure 15-8 of Chapter 15 of the EIAR, the L-7080 and the existing junction will be improved with visibility splays appropriate for traffic speeds during construction and the operational phase provided. It is noted traffic management measures, including signage and a "flagman" will be in place at all times during the construction phase.*'

The Design Team response in accepted by the Audit Team in the RSA Feedback form.

Problem 2.3 – Gradient of access road on approach to local road, Access junction B, connection point to local road L-7080 – The Audit Team state: '*The combination of steep approach gradient and unusual horizontal curvature could lead to delivery vehicles getting stuck or overturning at the access junction.*'

The Audit Team recommends the horizontal and vertical alignment of the access road should be carefully designed to mitigate the risks described (the inclusion of a suitable dwell area is likely to help in this regard).

The Design Team Response is as follows: '*The proposed junction design shown in Figure 15.9 of Chapter 15 of the EIAR is designed in accordance with Section 5.6.3 of TII Junction Design Guidelines (TII DN-GEO-03060) for junctions with respect to gradients. Junction radii of 9m are proposed to*

provide for standard small to medium sized HGV turning movements during the operational phase. The junction layout for the delivery of the abnormally sized loads takes account of an autotrack assessment undertaken for these vehicles. The proposed construction of the new access roads and connections with the existing L-7080 is detailed in Section 4.4.2.1 of the EIAR and will comprise of;

- *A layer of geogrid or geotextile material will be laid at the formation level to separate the road building material from the subsoil.*
- *A minimum of 450mm of granular fill material, such as Class 6F2 stone, will then be placed and compacted in layers, as specified by the detailed designer.*
- *the road will then be finished with a 150mm layer of capping material, such as Cl. 804.*
- *The road will be finished with a surface layer with a setback of up to 15m from the road edge.*'

The Design Team response in accepted by the Audit Team in the RSA Feedback form.

Problem 2.4 – Errant vehicles getting stuck in soft verge, Access junction D, soft verge with level difference at access junction – The Audit Team state: '*The combination of approach gradient, horizontal curvature and the (unforgiving) boggy soft verge could lead to delivery vehicles getting stuck or overturning.*'

The Audit Team recommends the horizontal and vertical alignment of the access road should be carefully designed to mitigate the risks described (the inclusion of a suitable dwell area is likely to help in this regard).

The Design Team Response is as follows: '*The proposed junction design shown in Figure 15.13 of Chapter 15 of this EIAR is designed in accordance with Section 5.6.3 of TII Junction Design Guidelines (TII DN-GEO-03060) for junctions with respect to gradients. In addition, junction radii of 9m are proposed to provide for standard small to medium sized HGV turning movements during the operational phase at the eastern junction. A swept path analysis for the abnormally sized loads was undertaken to inform the design for these deliveries. Access road construction details will be as for 2.3 above.*'

The Design Team response in accepted by the Audit Team in the RSA Feedback form.

Summary of Stage 1 Road Safety Audit - The Audit Team raised 4 potential road safety problems. The Design Team agreed with each problem and each recommendation suggested by the Audit Team and provided a detailed solution describing each mitigation measure proposed. It is confirmed that each solution was to the satisfaction of the RSA Team Leader. It is noted that the final column in the RSA Feedback form is blank in each case, as it is understood from TII that this column is for instances where alternative solutions to those recommended by the Audit Team are proposed.

15.1.11 Provision for Sustainable Modes of Travel

15.1.11.1 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.

15.1.11.2 Public Transport

There are no public transport services that currently pass the Proposed Wind Farm site on either the R466 or the L-7078, although mini-buses will be considered for transporting staff to and from the Proposed Wind Farm site in order to minimise traffic generation and parking demand. It is noted that

the traffic impact assessment above is based all staff travelling by car in order to ensure a robust test scenario.

The same applies to staff accessing the Proposed Grid Connection Route. It is proposed that construction staff will be transported to the point of construction by mini-bus.

15.1.12 Likely and Significant Effects and Associated Mitigation Measures

15.1.12.1 '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 transport.

If the Proposed Project were not to proceed, the opportunity to capture part of County Clares 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.

15.1.12.2 Construction Phase: Traffic and Transport

15.1.12.2.1 *Proposed Wind Farm*

During the 7 days when the concrete foundations are poured the effect on the surrounding road network will be negative. It is forecast that the increase in traffic volumes will range from +5.7% on the N69 east of Foynes (Link 1) down to +0.8% on the M7 (Link 2), followed by +5.8% on the R494 south of Killaloe (Link 3). On the west of the River Shannon the percentage differences increase as background traffic flows decrease, with the forecast differences ranging from +9.9% on the R463 east of O'Briensbridge (Link 4), to +31.2% on the R446 (Link 6) and + 137.9% on the L-3022 (Link 7) approaching the site. This will have a temporary negative effect on the delivery route with the impact forecast to be slight.

For the remaining 350 days when the general construction and groundworks are undertaken an additional 127 PCUs will travel to/from the Proposed Project. On these days it is forecast that the increase in traffic volumes will range from +1.6% on the N69 east of Foynes (Link 1) down to +0.2% on the M7 (Link 2), followed by +1.6% on the R494 south of Killaloe (Link 3). On the west of the River Shannon the percentage differences are forecast to range from +2.8% on the R463 east of O'Briensbridge (Link 4), to +8.7% on the R446 (Link 6) and + 38.6% on the L-3022 (Link 7) approaching the site. This will have a temporary negative effect on the delivery routes with the impact forecast to be slight.

On the 19 days when the abnormally sized loads will deliver the large turbine components to the site an additional 105 PCUs will travel to/from the Proposed Project. On these days it is forecast that the increase in traffic volumes will range from +1.3% on the N69 east of Foynes (Link 1) down to +0.2% on the M7 (Link 2), followed by +1.3% on the R494 south of Killaloe (Link 3). On the west of the River Shannon the percentage differences are forecast to range from +2.3% on the R463 east of O'Briensbridge (Link 4), to +7.2% on the R446 (Link 6) and + 31.9% on the L-3022 (Link 7) approaching the site. It is forecast that there will be a negative temporary, slight effect on traffic flows if the delivery of the abnormally sized loads is undertaken at night, as is proposed.

For 7 days, an additional 64 PCUs will travel to/from the Proposed Wind Farm site during the delivery of turbine components. On these days it is forecast that the increase in traffic volumes will range from +0.8% on the N69 east of Foynes (Link 1) down to +0.1% on the M7 (Link 2), followed by +0.8% on the R494 south of Killaloe (Link 3). On the west of the River Shannon the percentage differences are forecast to range from +1.4% on the R463 east of O'Briensbridge (Link 4), to +4.4% on the R446 (Link 6)

and + 19.4% on the L-3022 (Link 7) approaching the site. This will have a temporary imperceptible negative effect on the majority of the delivery route, and temporary slight negative effect on the L-7080 leading to the Proposed Wind Farm site access.

15.1.12.2.2 *Proposed Grid Connection Route*

With respect to the traffic volumes that will be generated during the construction of the Proposed Grid Connection Route connecting the proposed onsite 38kV substation to the Ardnacrusha 110kV substation, it is estimated that there will be approximately 14 daily return trips made by a truck transporting materials, and 7 return trips made by a car to transport construction staff, to and from the Proposed Wind Farm site. The construction staff will then be transported to the location of construction on the cable route by mini bus. 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.

15.1.12.3 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 Proposed Wind Farm site by car or LGVs per day, with less than that required for the Proposed Grid Connection Route. The effects of the maintenance traffic on the surrounding highway network will therefore be imperceptible.

15.1.12.4 Decommissioning Phase: Traffic and Transport

15.1.12.4.1 *Proposed Wind Farm*

The wind turbines proposed as part of the Proposed Wind Farm are expected to have a lifespan of approximately 35 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 Proposed Wind Farm 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 and allowed to re-vegetate naturally. The internal Proposed Wind Farm 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 Proposed Wind Farm 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. Further information on decommissioning can be found in the Decommissioning Plan (included as Appendix 4-7 of this EIAR).

15.1.12.4.2 *Proposed Grid Connection*

The Proposed Grid Connection Route will remain in place as it will remain under the management and operation of ESB and EirGrid. There are no impacts associated with this.

The works required during the decommissioning phase are described in Section 4.10 of Chapter 4: Description of the Proposed Project and the accompanying Decommissioning Plan included as Appendix 4-7 of this EIAR.

15.1.12.5 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).

15.1.12.5.1 *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 15.1.2.2.
- Selection of the shortest underground Proposed Grid Connection Route, minimising the impacts on the existing road network and traffic.

15.1.12.5.2 *Mitigation Measures During the Construction Stage*

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

A detailed TMP, included as Appendix 15-2 of this EIAR, will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the road's authority and An Garda Síochána prior to construction works commencing.

While the details of the traffic management measures will be developed in detail and submitted for agreement with Clare County Council prior to the construction of the Proposed Project, they will include the following measures:

- Introduction of signage on both approaches to the Proposed Wind Farm site access junction A to D on the L-7080 warning of approaching construction site (TMS Traffic Signs WK001).
- Signage at the 4 access junctions A to D on the L-7080 warning of the provision of Flagmen (TMS traffic Sign WK061).
- Similarly, temporary signage will be introduced at Location 9, the junction of the R463 / R466 including signage on eastbound R466 approach and westbound R463 approach to Temporary transition Zone (TMS Traffic Signs WK001), signage indicating the temporary construction access (TMS traffic Signs WK052 and WK053) and the presence of Flagmen (TMS traffic Sign WK061). These will be required during the construction of the transition zone only.

The detailed TMP also includes the following measures:

- **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 Clare County Council and other relevant authorities in advance of deliveries of turbine components to the Proposed Wind Farm 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 15.1.9.
- **Identification of delivery routes** – These routes will be agreed and adhered to by all contractors.
- **Travel plan for construction workers to the site–** A travel plan for construction staff, which will include the identification of a routes to / from the site and identification of parking areas will be implemented by the main contractor.
- **Temporary traffic signs** – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including the Proposed Wind Farm site access junctions off the L-7080 and the proposed blade transition area at the R463 / R466 junction. 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). 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.
- **Diversion routes during the construction of the Proposed Grid Connection Route –** As set out in Section 15.1.6 of this EIAR. Local access will be maintained to all premises with details agreed with those concerned prior to construction.
- **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.

15.1.12.5.3 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.

15.1.12.5.4 Mitigation Measures During Decommissioning Stage

In the event that the Proposed Project is decommissioned after the 35 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Chapter 4 and Appendix 4-7 Decommissioning Plan. The Decommissioning Plan will include a material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning, in accordance with Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013).

15.1.12.6 Residual Effects

15.1.12.6.1 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 Proposed Wind Farm site and during the construction of the Proposed Grid Connection Route will have a slight and temporary negative effect on existing road users, which will be minimised with the implementation of the mitigation measures included in the TMP included as Appendix 15-2.

15.1.12.6.2 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.

15.1.12.6.3 Decommissioning Stage

As stated above, in the event that the Proposed Wind Farm 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.

For this scenario the proposed onsite 38kV substation and Proposed Grid Connection Route along the public road will remain in-situ and continue to operate as part of the national electricity grid network.

15.1.12.7 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 2.9 of Chapter 2 with all developments included listed in Appendix 2-3. The potential for 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).

15.1.12.7.1 Other Wind Farms

From a review of all existing and approved wind farms set out in Appendix 2-3 it has been determined that the potential for cumulative impacts will only occur with other wind farms that are permitted and have yet to be constructed, as the traffic generation for existing operational wind farms is very low. There are several other applications in the pre-application stage that have not been considered as their applications have not been submitted to the relevant authorities and no traffic related information is available. In addition, any single/domestic turbines have not been considered in the cumulative assessment as the scale of construction traffic associated with these would be considered insignificant and therefore would not have a cumulative impact when associated with the Proposed Project.

As set out in Table 15-27 there are 2 permitted wind farms which are considered to have a high potential risk of traffic related cumulative impacts with the Proposed Project (Carrownagowan Wind Farm, and Fahy Beg Wind Farm) and 3 proposed wind farms that are determined to have a medium risk of cumulative traffic related impacts with the Proposed Project (Ballycar Wind Farm, Oatfield Wind Farm and Knockshanvo Wind Farm). In the event that the construction of the Proposed Project coincides with the construction phase of any of these wind farms the, the traffic related cumulative impacts would be negative, short-term and slight to 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 these permitted wind farm developments. This will ensure that the potential for cumulative effects is minimised.

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 for cumulative traffic effects
1 – Carrownagowan Wind Farm (19 Turbines), County Clare, ABP Reference 309799	Permitted	High	Medium	High
2 – Fahybeg Wind Farm (8 Turbines), County Clare, ABP Reference 317227	Permitted	High	Medium	High
3 – Ballycar Wind Farm (12 Turbines), County Clare, ABP Reference 318943	Proposed	Medium	Medium	Medium
4 – Oatfield Wind Farm (11 Turbines), County Clare, ABP Reference 318782	Proposed	Medium	Medium	Medium
5 – Knockshanvo Wind Farm (9 Turbines), County Clare, ABP Reference 315797 (pre-planning)	Proposed	Medium	Medium	Medium

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 Wind Farm site, as set out in Appendix 2-3. For the purpose of traffic related impacts, the search was reduced to a radius of 5 km from the Proposed Project site. Of the developments included in the list it was considered that the 10 developments listed in Table 15-28 should be considered, based on the location and scale of these developments. It is considered that the potential risk of cumulative impacts between the Proposed Project and these developments is low to medium with the resulting cumulative impacts being negative, short term and slight for all cases.

Table 15-28 Summary of other development applications considered in cumulative assessment and potential for cumulative traffic effects with Proposed Wind Farm

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
1 – Castlebank, County Clare CCC Planning Reference 23/60249.	Permitted	Medium	Low	Low

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
For a solar farm on a 70 hectare site including a 38 kV substation, located to the west/north-west of Ardnacrusha within the townlands of Castlebank Drummin , Glenlon North Glenlon South and Ballykeelaun , Co Clare				
2 – Dromore, Castletroy, Limerick, LC&CC Planning Reference 23/316168 For the proposed upgrade of the existing Castletroy Wastewater Treatment Plant.	Permitted	Low	Medium	Low
3 – Kyle, Broadford, County Clare, CCC Planning Reference 23/28 Permission to relocate the existing Ardnacrusha Tulla 38 kV Line.	Permitted	Low	Low	Low
4 – Prior's Land , New Road , Thomondgate, Limerick. LC&CC Planning Reference 22/1400 Permission for the construction of 46 apartments.	Permitted	Low	Low	Low
5 – Ballyglass, Coolderry, Dromintobin North, Reanabrone , and Oakfield Ardnacrusha , Co Clare CCC Planning Reference 22/591 Permission for a solar array.	Permitted	Medium	Low	Low

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
6 – Thomond Weir Browns Quay , Limerick City, Co Limerick. LC&CC Planning Reference 21/1669 For the development of 3no. hydrokinetic turbines and associated development.	Permitted	Low	Low	Low
7 – Castlebank, Ardnacrusha, Co. Clare, CCC Planning Reference 21/1232 For development on lands located within the site of the Ardnacrusha Generating Station in the townland of Ballykeelaun. The development consists of upgrading works to the electricity network within the site.	Permitted	Medium	Low	Low
8 - Hassett's Cross , Limerick City, Co Limerick. LC&CC Planning Reference 19/710. Permission for development of a six storey building comprising of 31 student apartment units (143 student bed spaces) & all associated auxiliary rooms. Medical Centre of 366.72 sq.m.	Permitted	Low	Low	Low

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
9 - Killeagy (Goonan), Co. Clare. ABP Planning Reference 318846. Permission for development of a temporary 100m high lattice type meteorological mast for a period of 5 years which also includes a hardstanding area and all ancillary works.	Appeal	High	Low	Low
10 – Faheymore North, O'Briensbridge), Co. Clare. ABP Planning Reference QD0011 and SU0127. Extension to existing sand and gravel quarry.	Permitted	High	Low	Low

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

15.2 Telecommunications and Aviation

15.2.1 Introduction

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

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

Section 15.2.3 and Section 15.2.5 describes the way in which wind turbines can potentially interfere with telecommunications signals or aviation activities. Section 15.2.4 presents details on how such effects will be avoided, with the likely significant effects assessed (and mitigation measures proposed) in Section 15.2.6.

15.2.1.1 Statement of Authority

This section of the EIAR has been prepared by Catherine Johnson and reviewed by Niamh McHugh and Sean Creedon, all of MKO. Catherine is an Environmental Scientist at MKO with over two years of consultancy experience in climate and sustainability. Prior to joining MKO in 2022, Catherine worked as an Environmental Social Governance (ESG) analyst for Acasta in Edinburgh. Catherine has expertise in international climate law and policy, earth science, and sustainability/ESG processes. Catherine has a BSc in Earth and Ocean Science and an LLM in Global Environment and Climate Change Law. Niamh is a Project Environmental Scientist who has been working with MKO since June 2021. Niamh possesses a BSc (Hons) in Environmental Science from the National University of Ireland, Galway. Niamh has been involved in the compilation and production of a number of EIARs, mainly in the field of Renewables. Sean is an Associate Director in the Environment Team at MKO. He oversees a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy related developments. He has worked on the planning and environmental impact elements within all stages of wind farm project delivery. He is a member of the MKO senior management team responsible for developing the business, mentoring team members, fostering a positive culture and promoting continuous employee professional development. Sean has over 22 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland.

15.2.2 Methodology and Guidance

This section of the assessment focuses particularly on the scoping and consultation exercise conducted with telecommunications operators and aviation authorities. Telecommunications operators and aviation authorities were contacted in May 2022 in order to determine the presence of telecommunications links either traversing or in close proximity to the Proposed Wind Farm. 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. In addition to this, consultation was also carried out with Commission for Communications Regulation (ComReg) in order to identify any other additional licensed operators in the vicinity of the Proposed Wind Farm to be contacted, who may not have been on the list of main operators.

A full description of the scoping and consultation exercise is provided in Section 2.7 of Chapter 2 of this EIAR. Consultation with the telecommunications operators and aviation bodies informed the constraints mapping process, which in turn informed the layout of the Proposed Wind Farm, as described in Chapter 3, Section 3.2.6 of the EIAR.

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

15.2.3 Background

15.2.3.1 Broadcast Communications

Wind turbines, like all large structures, have the potential to interfere with broadcast signals, by acting as a physical barrier or causing a degree of scattering to microwave links. The most significant effect at

a domestic level relates to a possible flicker effect caused by the moving rotor, affecting, for example, radio signals. The most significant potential effect occurs where the renewable energy development is directly in line with the transmitter radio path.

15.2.3.2 Domestic Receivers

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

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

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

15.2.3.3 Other Signal Types

Wind turbines have the potential to affect other signal types used for communication and navigational systems, for example tower-to-tower microwave communication links, and airborne and ground radar systems. Interference with radar systems occurs when wind turbines are located close to an airport or directly in line with the instrument landing approach. The closest operational large international airport is Shannon Airport in County Clare located approx. 27.5km southwest of the Proposed Wind Farm and the nearest operational airfield is Erinagh Airfield in County Tipperary which is located approx. 26.9km east of the Proposed Wind Farm.

Both Shannon Airport and the Erinagh Airfield listed above are outside the range at which such issues would be expected, and as detailed in Table 15-29 below, the Irish Aviation Authority noted no issues with the Proposed Project however they issued observations as discussed in Section 15.2.4.3 and Section 15.2.5 below.

15.2.3.4 Preventing Electromagnetic Interference

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

Developers are advised to contact individual local and national broadcasters and mobile phone operators to inform them of proposals to develop wind farms. This consultation has been carried out by MKO as part of the assessment of the Proposed Project as summarised below in Table 15-29; full details are provided in Section 2.7 in Chapter 2 of this EIAR.

15.2.3.5 Aviation

The Draft DoEHLG 2019 Guidelines note that wind turbines or any structure exceeding 90 metres in height are considered obstacles to aerial navigation and need to be shown on aviation charts. Contact

with the Irish Aviation Authority (IAA) is advised at the pre-planning stage of consultation to ensure that proposed wind farms will not cause difficulties with air navigation safety, including airports, radar and aircraft guidance systems.

In addition, the Irish Air Corps (IAC) drafted the '*Air Corps Wind Farm/Tall Structures Position Paper*' in 2014 (hereafter referred to as the IAC Position Paper), with the intent of ensuring IAC operations and training may be accomplished in a safe and economical manner, relevant aerodromes remain viable for air traffic, the ability to train military flying skills is protected and vital navigation routes are protected to safeguard the ability of the IAC to fulfil its role

In line with the above, the IAC notes they are opposed to any wind farms or tall structures in the following areas:

- Lands underlying military airspace used for flying activity, including designated Military Operation Areas (MOA)
- Areas wherein military flying occurs at low levels
- Critical low level routes in support of IAC operational requirements

The IAC Position Paper also notes that in all locations where wind farms or masts are permitted, they should be illuminated by high intensity strobe lights, be identifiable hazards relative to additional lighting in the vicinity and remain visible to night vision equipment.

Following the draft guidance above, consultation with the IAA and the Department of Defence (DoD) has been carried out by MKO as part of the assessment of the Proposed Project as summarised below in Table 15-29; full details are provided in Section 2.7 in Chapter 2 of this EIAR.

15.2.4 Scoping and Consultation

As part of the EIAR scoping and consultation exercise, MKO contacted the relevant national and regional broadcasters, fixed and mobile telephone operators, aviation authorities and other relevant consultees in May 2022. Consultation was also carried out with ComReg in order to identify any other additional licensed operators in the vicinity of the Proposed Wind Farm to be contacted, and with the Department of Defence in order to identify any military aviation constraints.

A list of the relevant telecommunications and aviation consultees and, where received, a summary of the responses are set out below in Table 15-29.

Table 15-29 Telecommunications and Aviation Scoping Responses

Consultee	Response	Potential for Interference Following Consultation Exercise
2rn (RTE Transmission Network)	Received 6th May 2022	Yes, potential risk of interference from the Proposed Wind Farm site. The Applicant has engaged with 2rn for a protocol agreement for the site to ensure no impact.
AirWire	No response received	N/A
Ajisko Ltd	Received 6th May 2022	No
Broadcasting Authority of Ireland (BAI)	Received 6th May 2022	No

Consultee	Response	Potential for Interference Following Consultation Exercise
BT Communications Ireland	Received 6th May 2022	No
ComReg (Commission for Communications Regulation)	Received 11th May 2022	N/A – Provided list of Telecommunications Operators in vicinity of site.
Department of Defence	No response received	N/A
Eir	Received 13th May 2022	Yes, link located within the vicinity of the Proposed Project. In order to ensure no impact, a 100m buffer has been applied for turbine locations. One turbine was relocated to ensure the link wouldn't be affected.
ENET	Received 6th May 2022	No
ESB Telecoms	No response received	N/A
Irish Aviation Authority (IAA)	Received 30th August 2023	IAA noted observations as discussed in Section 15.2.4.3 and Section 15.2.5.
Imagine Group	Received 27th May 2022	No
Irish Defence Forces (Air Corps)	No response received	N/A
Lightnet	Received 6th May 2022	No
Lighthouse Networks Ltd	Received 6th May 2022	No
Ripple Communications	No response received	N/A
RTE Transmission Network	Received 6th May 2022	Joint Response with 2rn
TETRA Ireland Communications Ltd.	Received 18th May 2022	No
Three Ireland Ltd	Received 19th May 2022	Yes, one microwave link traverses the area. Coordinates for this link were issued by Three and a 30m clearance distance was applied to turbine locations.
Towercom	Received 11th May 2022	No
Treaty Radio Ltd	No response received	N/A

Consultee	Response	Potential for Interference Following Consultation Exercise
Viatel	No response received	N/A
Virgin Media	Received 26th May 2022 and 29th August 2022	No
Vodafone Ireland	No response received	N/A

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

15.2.4.1 Broadcasters

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

RTÉ Transmission Network, replied on the 6th May 2022 to a scoping request from MKO stating that there is one path in the area where the Proposed Wind Farm is located. Therefore, a standard Protocol Document has been prepared by 2rn for the Proposed Wind Farm, which has been signed by EDF Renewables Ireland Ltd. A copy of the Protocol Document is presented in Appendix 15-5 of this EIAR. The Protocol Document ensures that in the event of any interference occurring to RTÉ television or radio reception due to operation of a 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 any unanticipated broadcast interference arising to RTÉ television or radio reception as a result of the Proposed Wind Farm.

Virgin Media responded to the scoping request from MKO on the 26th of May requesting further information. After further information was sent, a second scoping response was received on the 29th of August 2022 with a confirmation that there would be no impact from the Proposed Project on any Virgin Media radio links.

15.2.4.2 Other Consultees

Of the scoping responses received from telephone, broadband and other telecommunications operators, those who highlighted an initial potential interference risk are addressed below. The remaining consultees who responded to the scoping request either operate links outside the Proposed Wind Farm site and therefore are not subject to any interference risk, or they do not operate any links in the area and therefore are not subject to further assessment.

Eir

At the time of the initial scoping with the telecoms operators during May 2022, Eir identified one link that passes through the EIAR Site Boundary, south of T07, and could therefore be affected by the Proposed Wind Farm. Further engagement with Eir commenced and a clearance distance of 37.5 metres from the CE_2455 to CE_1886 link was proposed. This would require a change in turbine location (T07); the Applicant (EDF Renewables Ireland Ltd.) agreed to the change in turbine location in September 2022. It was then confirmed that the Proposed Wind Farm turbine (T07) will not affect this link once the turbine was moved outside of the clearance distance from the link identified by Eir.

Three Ireland Ltd.

At the time of the initial scoping with the telecoms operators during May 2022, Three Ireland Ltd. identified one microwave link that traverses the area and could potentially be affected. A clearance distance from the link to the rotor tip of the nearest proposed turbine of 30m would be required to ensure no impact on the link. The nearest proposed turbines (T05, T07) are located approximately 677m and 738m from the beginning of the microwave link and therefore the link would not be affected by the Proposed Wind Farm.

15.2.4.3 Aviation

As noted in Table 15-29 above, scoping responses were received from the Irish Aviation Authority (IAA).

Pertinent information has been summarised below; however, the scoping response (included as Appendix 2-1) should be referenced to for further detail:

Irish Aviation Authority

In December 2022, a scoping response was received from the IAA. They noted the IAA is not involved in the planning process but the developer must inform the aerodrome operator if erecting a manmade object at least 30 days in advance if the structure will be erected in the vicinity of the aerodrome. In their scoping response, the IAA provided a list of general observations which they said would be likely to be offered during the formal planning process by the relevant Local Authority.

The requirements of the IAA include the following:

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

As noted by the IAA, the nearest operational airport is Shannon Airport located approximately 27.5km southwest of the Proposed Wind Farm, and the nearest operational airfield is Erinagh Airfield in County Tipperary which is located approx. 26.9km east of the Proposed Wind Farm. The closest operational large international airport is Shannon Airport which is located approx. 27.5km southwest of the Proposed Wind Farm. The airports and airfields listed above are therefore outside the range at which such issues would be expected, as outlined in Appendix 15-6 Aviation Review Statement. Please refer to Appendix 15-6 for further information about potential impacts to Shannon Airport Runway Outer Horizontal Surface.

During initial consultations with the MKO, the IAA raised specific concerns in relation to the safeguarding of Instrument Flight Procedures (IFPs), Instrument Landing Systems (ILS) Flight Checks, and Navigation Aids (NAVAIDs) serving Shannon Airport. In subsequent consultations, the IAA indicated that they do not anticipate that the Proposed Project will cause any issues in relation to Instrument Flight Procedures for Shannon Airport. The IAA consultation response received on December 8th, 2022, indicated that there will be no impact on the IFPs. The IAA also indicated no impacts on the NAVAIDs for Shannon Airport. Please refer to Appendix 2-1 for further information on the scoping response from the IAA.

Additionally, in line with lighting requirements requested by the IAA and noted in the IAC Position Paper, the turbines will be marked on maps, lit at night and entered into aircraft navigation databases and therefore can be avoided during flight.

The IAA also noted that the Proposed Wind Farm is within 15km of the Woodcock Hill Secondary surveillance radar, and therefore requires a radar impact study be completed as part of the EIAR. In response to the IAA's scoping reply, an Aviation Review Statement was carried out by Ai Bridges. The Aviation Review Statement provides a detailed review on the possible impacts of the Proposed Wind Farm on aviation systems in the vicinity of the Proposed Project. This Aviation Impact Statement is included as Appendix 15-6, and further detailed in Section 15.2.5 below.

15.2.5 Aviation Review Statement

An Aviation Review Statement (ARS) was conducted by Ai Bridges. This report is included as Appendix 15-6. The ARS provides a qualitative evaluation of the Proposed Wind Farm's potential to impact airspace, civil and military flight following the framework outlined in the IAC Position Paper.[1]

The ARS highlighted ten sections in its review of the aviation and aeronautical safeguarding surfaces and infrastructure surrounding the Proposed Wind Farm. These sections are as follows:

- Annex 14 – Obstacle Limitation Surfaces
- Annex 15 – Aerodrome Surfaces
- Minimum Sector Altitudes (MSA)
- Instrument Flight Procedures
- Permitted Wind Farms in vicinity of proposed Wind Farm
- Communications and Navigation Systems
- Radar Surveillance Systems
- Flight Inspection and Calibration
- Aeronautical Obstacle Warning Light Scheme
- Irish Air-Corps / DoD Safeguarding

Of the ten sections, only the Radar Surveillance Systems section identified any impact that would require further investigation. A desktop assessment was carried out to determine which Assessment Zones from the IAA are applicable to the Proposed Wind Farm. The nearest radar surveillance sites to the Proposed Wind Farm site are the IAA Radar Station sites at Shannon Airport (PSR and SSR) and at Woodcock Hill (SSR), located approximately 28.2km and 13.9km southwest from the Proposed Wind Farm site, respectively. Therefore, detailed technical assessment is not required for the Radar Station at Shannon Airport but is required for the Woodcock MSSR. Appendix E of the ARS provides a detailed technical assessment on the Woodcock Hill MSSR and potential impacts result from the Proposed Wind Farm; this document is detailed below.

Technical Safeguarding Assessment

Cyrrus Limited was also engaged to undertake a TSA, including a Radar Line of Sight (RLoS) Assessment, for the Proposed Wind Farm as part of the Aviation Review Statement, detailed above; the TSA can be found as Appendix E to the Aviation Review Statement provided as Appendix 15-6 of this EIAR. The purpose of the TSA is to investigate the potential impact the Proposed Wind Farm will have on the Woodcock Hill MSSR.

Wind turbines pose potential issues for aviation Primary Surveillance Radar (PSR) and MSSRs as the radar is unable to differentiate between the movement of turbine bladers and unwanted aircrafts. An MSSR is an 'active' system. It operates by the radar transmitting a coded pulse sequence which is received and decoded by suitably equipped aircraft. The aircraft responds with a coded pulse sequence on a different frequency which is received by the MSSR. The radar detects the range and azimuth of an

[1] *Defence Forces Ireland (2014) Air Corps Wind Farm/Tall Structures Position Paper* < https://www.pleanala.ie/publicaccess/EAir%20Corps%20Position%20Paper.pdf>

aircraft based upon the difference in time between the transmission of pulses to the aircraft and the receipt of energy from the aircraft.

If a turbine is located between a MSSR beam and an aircraft, the turbine would reflect the interrogation to an aircraft on a different bearing. The aircraft transponder replies, and this is received by the radar via the turbine. The radar processes this as a false target on the bearing of the wind turbine and at a distance proportional to the path length, which is slightly longer than the direct path length.

The TSA Concludes that while RLoS does exist between the Proposed Wind Farm and the Woodcock Hill MSSR, false targets due to bistatic reflections from the turbine towers will not occur. Furthermore, the volumes of shadow regions from the proposed turbines are relatively small and considered operationally tolerable; therefore, no mitigation measures are considered necessary for the Woodcock Hill MSSR.

When assessing potential operational effects, other permitted wind farms in the area, i.e., the permitted Carrownagowan Wind Farm and the permitted Fahy Beg Wind Farm, which are sited 2.2km north of the Proposed Wind Farm at its closest point (i.e., T01) and 1.3km south of the Proposed Wind Farm at its closest point (i.e., T07), respectively, were used. Section 2.4.3 of Appendix 15-6 states that as both the Carrownagowan and Fahy Beg Wind Farms are permitted, there was no required amendments or redesign of instrument flight procedures at Shannon Airport, the closest operational international airport, associated with other permitted wind farms in the area. As the Proposed Wind Farm is located at a similar distance from Shannon Airport, any impacts would be similar to the permitted turbines at Fahybeg Wind Farm and Carrownagowan Wind Farm.

Therefore, based on the distance of the Proposed Wind Farm from the Woodcock Hill MSSR, Shannon Airport, and the information presented in Appendix 15-6, it is not foreseen that any operational problems will be caused through cumulative effects.

Summary

Overall, the ARS identifies that the Proposed Wind Farm will not have an impact on aviation in the area to any degree that may be deemed unsafe or inconvenient to users.

Figure 15-15 below provides of the aviation review for the Proposed Wind Farm (provided as Table 12 in Appendix 15-6).

Figure 15-15 Aviation Review Statement Summary

Item	Impact	Summary
Annex 14 - Obstacle Limitation Surfaces (OLS)	None	The proposed wind farm site is located outside the Outer Horizontal Surfaces for Shannon Airport. Turbines at the proposed wind farm would be outside the take-off and approach surfaces for Shannon Airport
Annex 15 - Aerodrome Surfaces	Notification to IAA required	The proposed wind turbines would penetrate the ICAO Annex 15 Aerodrome Surface and should be included in the IAA Obstacle Data Set.
Minimum Sector Altitudes (MSA)	None	A review of the Minimum Sector Altitudes (MSA) shows that the proposed wind farm is within 25 nautical miles from the VOR/DME at Shannon Airport. The maximum allowable structure in the relevant Quadrant is 2400ft (AMSL). Turbines at the proposed wind farm would not exceed the 2400ft threshold, therefore the MSA of the Main Quadrant will not be affected and there will be no impact on the published MSA altitude figures.
Instrument Flight Procedures	None	A review shows that the proposed wind farm site is sufficiently far from Shannon Airport that the instrument flight procedures (IFPs) for approach and departure flights to/from these airports are unlikely to be impacted for precision aircraft. The IAA have also stated that they do not anticipate any impacts to IFPs due to the proposed wind farm.
Communication and Navigation Systems	None	As the proposed wind farm is over 20km from the Localizers and transmitting antennas at Shannon Airport, it is very unlikely that the proposed development will have any impact on these ATS communications and radio navigational aids. The IAA have also stated that they do not anticipate any impacts to Navigational Aids due to the proposed wind farm.
Radar Surveillance Systems Safeguarding	None	For the MSSR at Woodcock Hill, the IAA have requested a further technical assessment. It should be noted that a technical assessment was carried out for the permitted wind farm at Carrownagowan and the IAA deemed that there would be no adverse impacts on the MSSR. No Radar Assessment was requested for the consented Fahybeg wind farm which is closer than the proposed Lackareagh development. A detailed Radar Safeguarding Assessment was conducted by Cyrrus Limited and it was concluded that there would be small shadow regions from the turbines are small and would be operationally tolerable and no mitigation measures are considered necessary for the Woodcock Hill MSSR
Flight Inspection and Calibration	None	The findings contained within this review statement document in relation to the impact assessment on ILS Flight Check Procedures should be presented to the IAA for their review noting that the obstacle terrain AMSL for Moylussa mountain is exceeds then AMSL for the highest of the proposed turbines.
Aeronautical Obstacle Warning Light Scheme	None	The IAA have stated that in the event of planning consent being granted, the wind farm should be fitted with Aeronautical Obstacle Warning Lights. It is recommended that an aeronautical obstacle lighting scheme be implemented and agreed with the IAA.
Irish Air Corps / DoD Safeguarding	None	The proposed wind farm is located outside the Irish Air Corps Restricted Areas.

15.2.6 Likely Significant Effects and Associated Mitigation Measures

15.2.6.1 'Do-Nothing' Scenario

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

15.2.6.2 Construction Phase

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

15.2.6.3 Operational Phase

15.2.6.3.1 *Telecommunications*

Consultation regarding the potential for electromagnetic interference from the Proposed Wind Farm was carried out with the relevant national and regional broadcasters, fixed line and mobile telephone operators and other operators, which required one turbine (T07) to be moved so it would not interfere with the Eir link in the area. One microwave link from Three Ireland Ltd. was also identified in the area, but the turbines were already of sufficient distance from this link that it was determined that there would be no impact. notwithstanding this, the presence of turbines within the Proposed Wind Farm Site, there could be a potential negative, imperceptible, long-term effect on telecommunications as a result of the Proposed Project.

Mitigation Measures

In the event of interference occurring to telecommunications, the DoEHLG 2006 Guidelines acknowledge that '*electromagnetic interference can be overcome'* by the use of divertor relay links out of line with the wind farm. As detailed in Section 15.2.4.2 above, all constraints identified by Eir and Three Ireland Ltd. have been taken into consideration for design of the Proposed Wind Farm.

Residual Effect

Following the implementation of the mitigation measures above, the Proposed Project will have no residual effect on the telecommunications signals of any other operator, due to distance from or absence of any links in the area.

Significance of Effects

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

15.2.6.3.2 *Aviation*

As outlined in Section 15.2.5 above, the ARS notes that the Proposed Wind Farm will have little to low impact on aviation, with further assessment only required in relation to the safeguarding of radar surveillance systems. This further assessment was completed in the form of a Technical Safeguarding

Assessment, Appendix E to Appendix 15-6, by Cyrrus. It was determined that the Proposed Wind Farm will have no operational effects on aviation, including from a cumulative perspective.

The ARS goes on to identify that there will be no impact on all other aviation areas assessed (see Figure 15-15 above) and provides further details on the IAC Position Paper on Wind Farms/Tall Structures. The nearest Air Corps restricted area to the Proposed Wind Farm is the low-level flight route around the M7 motorway. This Proposed Wind Farm site is 5 nautical miles (nm) (9.2km) from the M7 and is therefore outside the 3nm restricted area. Therefore, there will be no impact on IAC activity. When taking this into account, the overall effect of the Proposed Wind Farm on aviation is lower than stated.

When all the aspects above are considered as one, the Proposed Wind Farm will result in a negative, imperceptible, long-term effect on aviation.

Mitigation Measures

Best practice measures for aviation will be adhered to during the operational phase of the Proposed Project in order to mitigate the effects associated with this phase of the development. The measures include:

- Lighting requirements will be complied with for the Proposed Wind Farm and any further details will be agreed in advance of construction with the IAA and DoD, i.e. crane erection. The coordinates and elevations for built turbines will be supplied to the IAA and DoD, as is standard practice for wind farm developments.

Residual Effect

Following the implementation of the mitigation measures above, there will be a negative, imperceptible, long-term residual effect from the Proposed Project on aviation.

Significance of Effects

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

15.2.6.4 Decommissioning Phase

As stated in Section 15.2.6.2 above, the potential for electromagnetic interference from wind turbines occurs only during the operational phase of the Proposed Wind Farm. There are no electromagnetic interference impacts associated with the construction or decommissioning phases of the Proposed Wind Farm, and therefore no mitigation is required.

15.2.6.5 Cumulative Effect

Chapter 2, Section 2.9 of this EIAR describes the methodology used in compiling the list of permitted or proposed projects and plans in the area, (wind energy or otherwise) considered in the assessment of cumulative effects, and provides a description of each project, including current status. The closest operational turbine is the Parteen Turbine in Co. Clare, located approximately 12.2km southwest of the Proposed Wind Farm at its closest point (i.e., T07). The closest permitted wind farm project is Fahy Beg Wind Farm located approx. 1.3 km south of the Proposed Wind Farm at its closets point (i.e., T07), followed by the permitted Carrownagowan Wind Farm located approx. 2.2km north of the Proposed Wind Farm at its closest point (i.e., T01).

During the development of any large project that may affect telecoms or aviation, the Developer is responsible for engaging with all relevant Telecoms Operators and Aviation Authorities to ensure that the proposals will not interfere with television or radio signals by acting as a physical barrier. In the

event of any potential impact, the Developer for each individual project is responsible for ensuring that the necessary mitigation measures are in place.

In their scoping response the IAA noted that the Proposed Wind Farm is within 15km of the Woodcock Hill MSSR, and therefore a radar impact study was required as part of the EIAR. An Aviation Review Statement was carried out by Ai Bridges Statement which provides a detailed review on the possible impacts of the Proposed Wind Farm, and other permitted wind farms in the area (i.e. permitted Carrownagowan Wind Farm and the permitted Fahy Beg Wind Farm, on aviation systems in the vicinity of the Proposed Project. The TSA , Appendix E to Appendix 15-6 notes that that a technical assessment was carried out for the permitted Carrownagowan Wind Farm and the IAA deemed that there would be no adverse impacts on the MSSR. No Radar Assessment was requested for the permitted Fahy Beg Wind Farm which is closer to the Woodcock Hill MSSR than the Proposed Wind Farm. Therefore, the TSA concludes that there will be no operational impact at the Woodcock Hill MSSR due to the cumulative effect of nearby turbines.

Furthermore, all modern wind farms have lighting requirements agreed with IAA and the turbine locations entered into aircraft navigation databases and therefore can be avoided during flight. It is on this basis that it can be concluded that there would be no cumulative effects relating to the Proposed Project and surrounding projects in relation to Telecommunications or Aviation.

15.3 Other Material Assets

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

In order to assess the potential for significant effects on built services and waste management in the vicinity of the Proposed Project, scoping requests were made to EirGrid, Irish Water and numerous departments of Clare County Council including Operations, Heritage and Environment. Refer to Section 2.7 of Chapter 2 of this EIAR for details in relation to the EIA scoping exercise.

A scoping response was received from Clare County Council (heritage, environment and planning departments); however, it did not provide details in relation to other utilities or built services within the EIAR Site Boundary.

No response was received from EirGrid or Irish Water.

Following the lack of response from the above-mentioned scoping response best practice measures will be put in place to ensure that any utilities or built services in the area will not be negatively affected by the Proposed Project during construction, operational and decommissioning phases. Mitigation measures to be put in place are detailed below in Section 15.3.4.

15.3.1 Existing Built Services and Utilities

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

There are no known existing underground electricity cables present on the Proposed Wind Farm site. As identified above, a scoping response was received from Clare County Council, this response did not flag any information re underground cables within the Proposed Wind Farm site. There are existing underground electricity cables present along the Proposed Grid Connection Route, and in the vicinity of the Proposed Wind Farm. At the feasibility stage, TLI carried out a study of various routes and

identified within that document the presence of underground services. The Proposed Grid Connection Route was subsequently designed in order to avoid congestion of existing and proposed services, the construction methodology of the Proposed Grid Connection Route is provided as Appendix 4-5 of this EIAR.

Damage of underground electricity cables during construction operations could potentially result in serious injury or death of site staff. The Proposed Project has been designed to avoid exisiting underground electricity cables.

The Proposed Grid Connection Route will not pass over any existing gas lines between the Proposed Wind Farm site and the Ardnacrusha 110kV substation.

Scoping responses received from a number of bodies such as Clare County Council and the Department of Transport (responses detailed in Appendix 2-1 of this EIAR) did not identify the presence of any underground services (i.e. water supply, sewage, telecommunications) on the Proposed Wind Farm site. There are existing services (i.e. water supply, sewage, telecommunications) present along the Proposed Grid Connection Route, and in the vicinity of the Proposed Wind Farm site. Damage of underground services during construction operations could potentially result in disruption to those local services, and a risk to health and safety of site staff.

The Proposed Grid Connection Route has been designed to avoid identified services and utilities. Prior to commencement of construction the appointed contractor will carry out site investigations to confirm design assumptions and undertake additional surveys to identify any new services and utilities and ensure they will not be impacted by the Proposed Project. The construction of the Proposed Grid Connection Route would also be subject to a Road Opening License (ROL). The timing of these works would therefore be controlled by the ROL process with the relevant Local Authority.

15.3.2 Electricity Supply

Ireland faces significant challenges to its efforts to meet European Union (EU) targets for renewable energy by 2030 and its commitment to transition to a low carbon economy by 2050. The need to decarbonise the economy and reduce emissions has always been imperative, however in recent years the urgency involved has become clearer to all stakeholders. The primary driver behind the Proposed Project is the need to provide additional renewable energy to offset the use of fossil fuels within the electricity generating sector. Further detail can be found in Chapter 2, Section 2.2 and Section 2.3 of this EIAR. The Proposed Project comprises the provision of a wind farm of 7 no. wind turbines and associated infrastructure, which is capable of generating and providing a significant amount of renewable energy onto the national grid and capture an additional part of County Clare's valuable renewable energy resource, which is among the strongest in Europe.

15.3.3 Waste Management

A Waste Management Plan (WMP) has been prepared and forms part of the CEMP in Appendix 4-3 of the EIAR.

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

All waste generated onsite will be contained in waste skips at a waste storage area onsite. 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 onsite are unlikely to be large enough to warrant source segregation at the Proposed Wind Farm. Therefore, all wastes streams generated onsite will be deposited into a single waste skip. This waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.

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

Further details on waste management are presented in the CEMP which is included as Appendix 4-3.

15.3.4 Likely Significant Effects and Associated Mitigation Measures

15.3.4.1 'Do-Nothing' Scenario

If the Proposed Project were not to proceed no waste volumes associated with construction, operation and decommissioning would be generated and the opportunity to generate renewable energy and electrical supply to the national grid would be lost.

15.3.4.2 Construction Phase

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

Proposed Mitigation Measures

Notwithstanding the above, specific measures are incorporated into the CEMP, included as Appendix 4-3 of this EIAR, to ensure that the construction of the Proposed Project will not have effect on underground electrical cables and built services at the site. Section 3.9 of the CEMP specifically considers waste management during the construction phase and provides site specific mitigation to ensure all waste is managed under the waste hierarchy. The mitigation measures relating to the above include the following:

- Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works.
- Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified.
- Excavation permits will be completed, and all plant operators and general operatives will be inducted and informed as to the location of any services.
- The contractor must comply with and standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks.
- Ordering of materials will be on an 'as needed' basis to prevent over supply to site. Co-ordination is required with suppliers enabling them to take/buy back surplus stock.
- Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal
- Ensuring correct sequencing of operations.
- Use reclaimed materials in the construction works

Regarding the Proposed Grid Connection Route, it is considered best practice to apply for a ROL that will cover both detailed surveys prior to and the construction of the grid connection from the local authority. A ROL will be obtained where required and all plant operators and general operatives will be inducted and informed as to the location of any services.

Residual Effect

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

Significance of Effects

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

15.3.4.3 Operational Phase

There will be no operational phase impacts or associated effects on waste management associated with the Proposed Project. The Proposed Project will have an installed capacity of 46.2MW which has potential to produce 145,649 MWh of electricity. This would be sufficient to supply approximately 33,726 Irish households with electricity per year during its operational phase. The Proposed Project will therefore have a positive, moderate, long-term effect on built services.

15.3.4.4 Decommissioning Phase

The wind turbines proposed as part of the Proposed Wind Farm are expected to have a lifespan of approximately 35 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 Proposed Wind Farm and Proposed Grid Connection Route will be decommissioned fully as described in Chapter 4 and the accompanying Decommissioning Plan in Appendix 4-7.

Other waste resulting from the decommissioning of the Proposed Wind Farm site will be disposed of in the same manner as during the construction phase, i.e., following the waste hierarchy which sets out the most efficient way of managing waste on site. During the decommissioning phase the only materials remaining on site at that time will be infrastructural material such as the turbine foundations, turbines and the granular material used to construct roads; this is due to the lengthy time frame between the completion of the construction phase and decommissioning. When the site is decommissioned, cranes will disassemble each turbine tower and all equipment. The associated components will be removed from site for re-use, recycling or waste disposal. Any structural elements that are not suitable for recycling will be disposed of in an appropriate manner. All lubrication fluids will be drained down and put aside for appropriate collection, storage, transport and disposal. Any materials which cannot be re-used or recycled will be disposed of by an appropriately licenced contractor. The measures outlined in Section 3.9.3.2 and 3.9.3.3 of the CEMP will be utilised during the decommissioning phase to ensure that all waste is dealt with in alignment with the best practice measures at the time. The works required during the decommissioning phase are described in Section 4.10 in Chapter 4 of this EIAR. Any impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent.

15.3.5 Cumulative Impact Assessment

The potential cumulative impact of the Proposed Project and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Project will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans in the area, in the vicinity of the Proposed Wind Farm site, as set out in Section 2.9 in Chapter 2 of this EIAR.

In addition to the Proposed Project, the following permitted and proposed developments are acknowledged to have permitted or proposed grid connection underground cabling routes connecting to the Ardnacrusha 110kV substation:

- Proposed Knockshanvo Wind Farm
- Permitted Carrownagowan Wind Farm
    - Grid connection assessed in EIAR supporting the planning application to An Bord Pleanála (ABP), however this project component was not part of the planning application and a subsequent S182 application for this grid connection has been submitted to ABP.
- Permitted Fahy Beg Wind Farm

The potential for cumulative effects with these nearby energy developments are not significant from the perspective of built services and waste management. With regard to underground grid connection cabling routes, there is potential for cumulative effects of the Proposed Grid Connection Route in conjunction with these other permitted and proposed projects. The construction of the Proposed Grid Connection Route would be subject to a Road Opening License, as would any other similar nearby grid connection works. The timing of these works would therefore be controlled by the road opening licensing process with the relevant Local Authority and would not overlap. It is also likely that the construction phases of these projects will not overlap with the construction phase of the Proposed Project.

It is on this basis that it can be concluded that there would be a potential negative, imperceptible, short-term cumulative impact on built services and waste management from the Proposed Project and permitted or proposed projects and plans in the area as set out in Section 2.9 in Chapter 2 of this EIAR, however this can be controlled by the ROL procedure.