Planning and Environmental Consultants

Environmental Impact Assessment Report (EIAR)

Seskin Wind Farm, Co. Carlow

Ch 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 13 of this Environmental Impact Assessment Report (EIAR). Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are addressed in Chapter 8: Land, Soils and Geology, Chapter 9: Water, and Chapter 10: Air 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 4.4.12.6 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. 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. Locations where remedial measures are required to accommodate the abnormal loads on the proposed delivery route (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 preliminary traffic management plan is also provided in Section 15.1.14.5.2 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.

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. 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 scoping by emails on the 21st 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
- DN-GEO-03030, Design Phase Procedure for Road Safety Improvement Schemes, Urban Renewal Schemes and Local Improvement Schemes, Transport Infrastructure Ireland, April 2021

Specific issues raised by TII include the following;

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 Carlow County Council and Kilkenny County Council as set out in Section 15.1.1.5 below.
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 Project, including the potential haul route.	The impacts of the Proposed Project on the delivery routes in terms of link flows are set out in Section 15.1.6.1 of the EIAR, while an assessment of the capacity of the Proposed Wind Farm access road on the L-3037 is set out in Section 15.1.6.2. An assessment of the impacts during the construction of the Proposed Grid Connection Route is set out in Section 15.1.7 while a swept path analysis undertaken for the abnormally large loads on the proposed TDR is set out in Section 15.1.9 of the EIAR. The assessment sets out the temporary local measures that will be required on the national, regional and local road networks during the construction of the Proposed Project.
3	The developer should assess visual impacts from existing national roads.	The visual impacts of the Proposed Project are set out in Chapter 14 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 15.1.12.7.1.
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 Carlow County Development Plan 2022 to 2028.
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 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 noted that there are no new permanent access junctions proposed on the national road network and that only a temporary access junction and minor temporary works are proposed at existing junctions in order to accommodate the abnormally sized loads. Any temporary additional access points that are proposed on the national road network will be open for the duration of the abnormal load deliveries which will be managed by Garda Siochana escort vehicles. These temporary access points will be closed at all other times. For this reason, a Road Safety Audit has not been undertaken at this stage, although the Applicant will do

ID	TII Scoping Item	Response
		so if considered appropriate as the design progresses.
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).
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 and all structures on the haul route through all the relevant County Council administrative areas should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal 'weight' load proposed.	The proposed haul routes are identified in this Chapter 15 of the EIAR. While it is proposed that the delivery stage of the Proposed Project will involve abnormally large loads, the axle loadings will not exceed accepted limits. A program of pre-delivery condition and structural assessment of the route is however proposed, as set out in the Traffic Management Measures, included set out in Section 15.1.12.5.2.
12	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.
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 15.1.12.5.2 of this EIAR.
15	It is noted that grid connection routing is identified as being potentially to Kilkenny 110kV. 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	The applicant agrees with this condition.

ID	TII Scoping Item	Response
	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.	

Department of Transport

A response to scoping was received from The Department of Transport on the 5th January 2023. 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,
- Examine the possible elimination of jointing bays to protect the integrity of the road structure for the safety of those driving on the public road by eliminating hard spots and also preserve the road width for other utilities and,
- Rationalisation of the number of cables involved (including existing electric or possible future cables) and their diversion into one trench, in order to minimise the impacts on the road network and the environment along the road boundary (hedgerows).

It is confirmed that the above points raised by the Department of Transport have been considered in the route selection and design of the Proposed 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

Carlow County Council

A response to the pre-planning application scoping request was received from Carlow County Council on 23rd March, 2023 with specific traffic and transport related issues raised set out in Table 15-2.

Specific issues raised by TII include the following;

Table 15-2 Issues raised by Carlow County Council in relation to the Proposed Project and Responses

ID	Carlow County Council Scoping Item	Response
1	The provision of a traffic impact assessment for the construction phase.	It is confirmed that the assessment presented in Chapter 15 of this EAIR adopts the Guidance set out for traffic and Transport Assessments, including an assessment of the traffic impacts during the construction phase.
2	Details of the anticipated traffic types and volumes for the development should be provided and assessed, and broken down in daily, weekly and monthly figures. Details should also include expected peak site traffic, day to day, hours and duration.	Trip generation estimates by construction period and day are set out in detail in Section 15.1.4.2 of the EIAR.

ID	Carlow County Council Scoping Item	Response
3	Proposed access route(s) for turbine delivery should be clearly identified on suitably scaled maps. Access routes should seek to predominantly utilise main roads, and therefore minimise the use of, and impacts on, county and local roads.	The proposed TDR is identified in Figure 15.2a and a swept path analysis of the turbine vehicles negotiating the Proposed TDR is provided in Section 15.1.9.
4	Potential traffic impacts from HGVs negotiating built up areas should be considered, as well as the feasibility of avoiding routing HGV traffic through such locations.	The proposed TDR was selected to minimise routing through urban areas. All pinch points on the proposed TDR are assessed in Section 15.1.9 of the EIAR.
5	Full design details for the entrance(s) to the site should be provided to demonstrate adequate turning movements for HGV's and sightlines. Accommodation works on third party lands must have written agreement of third party landowners.	Design details for the 2 access junctions are discussed in Section 15.1.9 and set out in Figures 15.8 to 15.17. It is confirmed that agreements with third party landowners are in place to provide all accommodation works and visibility splays.
6	A swept path analysis should be carried out for the proposed delivery route(s).	A swept path analysis of the turbine vehicles negotiating the proposed TDR is provided in Section 15.1.9.
7	The estimated load of turbine components should be provided.	It is confirmed that while the turbine delivery vehicles will be abnormal in size, axle loads will be within accepted limits.
8	All structures on the proposed access route(s) to the site should be evaluated for the ability to carry respective weights of transportation vehicles and turbines, including width and structural capacity of proposed access routes. The three roads: L-30372, L-7123 and L-7127 are small rural roads that are not suitable for the volumes of heavy trucks and lorries that will be required for the proposed works.	It is confirmed that the roads indicated will not be used for deliveries during construction of the Proposed Project.
9	A pre-construction and post construction conditions survey of the public roads from which the site is proposed to be accessed should be carried out.	This condition is accepted by the Applicant.
10	Proposals to upgrade a road structure where it is shown to be structurally unsuitable should be provided.	All construction details for accommodation works, including for the temporary access road between the N78

ID	Carlow County Council Scoping Item	Response
		and L-1834 and at the Black Bridge are included in Section 4.8 of this EIAR.
11	Funding to be made available to carry out remedial works to these roads post construction	The applicant agrees with this condition, as set out in Section 15.2.16.2 of this EIAR.
12	Construction and Environmental Management Plan / Traffic Management Plans are required.	Details are provided in Section 15.1.12.5.2 with a full TMP provided as Appendix 15-2. A CEMP is provided as Appendix 4-4 of this EIAR.
13	Alternative route options where road closures are required.	These are set out in Section 15.1.7 and Figures 15.3a to 15.3f for the construction of the Proposed Grid Connection Route. There are no road closures required for the construction of the Proposed Wind Farm.
14	Proposals for maintaining adjoining roads free of muck and debris during construction are required.	The applicant agrees with this condition, as set out in Section 15.1.12.5.2 of this EIAR.

Kilkenny County Council

A response to the pre-planning application scoping request was received from Kilkenny County Council on the 31st of January 2023 with specific traffic and transport related issues raised set out in Table 15-3.

Specific issues raised by Kilkenny County Council include the following;

Table 15-3 Issues raised by Kilkenny County Council in relation to the Proposed Project and Responses

ID	Kilkenny County Council Scoping Item	Response
1	Kilkenny set out all issues raised by TII in their submission dated 21st December 2022 and summarised in Table 15-1.	All responses are provided in Table 15-1.
2	The haul route should be assessed to confirm capacity to accommodate abnormal "length" loads and any temporary works.	A swept path analysis of the turbine vehicles negotiating the proposed TDR is provided in Section 15.1.9 with locations where temporary works are required highlighted. Please also refer to Appendix 15-3: Swept Path Analysis for swept path analysis of the Proposed TDR.
3	The national road network is managed by a combination of PPP Concessions, Motorway	The Applicant agrees with this condition.

ID	Kilkenny County Council Scoping Item	Response
	Maintenance and Renewals Contractors (MMaRC) and local road authorities in association with TII. The applicant / developer should also consult with all PPP Concessions, Motorway Maintenance and Renewals Contractors (MMaRC) and local 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.	
4	Any damage caused to the pavement on the existing national road arising from any temporary works due to the turning movements of abnormal loads (ie 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 on site.	The Applicant agrees with this condition.
5	It is noted that grid connection routing is identified as being potentially to Kilkenny 110kV. 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 any area of a proposed national road scheme. In that regard, consideration should be given to routing options, use of existing crossings, depth of cable laying etc.	Details of the Proposed Grid Connection Route is presented in Section 4.4.6 of Chapter 4 of this EIAR, while the traffic related impacts on the Proposed Grid Connection Route are set out in Section 15.1.7 of this EIAR.

It is noted that the Proposed Grid Connection Route does not impact on the existing national road network or any future road schemes being considered by TII.

15.1.1.6 Methodology and Section Structure

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

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

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

- A review of the existing and future transport infrastructure in the vicinity of the Proposed Project, including the proposed 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 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),
- A review of the effects of development generated traffic on links and junctions during construction, when the facility is operational and during decommissioning (Section 15.1.6 –Traffic Effects During Construction, Operation and Decommissioning),
- An assessment of the effects during the Proposed Grid Connection Route (Section 15.1.7 – 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 15.1.8 – Traffic Management of Large Deliveries and Section 15.1.9– Abnormal Load Route Assessment),
- An assessment of the provision for sustainable modes of travel (in this case primarily with respect to the transport of construction staff) (Section 15.1.10 – Provision for Sustainable Modes of Travel),
- A description of potential significant effects on Roads and Traffic (Section 15.1.11 – Likely and Significant Effect and Associated Mitigation Measures).

15.1.3 Receiving Environment

15.1.3.1 Site Location

The Proposed Wind Farm is located predominantly in County Carlow with parts of the Proposed Grid Connection Route in County Kilkenny in the townlands listed in Table 1-1 of Chapter 1. The centre of the Proposed Wind Farm site is located approximately 3.1 kms northwest of the village of Oldleighlin, Co Carlow, 5km northwest of Leighlinbridge, Co. Carlow, and 9.9 kilometres southeast of Castlecomer, Co. Kilkenny. The site location is shown in Figure 15-1.

It is proposed to access the Proposed Wind Farm site during both the construction and operational phase via an existing agricultural site entrance off the L3037 local road along the western boundary of the Proposed Project site in the townland of Ridge. This entrance will be widened to facilitate the delivery of the construction materials and turbine components. The proposed works will result in a permanent upgrade of this existing site access from the L3037 local road, which will also form the main site entrance to the Proposed Project during the operational phase. Further details on site entrances are provided in Section 4.5.1 in Chapter 4 of this EIAR.

The Proposed Grid Connection Route linking the proposed onsite 38kV Substation to the Kilkenny 110kV substation is primarily located in County Kilkenny (18.1km) with the northeastern section approaching the Proposed Wind Farm site (2.0 kms) located in County Carlow, traversing the townlands listed in Table 1-1 of Chapter 1.

TDR Location 1

Belview Port

Proposed Wind Farm

Proposed Grid Route

Kilkenny 110kV Substation

N78

L-1834

L-1835

L-30371

L-30372

L-3037

R448

L-30371

L-2627

L-6657

R712

KEY

EIAR site boundary

Turbine delivery route

Alternative route for stone / cement

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-1 Site location and delivery routes

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

15.1.3.2 Proposed Abnormal Size Load Delivery Route

The proposed port of entry for the large wind turbine components is the Belview Port in Waterford City. The proposed TDR from Belview Port to the Proposed Wind Farm site is shown in Figure 15-1.

The proposed TDR is as follows;

- From Belview Port the route travels north on the N29 for approximately 4kms before heading west on the N25 for approximately 6 kms.
- The route the turns off the N25 at the Grannagh Roundabout to access the N9 heading west for a further 0.8 kms to the Quarry Roundabout that connects with the M9.
- From the Quarry Roundabout the route heads north on the M9 for approximately 100 kms exiting at Junction 3 onto the N78.
- From this point the route travels west on the N78 for approximately 33kms passing through the town of Athy and the villages of Ballylynan and Crettyard to the junction with the L-1834, where it is proposed that a temporary access road will connect the two roads to facilitate the abnormally sized vehicles,
- From this point the route travels south on the L-1834 for approximately 2kms and a further 5kms as the road links with the L-1835, and finally for a further 3kms on the L-3037 to the location of an existing agricultural access which is the location of the proposed access to the Proposed Wind Farm site.

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 15-2a. The swept path assessment undertaken for these locations is discussed in Section 15.1.9.

15.1.3.3 Proposed Construction Traffic Haul Route

In order to facilitate the construction of the Proposed Project, all concrete, rock and hardcore material that will be required during the construction will be sourced from local, appropriately authorised quarries. The most likely quarries for the supply of concrete and stone are located to the east and south of the Proposed Wind Farm site, such as Kilcarrig Quarries Ltd. an shown on Figure 4-23. 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 north of Leighlinbridge via the N52 shown in Figure 15-2a.

15.1.3.4 Proposed Grid Connection Route

The Proposed Grid Connection Route is a 38kV underground cabling route connecting to the existing Kilkenny 110kV Substation, located in the townland of Scart. The Proposed Grid Connection Route measures approximately 20.1km, of which approximately 2km is located in County Carlow, and 18.1km traversing the road network in County Kilkenny. The Proposed Grid Connection Route and associated traffic related impacts are discussed in Section 15.1.7.

15.1.4 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.

15.1.4.1 Background Traffic Flows

The 4 locations included in the link flow assessment and for which base year 2024 traffic count data was collated are shown in Figure 15-2b. The locations included in the assessment are as follows;

- Link 1 – N78 (from Athy).
- Link 2 – L-1834 south towards site.
- Link 3 – R448 from north of Leighlinbridge.
- Link 4 – L-3037 north towards site.

The traffic counts were derived from all day traffic counts undertaken at the N78 / L-1834 junction and the R448 / L-3037 junction, as indicated in Figure 15-2b to provide 2-way links flows and junction turning count data. The traffic counts were undertaken by Traffinomics Ltd on Tuesday 20th February 2024. All base year traffic count data is included as Appendix 15-1.

The all-day traffic flows observed for the base year 2023 are shown in terms of vehicle numbers in Table 15-4. The figures show that there is a considerable range in existing traffic volumes on the proposed TDR and construction traffic routes, ranging from 7,524 vehicles per day on the R448 north of Leighlinbridge (Link 3) to 838 vehicles per day on the L-1834 just south of the N78 (Link 2) on the proposed TDR.

Table 15-4 All day traffic flows by location, year 2024 (2-way vehicles)

Link	2024
1- N78 from Athy	3,752
2 – L-1834 south towards site	838
3 – R448 from north of Leighlinbridge	7,524
4 - L-3037 north towards site	2,410

15.1.4.2 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 Carlow and factors for the years relevant to this study are shown in Tables 15-5 and 15-6. Based on TII growth rates it is estimated that traffic volumes will increase by 8.3% during the period from 2024, when the base traffic data was collected, and the year 2030, when the construction of the Proposed Project is forecast to be complete. Year 2024 and 2030 all day traffic flows on the study area network are compared in Table 15-7.

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 0.047% by the year 2030 (as shown in Table 15-5 as 1.0047) and the traffic volumes generated by the Proposed Project will remain unchanged regardless of construction year, as presented subsequently in Section 15.2.4. For example, in the event that the construction completion year is 2032 rather than 2030,

background traffic volumes will increase from the base year of 2024 by 9.3% rather that 8.3%, as also shown in Table 15-5.

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 15-8 and range from a minimum of 5.1% observed on L-1884 between the N78 and the proposed site access (Link 2), to a maximum of 9.0% observed on the R448 just to the north of Leighlinbridge (Link 3).

Table 15-5 TII traffic growth forecasts, growth per annum and cumulative, County Carlow

Year	Lights – Annual Factor			Lights – Cumulative Factor		
	Low	Medium	High	Low	Medium	High
2024	1.0116	1.0133	1.0165	1.000	1.000	1.000
2025	1.0116	1.0133	1.0165	1.012	1.013	1.017
2026	1.0116	1.0133	1.0165	1.023	1.027	1.033
2027	1.0116	1.0133	1.0165	1.035	1.040	1.050
2028	1.0116	1.0133	1.0165	1.047	1.054	1.068
2029	1.0116	1.0133	1.0165	1.059	1.068	1.085
2030	1.0116	1.0133	1.0165	1.072	1.083	1.103
2031	1.0027	1.0047	1.0085	1.075	1.088	1.113
2032	1.0027	1.0047	1.0085	1.077	1.093	1.122

Table 15-6 TII traffic growth rates by growth scenario

Period	New Factors		
	Low	Medium	High
2024 - 2030	1.072	1.083	1.103

Table 15-7 All day traffic flows by location and year (2-way vehicles)

Link	2024	2030
1- N78 from Athy	3,752	4,063
2 – L-1834 south towards site	838	908
3 – R448 from north of Leighlinbridge	7,524	8,148
4 - L-3037 north towards site	2,410	2,610

Table 15-8 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- N78 from Athy	4,063	5.6%	228	3,836	546	3,836	4,382
2 – L-1834 south towards site	908	5.1%	46	861	111	861	972
3 – R448 from north of Leighlinbridge	8,148	9.0%	733	7,415	1,760	7,415	9,175
4 - L-3037 north towards site	2,610	5.33%	138	2,472	332	2,472	2,804

TDR Location 1

Belview Port

1

2

3

4

5

6

7

8

N78

L-1834

L-1835

L-30371

L-30372

L-3037

R448

L-2627

L-6657

R712

Proposed Wind Farm

Proposed Grid Route

Kilkenny 110kV Substation

KEY

- EIAR site boundary
- Turbine delivery route
- Alternative route for stone / cement
- Locations for autotrack assessment
- Wind Farm Site Access Junctions

NOTES:

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Figure 15-2a Turbine delivery route assessment locations and access junctions

PROJECT:	Seskin Wind Farm, Co.Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

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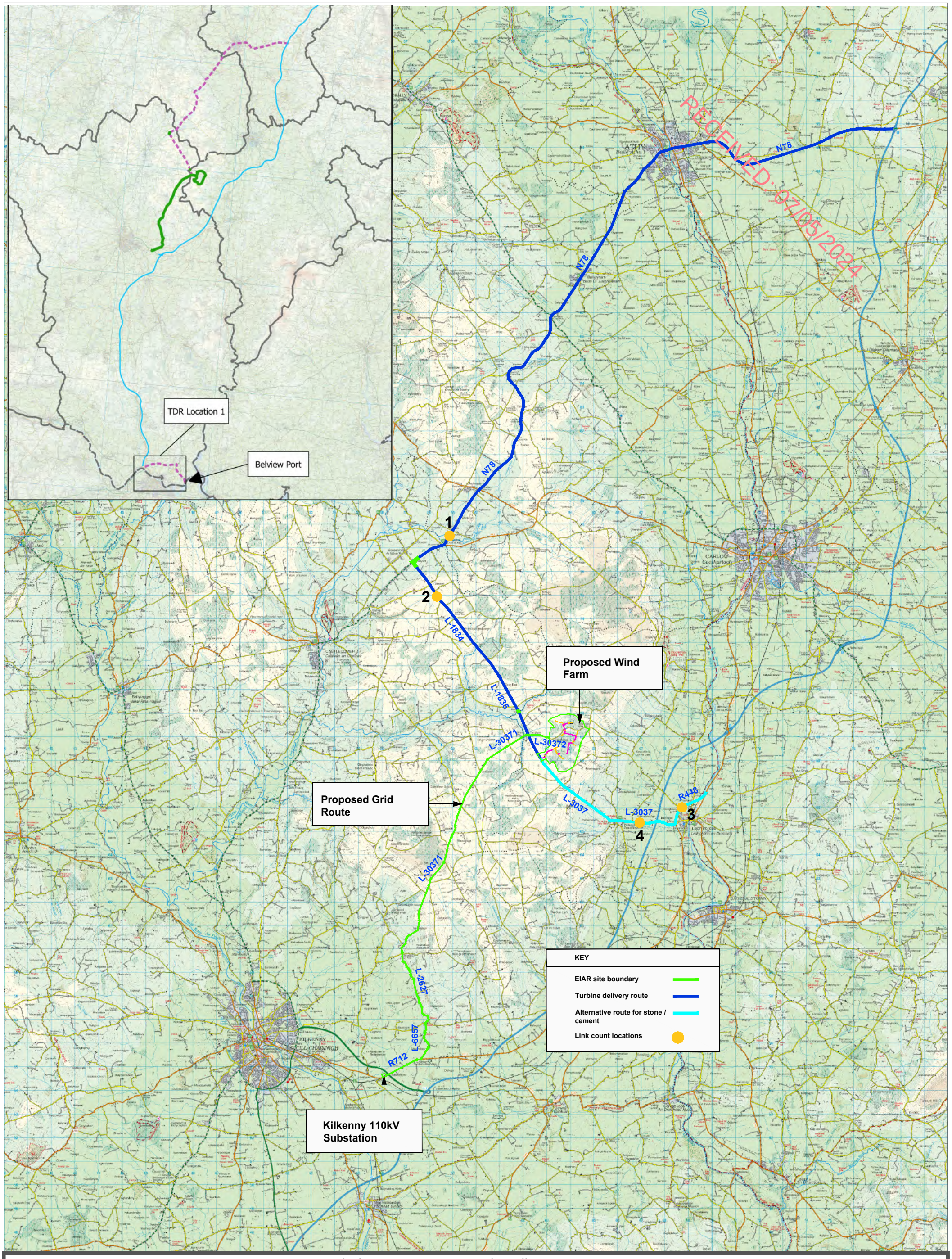

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-2b Link count locations for traffic assessment

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
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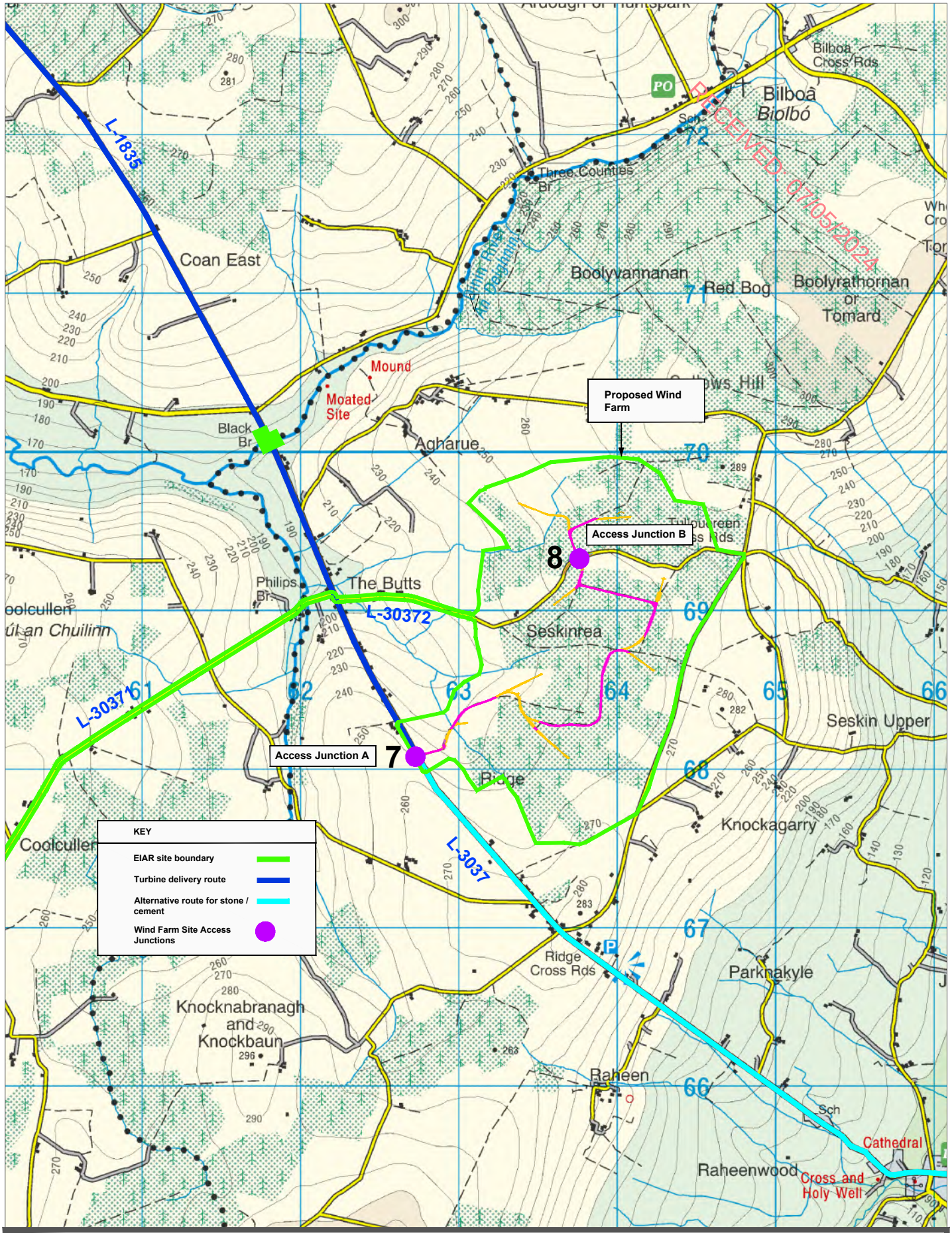


Figure 15-2c Wind farm access junctions

PROJECT:	Seskin Wind Farm, Co. Carlow		ALAN LIPSCOMBE TRAFFIC & TRANSPORT CONSULTANTS
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

15.1.5 Proposed Project and Traffic Generation

15.1.5.1 Proposed Access Junctions

While the design of the junctions that will provide access to the Proposed Wind Farm is discussed in Sections 15.1.9, a summary is provided below.

Temporary access Road between N78 and L-1834 (Location 5)

It is proposed that a temporary access road will be constructed linking the N78 to the L-1834 in order to bypass the existing junction to the southeast, shown as location 5 in Figure 15-2a. The sole purpose of this temporary access road will be to facilitate the delivery of the turbine components only, which will be made during night-time hours accompanied by an escort provided by An Garda Siochana and the haulage company.

Once the construction of the Proposed Wind Farm is complete the temporary road will be closed by means of fencing and the land and existing boundary treatments re-instated. The proposed link will only be re-opened for the replacement of turbine components.

All other traffic generated by the Proposed Wind Farm, including standard HGVs, trucks and construction staff cars will use the existing N78 / L-1834 junction.

Construction and Operational Entrance off the L-3037 (Location 7)

The location of the proposed access junction are shown in Figures 15-2a and 15-2c.

The construction and operational entrance for all traffic generated by the Proposed Wind Farm, including the abnormally sized loads, will be via the proposed access junction off the L-3037 in the townland of Ridge, located approximately 10km south of the L-1834 junction with the N78. This entrance will be established for construction traffic and construction staff access and will be retained during the life of the Proposed Wind Farm for operational phase access. On completion of the construction phase, the site entrance will be gated for security.

Construction and Operational Crossing / Entrance off the L-30372 (Location 8)

It is proposed to provide a crossroads type junction on the L-30372 to serve as a crossing point for all construction traffic crossing from the southern part of the Proposed Wind Farm site (Turbines 3 to 7) to the northern section (to Turbines 1 and 2). The location of the crossing on the L-30372 is an existing forestry track providing access to the northern part of the site and is located approximately 1.7kms east of the junction with the L-3037. During the construction phase the junction will provide for construction vehicles crossing the L-30372 only. There will be no construction traffic permitted to access the site via the L-30372 at the proposed junction. Once operational it is proposed that occasional maintenance car and light goods vehicle (LGV) trips will be permitted to access the northern and southern parts of the site via the L-30372. Again, on completion of the construction phase, the site entrances will be gated for security.

15.1.5.3 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, 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 CEMP, included as Appendix 4-4 of this EIAR, which will be agreed, where required, with the relevant Local Authorities.

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 15-8. It is estimated that a total of 9,764 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 Table 15-8 between materials delivered for the construction of the Proposed Wind Farm and materials delivered for the construction of the Proposed Grid Connection Route, as discussed further below.

15.1.5.3.1 *Stage 1 – Site Preparation and Groundworks*

For assessment purposes, this stage of the Proposed Project construction, which includes the groundworks, construction of temporary construction compounds, turbine foundations, met mast foundations, onsite 38kV substation, Battery Energy Storage System (BESS), internal electrical cabling and construction of the Proposed Grid Connection Route is estimated to last approximately 11 months (357 days), during which a total of 9,764 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 15-10 and 15-11. 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 15-10. 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 126 PCUs, as set out in Table 15-11. The construction of the of the Proposed Grid Connection Route is discussed further in Section 15.1.7 of the EIAR.

Table 15-99 Trip generation - Stage 1 - Site preparation and groundworks – 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	190	Large artic
Crane (to lift steel)	1	Large artic
Stone for Proposed Wind Farm	5,040	Trucks
All materials for Proposed Grid Connection Route	2,814	Large artic
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	9,764	

Table 15-10 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

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2- way PCUs/day
* Estimation based on 7 concrete pouring days						

Table 15-11 Trip generation - Stage 1 – Site preparation and groundworks – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
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	190	Large artic	2.4	456.0	1.30	2.61
Crane (to lift steel)	1	Large artic	2.4	2.4	0.01	0.01
Stone for Proposed Wind Farm	5,040	Trucks	2.4	12,096.0	34.56	69.12
All materials for Proposed Grid Connection Route	2,814	Large artic	2.4	6,753.6	19.30	38.59
Substation and mast	120	Large artic	2.4	288.0	0.82	1.65

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
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	9,204			22,089.6	63.11	126.20

15.1.5.3.2 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 15-12, 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 15-12 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
Base and other deliveries	7	2	14	1	14	Large Artic

Material	Units	Quantity per Unit	Total Quantity	Quantity per Truck	Total Truck Loads	Truck type
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 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 15-13 and 15-14. In Table 15-13 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 15-14, during the turbine construction phase.

Table 15-13 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 15-14 Trip generation - Stage 2 - Wind turbine plant, standard artic HGVs - total movements and volumes per delivery day Farm

Material	Quantity per Unit	PCU Value	2-way PCUs / day
Transformer	1	2.4	4.8
Drive train and blade hub	1	2.4	4.8
Base & other deliveries	2	2.4	9.6
Total	4		19.2

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

15.1.5.4 Development Trip Generation – During Operation

It is estimated that the Proposed Project 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 15.1.6.3.

15.1.5.5 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.

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

15.1.7 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 for the Proposed Project 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, with the geometry of each shown in Figures 15-3 for the blade transporter and 15-4 for the tower transporter.

The key dimensions are as follows:

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

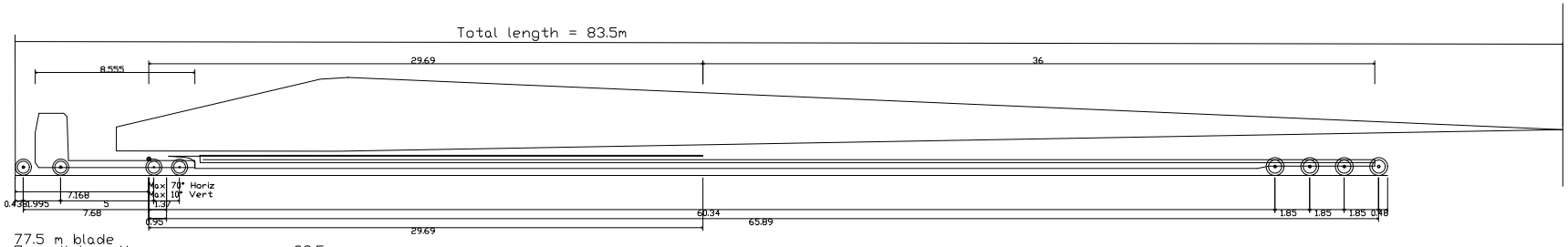
Total length	83.5 m
Length of blade	77.5 m

Transport of Tower – Using low-bed or drop deck trailers (See Figure 15-4)

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 proposed access junction off the L3037.



77.5 m blade

Overall Length	83.5m
Overall Width	2.550m
Overall Body Height	4.800m
Min Body Ground Clearance	0.375m
Track Width	2.500m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	9.800m

NOTES:

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FIGURE 15-3 Design blade extended artic profile

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

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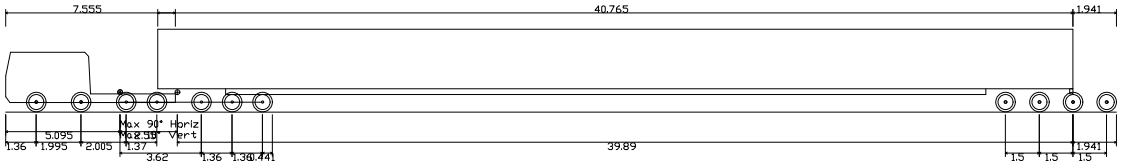

Tower	
Overall Length	49.476m
Overall Width	2.550m
Overall Body Height	3.695m
Min Body Ground Clearance	0.427m
Max Track Width	2.520m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

FIGURE 15-4 Design tower extended artic profile

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

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15.1.8 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 have been assumed to do so from the same single direction. The assessment is therefore based on a precautionary scenario, where all traffic generated by the Proposed Project travels to/from the Proposed Wind Farm site on the same route with the maximum increase in traffic volumes assessed on each link shown in Figure 15-2b.

15.1.8.1 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 15.1.3.1 and shown in Tables 15-15 to 15-18, 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 15-19 to 15-22. 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, if approaching the Proposed Wind Farm site from the north, it is forecast that the increase in traffic volumes will range from +10.4% on the N78 eastern arm from the direction of Athy (Link 1), to +46.7% on the L-1834 between the N78 and the Proposed Wind Farm site access (Link 2). If approaching from the south it is forecast that traffic flows on the R448 just north of Leighlinbridge (Link 3) will increase by 4.9% and on the L-3037 travelling towards the Proposed Wind Farm site access (Link 4) by 16.2%.

During Stage 1 – Site Preparation and Groundworks

For 350 days when the general construction and groundworks are undertaken an additional 196 PCUs will travel to/from the Proposed Project.

On these days it is forecast that the increase in traffic volumes will range from +4.5% on the N78 eastern arm from the direction of Athy (Link 1), to +20.2% on the L-1834 between the N78 and the Proposed Wind Farm site access (Link 2) if accessing the Proposed Wind Farm from the north. If approaching from the south it is forecast that traffic flows on the R448 just north of Leighlinbridge (Link 3) will increase by 2.1% and on the L-3037 travelling towards the Proposed Wind Farm site access (Link 4) by 7.0%

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 +2.4% on the N78 eastern arm from the direction of Athy (Link 1), to +10.8% on the L-1834 between the N78 and the Proposed Wind Farm site access (Link 2). These deliveries will access the Proposed Wind Farm site from the north via the proposed TDR so there is no southern access option considered for these deliveries.

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 +1.5% on the N78 eastern arm from the direction of Athy (Link 1), to +6.6% on the L-1834 between the N78 and the Proposed Wind Farm site access (Link 2). Again, these deliveries will access the Proposed Wind Farm site from the north via the proposed TDR so there is no southern access option considered for these deliveries.

Table 15-15 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- N78 from Athy	3,836	546	4,382	70	384	454	3,906	930	4,836
2 – L-1834 south towards site	861	111	972	70	384	454	931	495	1,426
3 – R448 from north of Leighlinbridge	7,415	1,760	9,175	70	384	454	7,485	2,144	9,629
4 - L-3037 north towards site	2,472	332	2,804	70	384	454	2,542	716	3,258

Table 15-16 Daily Traffic volumes during site preparation and groundworks – 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- N78 from Athy	3,836	546	4,382	70	126	196	3,906	672	4,578
2 – L-1834 south towards site	861	111	972	70	126	196	931	237	1,168

Link	Background PCUs			Proposed Wind Farm PCUs			Total PCUs (Background + Proposed Wind Farm)		
3 – R448 from north of Leighlinbridge	7,415	1,760	9,175	70	126	196	7,485	1,886	9,371
4 - L-3037 north towards site	2,472	332	2,804	70	126	196	2,542	458	3,000

Table 15-17 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- N78 from Athy	3,836	546	4,382	45	60	105	3,881	606	4,487
2 – L-1834 south towards site	861	111	972	45	60	105	906	171	1,077
3 – R448 from north of Leighlinbridge	7,415	1,760	9,175	45	60	105	7,460	1,820	9,280
4 - L-3037 north towards site	2,472	332	2,804	45	60	105	2,517	392	2,909

Table 15-18 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- N78 from Athy	3,836	546	4,382	45	19	64	3,881	565	4,446
2 – L-1834 south towards site	861	111	972	45	19	64	906	130	1,036
3 – R448 from north of Leighlinbridge	7,415	1,760	9,175	45	19	64	7,460	1,779	9,239
4 - L-3037 north towards site	2,472	332	2,804	45	19	64	2,517	351	2,868

Table 15-19 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- N78 from Athy	4,382	454	4,836	10.4%	7
2 – L-1834 south towards site	972	454	1,426	46.7%	7
3 – R448 from north of Leighlinbridge	9,175	454	9,629	4.9%	7
4 - L-3037 north towards site	2,804	454	3,258	16.2%	7

Table 15-20 Summary daily effect of Proposed Wind Farm traffic – site preparation and ground works - % increase and number of days

Link	Background	Proposed Wind Farm	Total	% increase	Estimated No. of days
1- N78 from Athy	4,382	196	4,578	4.5%	350
2 – L-1834 south towards site	972	196	1,168	20.2%	350
3 – R448 from north of Leighlinbridge	9,175	196	9,371	2.1%	350
4 - L-3037 north towards site	2,804	196	3,000	7.0%	350

Table 15-21 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- N78 from Athy	4,382	105	4,487	2.4%	19
2 – L-1834 south towards site	972	105	1,077	10.8%	19
3 – R448 from north of Leighlinbridge	9,175	105	9,280	1.1%	19
4 - L-3037 north towards site	2,804	105	2,909	3.7%	19

Table 15-22 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- N78 from Athy	4,382	64	4,446	1.5%	7
2 – L-1834 south towards site	972	64	1,036	6.6%	7
3 – R448 from north of Leighlinbridge	9,175	64	9,239	0.7%	7
4 - L-3037 north towards site	2,804	64	2,868	2.3%	7

15.1.8.2 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 15-23 to 15-25 with the capacity of the links on the route options, as shown in Table 15-23, varying from 11,600 vehicles per day on the N78 (Link 1) and R448 (Link 3), down to 5,000 vehicles per day for local L-1834 (Link 2) and L-3037 (Link 4) leading to the Proposed Wind Farm site. Capacities are based on road types and widths as set out in the TII Standards document DN-GEO-03031 Road Link Design, Table 6/1.

It is noted that the link capacities adopted from the TII guidelines correspond to a Level of Service D, which the guidelines describe as being the level where:

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

Background traffic flows are compared to flows forecast for the various construction delivery stages, in Table 15-24, with the percentage capacity reached for each stage shown in Table 15-25.

Based on this assessment, it is forecast that all links are forecast to operate below capacity for all construction day scenarios in the construction year of 2030. The busiest link is forecast to be the R448 (Link 3) which is estimated to operate at 79% of capacity without the additional traffic forecast to be generated by the Proposed Project. For this road it is forecast that during the 7 foundation pouring days the level of capacity will increase to 83% (or 4% points above base) before reducing to a maximum of 81% capacity (or 2% points above base).

Table 15-23 Delivery route link type and link capacity (at Level of Service D)

Link	Link type	Link capacity (Level of Service D)
1- N78 from Athy	Type 1 single	11,600
2 – L-1834 south towards site	Type 3 single	5,000
	Type 1 single	11,600

Link	Link type	Link capacity (Level of Service D)
3 – R448 from north of Leighlinbridge		
4 - L-3037 north towards site	Type 3 single	5,000

Table 15-24 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 and Groundworks	Turbine plant	Turbine equipment
1- N78 from Athy	11,600	4,382	4,836	4,578	4,487	4,446
2 – L-1834 south towards site	5,000	972	1,426	1,168	1,077	1,036
3 – R448 from north of Leighlinbridge	11,600	9,175	9,629	9,371	9,280	9,239
4 - L-3037 north towards site	5,000	2,804	3,258	3,000	2,909	2,868

Table 15-25 Delivery route link capacity and % of link capacity by construction delivery stage, year 2024

Link	Link capacity (Level of Service D)	Construction delivery stage				
		Background traffic	Concrete pour	Site Preparation and Groundworks	Turbine plant	Turbine equipment
1- N78 from Athy	11,600	38%	42%	39%	39%	38%
2 – L-1834 south towards site	5,000	19%	29%	23%	22%	21%

3 – R448 from north of Leighlinbridge	11,600	79%	83%	81%	80%	80%
4 - L-3037 north towards site	5,000	56%	65%	60%	58%	57%

15.1.8.3 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.

15.1.8.4 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 development 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.

With reference to the forecast impact on the link flows of the Proposed Project during the various construction phases as set out in Section 15.1.6.1 and Tables 15-19 to 15-21, it is forecast that the N78 from Athy (Link 1) is forecast to increase by 10.4% during the 7 days that concrete foundations will be poured, reducing to a maximum of 4.5% for the remainder of the construction period. For the L-1834 just to the south of the N78 (Link 2) it is forecast that traffic flows will increase by 46.7% during the 7 days that concrete foundations are poured, reducing to a maximum of 20.2% for the remainder of the Proposed Wind Farm site preparation and groundworks construction period. Based on the above forecast increase on the L-1834 arm the N78 / L-1834 / L-5872 junction is included in the junction capacity tests discussed below.

While the L-3037 approaching the Proposed Wind Farm site from the south (Link 4) is forecast to increase by 16.2% during then 7 concrete pouring days, it is forecast that flows will increase by a maximum of +7.0% 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 L-3037 / R448 junction.

As the Proposed Wind Farm site access junction is a new junction on the network and the point at which all construction traffic will access and egress the Proposed Wind Farm site, this location was also included in the junction capacity assessment set out below.

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.

15.1.8.4.1 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.

15.1.8.4.2 N78 / L-1834 / L-5872 Junction Capacity Test Results

The AM and PM peak hour traffic flows at the N78 / L-1834 / L-5872 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 15-26 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 2.4% to 6.7% for the right turn from the N78 onto the L-1834 during the AM peak hour, and from 9.3% to 18.0% for the exit from the L-1834 onto the N78 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 15-26 Junction capacity test results, N78 / L-1834 / L-5872 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-1834	12.6%	0.14	0.16	12.8%	0.15	0.16
	From L-5872	7.3%	0.08	0.16	7.4%	0.08	0.16
	Right turn from N78 west	2.4%	0.03	0.09	6.7%	0.11	0.10
	Right turn from N78 east	1.0%	0.01	0.09	1.0%	0.01	0.09
PM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From L-1834	9.3%	0.10	0.16	18.0%	0.22	0.17
	From L-5872	9.8%	0.11	0.16	9.9%	0.11	0.16
	Right turn from N78 west	4.3%	0.06	0.10	4.3%	0.06	0.10

Period	Location	Without construction traffic			With construction traffic		
	Right turn from N78 east	3.6%	0.05	0.09	3.6%	0.05	0.09

15.1.8.4.3 L-3037 / Site Access Junction Capacity Test Results

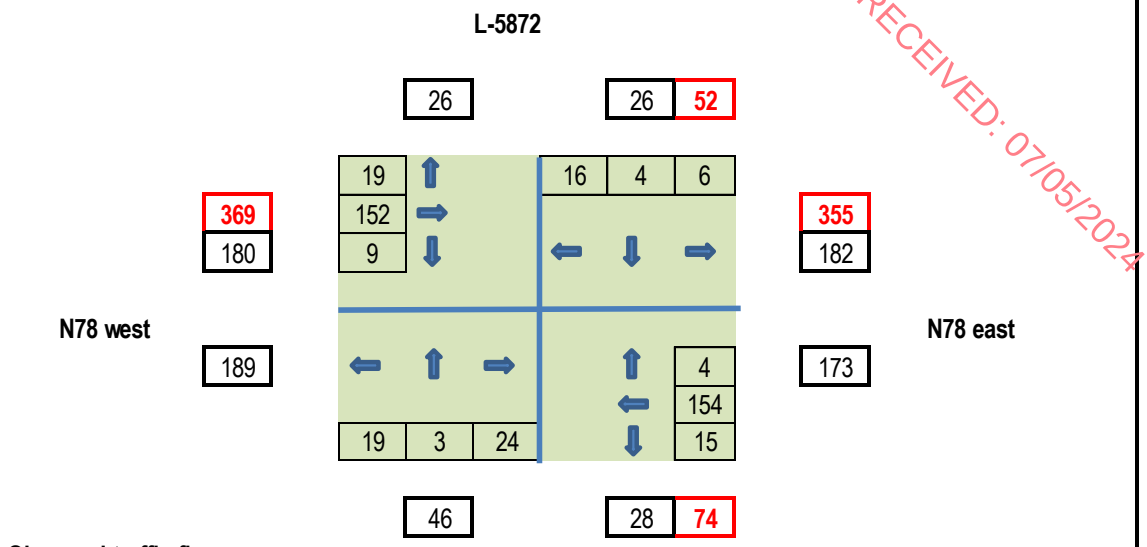
Peak hour traffic flows at the L-3037 / Site access junction L-5872 junction are shown for the base year 2024 and the proposed construction year of 2030 in Figures 15-6a and 15-6b, with the traffic movements generated by construction workers shown in Figure 15-6c and with proposed construction year 2030 traffic flows shown in Figure 15-6d. For this junction there are no test results for the no development scenario. The results of the capacity tests for the Proposed Wind Farm site access junction are shown in Table 15-27 and show that the traffic movements generated by construction staff turning right into the site from the L-3037 will result in a ratio of flow to capacity (RFC) of 3.9%. Similarly, during the PM peak hour it is forecast that the staff car trips leaving the site will result in a maximum RFC of 4.2% for trip turning right out of the Proposed Wind Farm site. The assessment shows that the Proposed Wind Farm site access junction is also forecast to operate well within the acceptable limit of 85%.

Table 15-27 Junction capacity test results, L-3037 / Site access junction, AM and PM peak hours, with construction traffic, year 2030.

Period	Location	With construction traffic		
AM		RFC	Queue (vehicles)	Delay (minutes)
	Right turn from site access	0.0%	0.00	0.00
	Left turn from site access	0.0%	0.00	0.00
	Right turn into site access	3.9%	0.05	0.11
PM		RFC	Queue (vehicles)	Delay (minutes)
	Right turn from site access	4.2%	0.04	0.13
	Left turn from site access	3.0%	0.03	0.10
	Right turn into site access	0.0%	0.00	0.00

15.1.8.4.4 Effect on Junctions – During Operation

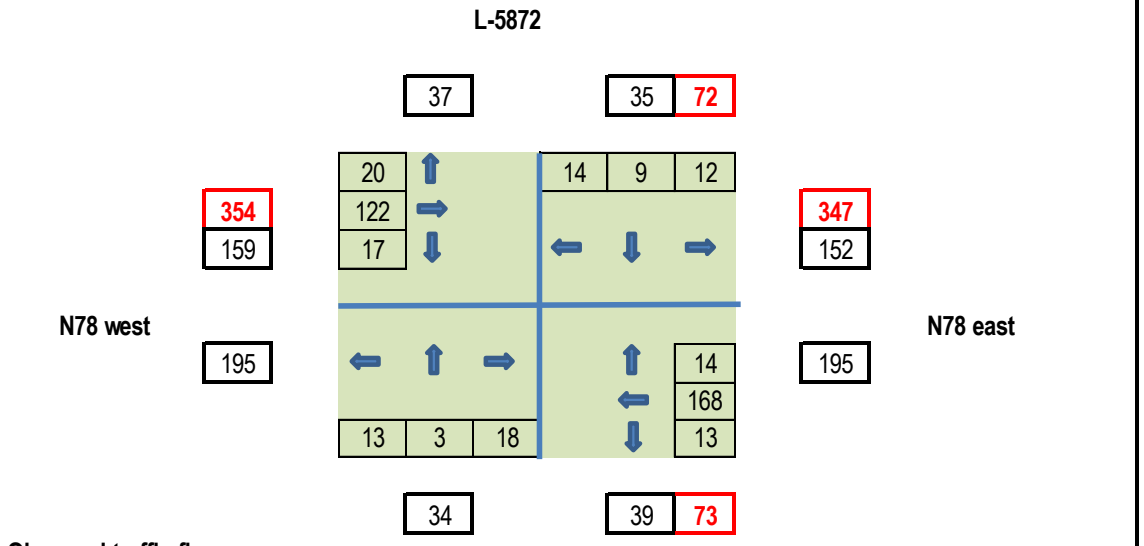
As discussed in Section 15.1.4.3 it is forecast that once operational, the Proposed Wind Farm is expected to generate 1 to 2 trips per day for maintenance purposes. It is therefore concluded that the Proposed Wind Farm will have an imperceptible effect on the local network once constructed.



Observed traffic flows
Tuesday 20th February 2024
AM peak hour (08:00 - 09:00)
All flows in pcus

L-1834 to site

N78 / L-1834 junction



Observed traffic flows
Tuesday 20th February 2024
PM peak hour (16:00 - 17:00)
All flows in pcus

L-1834 to site

N78 / L-1834 junction

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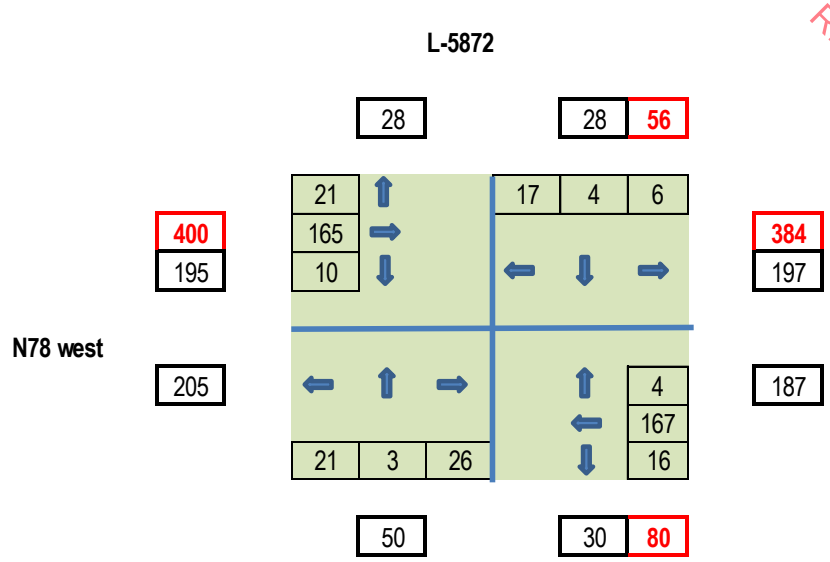
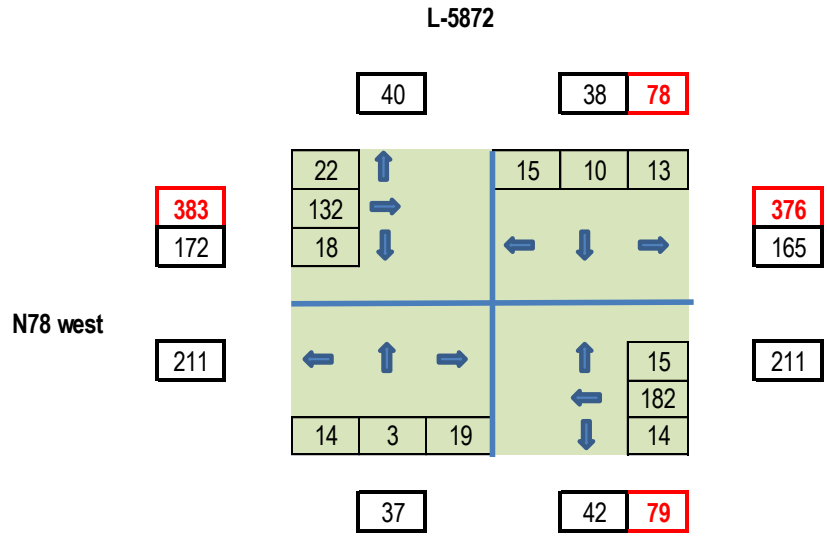
Figure 15-5a Observed traffic flows, N78 / L-1834 junction
Year 2024 - pcus



Forecast background traffic flows
Year 2030
AM peak hour (08:00 to 09:00)
All flows in pcus

L-1834 to site

N78 / L-1834 junction



Forecast background traffic flows
Year 2030
PM peak hour (17:00 to 18:00)
All flows in pcus

L-1834 to site

N78 / L-1834 junction

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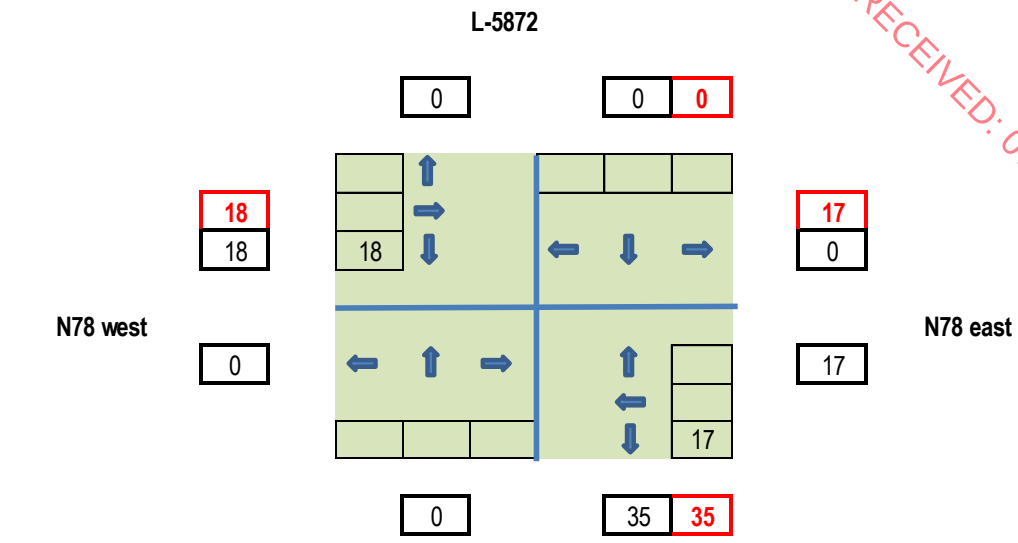
Figure 15-5b Background traffic flows, N78 / L-1834 junction
Year 2030 - pcus



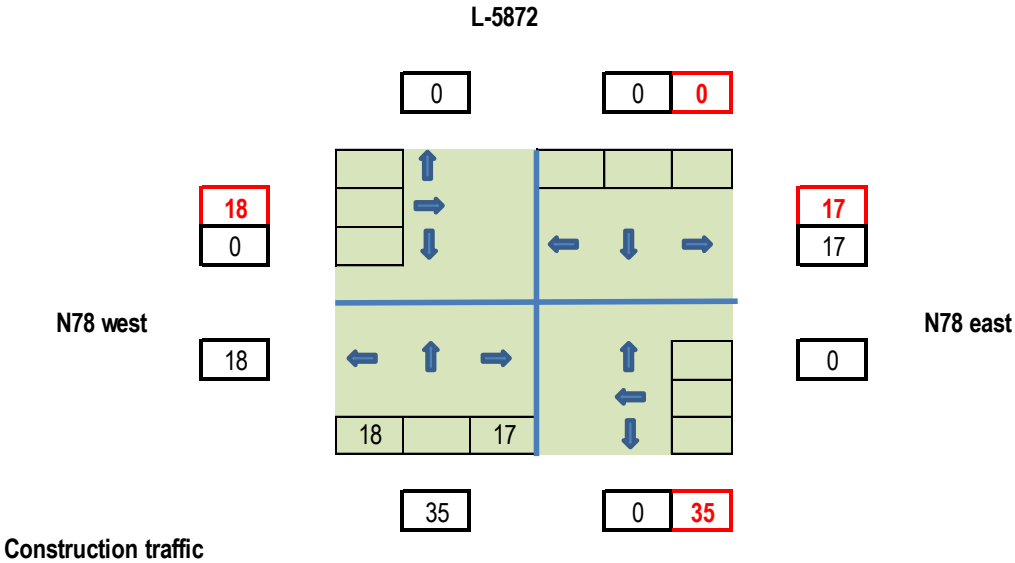


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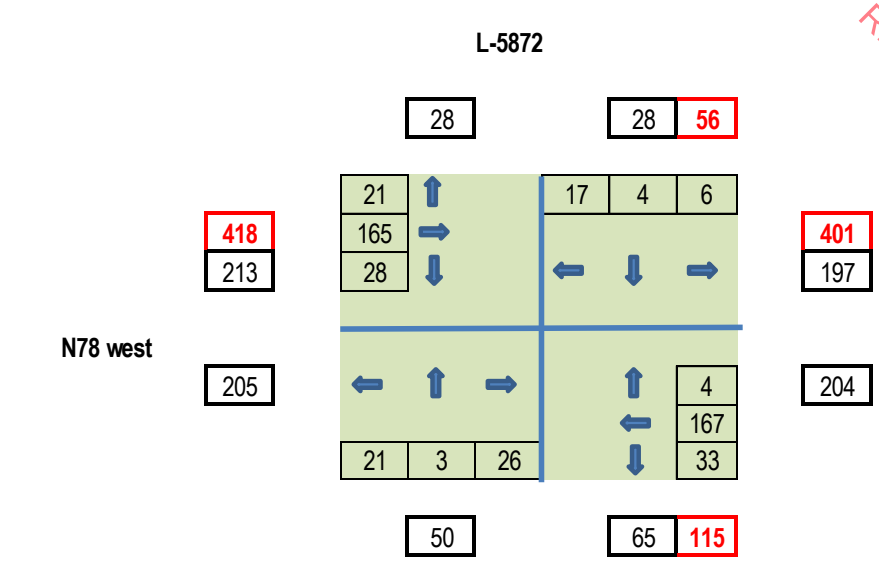
Figure 15-5c Construction traffic flows, N78 / L-1834 junction

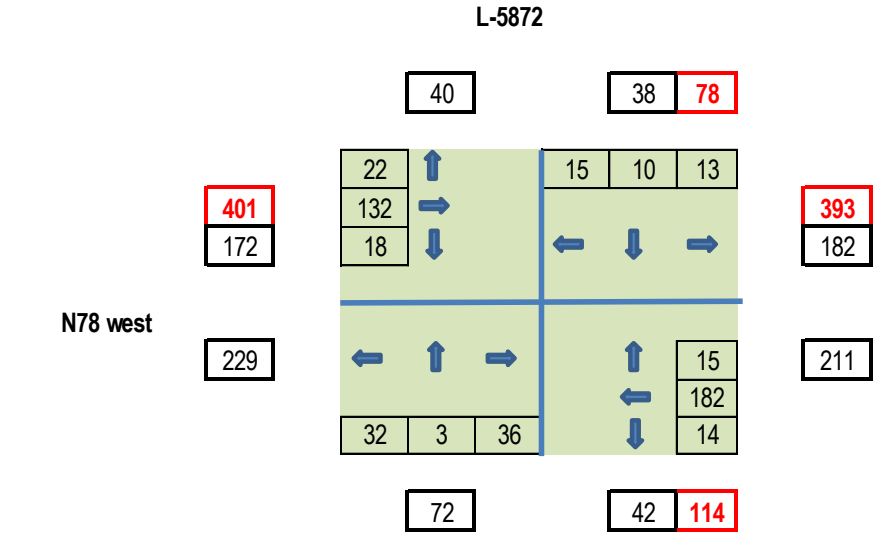
pcus



With construction traffic flows
Year 2030
AM peak hour (08:00 to 09:00)
All flows in pcus

L-1834 to site

N78 / L-1834 junction



With construction traffic flows
Year 2030
PM peak hour (16:00 to 17:00)
All flows in pcus

L-1834 to site

N78 / L-1834 junction

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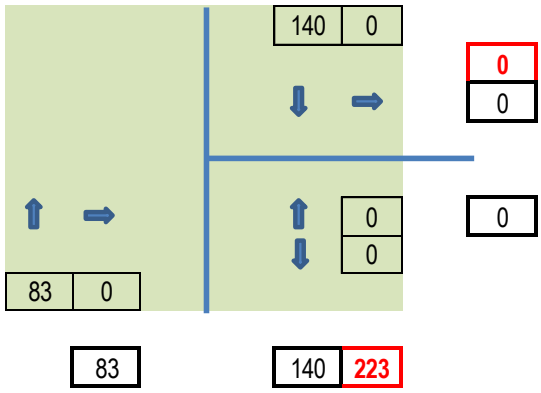
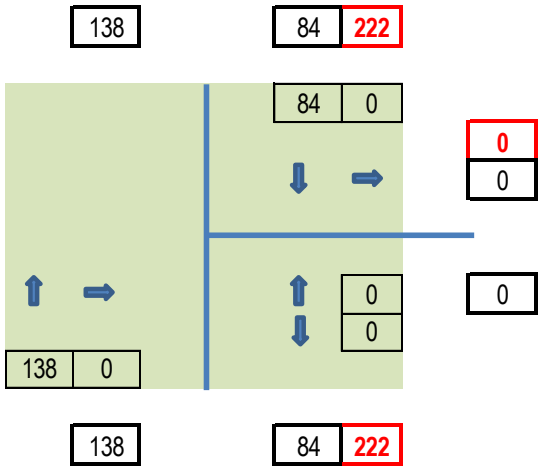
Figure 15-5d With construction traffic flows, N78 / L-1834 junction
Year 2030 - pcus



Observed traffic flows
Tuesday 20th February 2024
AM peak hour (08:00 - 09:00)
All flows in pcus

L-3037 / site access junction



Observed traffic flows
Tuesday 20th February 2024
PM peak hour (16:00 - 17:00)
All flows in pcus

L-3037 / site access junction

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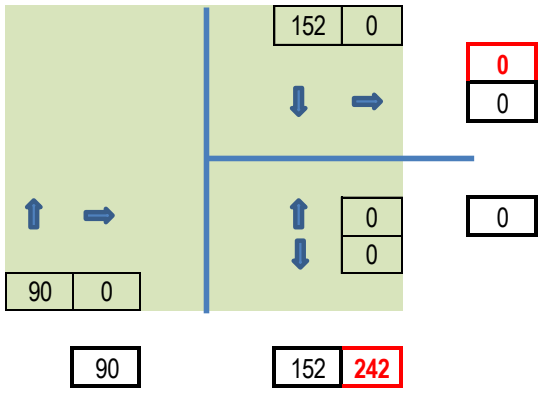
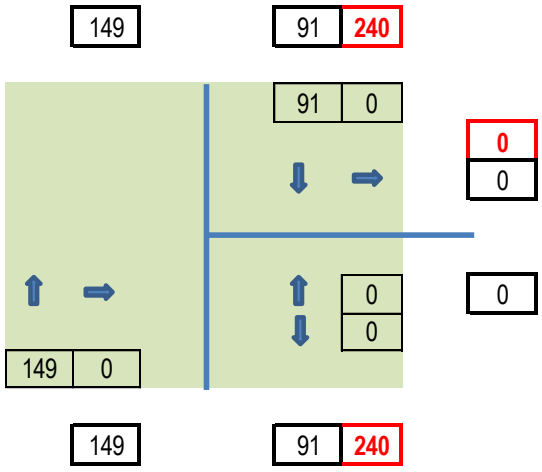
Figure 15-6a Observed traffic flows, L-3037 / site access junction
Year 2024 - pcus



Forecast background traffic flows
Year 2030
AM peak hour (08:00 to 09:00)
All flows in pcus

L-3037 south

L-3037 / site access junction



Forecast background traffic flows
Year 2030
PM peak hour (17:00 to 18:00)
All flows in pcus

L-3037 south

L-3037 / site access junction

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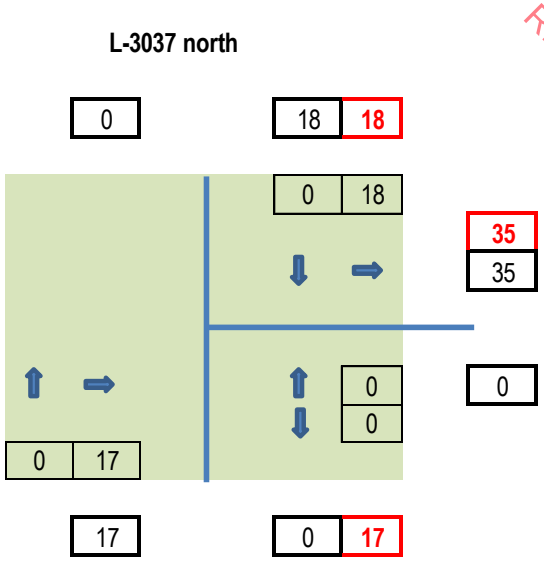
Figure 15-6b Background traffic flows, L-3037 / site access junction
Year 2030 - pcus



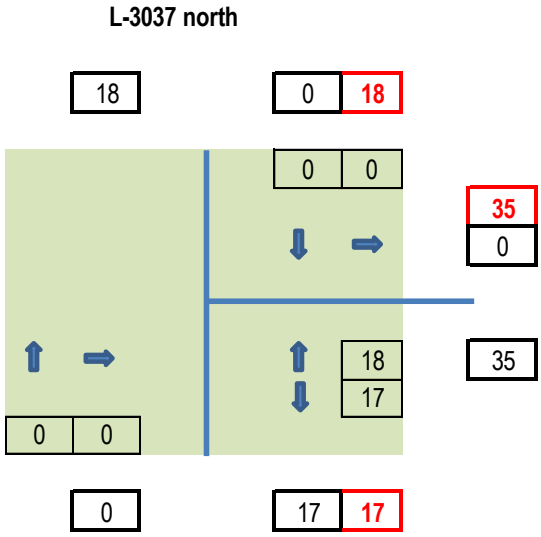


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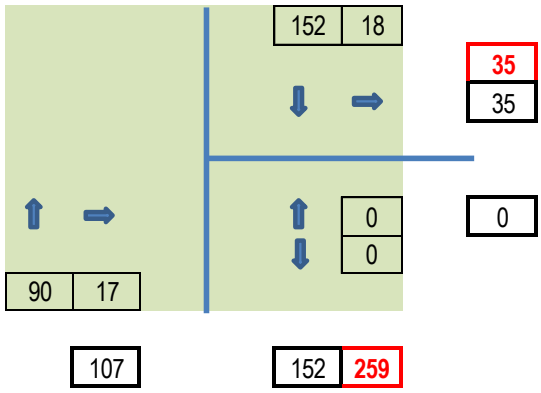
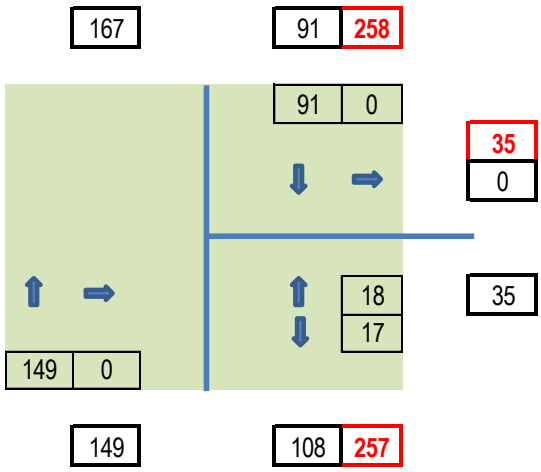
Figure 15-6c Construction traffic flows, L-3037 / site access junction

pcus



With construction traffic flows
Year 2030
AM peak hour (08:00 to 09:00)
All flows in pcus

L-3037 / site access junction



With construction traffic flows
Year 2030
PM peak hour (16:00 to 17:00)
All flows in pcus

L-3037 / site access junction

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Figure 15-6d With construction traffic flows, L-3037 / site access junction
Year 2030 - pcus

15.1.9 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 38kV onsite substation is connected by means of a 20.1km in length underground 38kV electricity cable to the existing Kilkenny 110kV substation.

The total length of the Proposed Grid Connection Route located in Co. Carlow measures approximately 2km, 1.8km of which is located within the public road corridor, and 0.2km of which is located within private lands originating from the onsite 38kV substation before meeting the local public road in the townland of Seskinrea. The total length of the underground electrical cabling route located in Co. Kilkenny measures approximately 18.1km and is entirely located within the public road corridor.

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 Proposed Grid Connection Route and the onsite 38kV substation will be delivered to the Proposed Wind Farm site via the Proposed Wind Farm site access junction off the L-3037 and the R712 at the southwestern eastern end of 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 7 sections, as indicated in Figure 15-7a and summarised in Tables 15-28 and 15-29.

Section 1 – R712 (length 1.6 kms) – The Proposed Grid Connection Route commences at the existing Kilkenny 110kV substation and continues east on the R712 for approximately 1.6kms to link into the L-61461. This section of the carriageway has sufficient width for the construction of the Proposed Grid Connection Route to take place while operating a "stop-go" arrangement in order to retain 2-way traffic flow on the regional road. This section of the Proposed Grid Connection Route will take approximately 16 days to construct. While this section of the Proposed Grid Connection Route is on a section of the R712 that passes underneath the N10 National Road, there will be no traffic related impacts on the national road during construction.

Section 2 – L6657 / L2627 (length 5.0 kms) – This section of the Proposed Grid Connection Route heads north on the local road network for approximately 5.0 kms. During the 54 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 15-7b, which will result in a diversion of +4.0kms.

Section 3 – L30371 (length 3.9 kms) – The Proposed Grid Connection Route then travels north on the L30371 for approximately 3.9kms. During the 45 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 15-7c, which will result in a diversion of +1.8kms.

Sections 4 & 5– L30371 (lengths 3.7 kms and 4.1kms) – The Proposed Grid Connection Route continues on the L30371 for both of these sections with the construction taking 41 and 43 days for Sections 4 & 5 respectively. Diversion routes for Sections 4 & 5 are shown in Figures 15-7d and 15-7e with local diversions of +9.0kms and +6.4kms respectively.

Section 6 – L3037 (length 0.1 kms) – For the short section of the Proposed Grid Connection Route that travels on and crosses the L3037 there is sufficient carriageway width for the construction of the Proposed Grid Connection Route to take place while operating a "stop-go" arrangement in order to retain 2-way traffic flow on the local road. This section of the Proposed Grid Connection Route will take approximately 3 days to construct.

Section 7 – L30372 (length 1.7 kms) – The final section of the Proposed Grid Connection Route heads east on the L30372 for approximately 1.7kms before heading south into the Proposed Wind Farm site and the connection with the on-site 38kV substation. During the estimated 19 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 15-7f, which will result in a diversion of +4.7kms.

Table 15-28 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)	No Water crossings	Water crossing construction days (2 days / crossing)	Total construction days
Section 1 – R712	1.6	16	0	0	16
Section 2 – L6657 / L2627	5.0	50	2	4	54
Section 3 – L30371	3.9	39	3	6	45
Section 4 – L30371	3.7	37	2	4	41
Section 5 – L30371	4.1	41	1	2	43
Section 6 – L3037	0.1	01	1	2	3
Section 7 – L30372	1.7	17	1	2	19
Total	20.1	201	10	20	221

Table 15-29 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)
Section 1 – R712	Stop & go	1.6	N/A	N/A
Section 2 – L6657/L2627	Closure with diversion	5.0	9.0	4.0
Section 3 – L30371	Closure with diversion	3.9	5.7	1.8
Section 4 – L30371	Closure with diversion	3.7	12.7	9.0
Section 5 – L30371	Closure with diversion	4.1	10.5	6.4
Section 6 – L3037	Stop & go	0.1	N/A	N/A

Proposed Grid Connection Route Section	Traffic management	Length (kms)	Diversion route length (kms)	Increase in trip length (kms)
Section 7 – L30372	Closure with diversion	1.7	6.4	4.7
Total		20.1		

In summary, it is estimated that the Proposed Grid Connection Route will take a total of approximately 221 days to construct during which a road closure will be required at one point on the network on approximately 202 of these days. The diversions incurred will be a maximum of 9km and a minimum of 1.8 km. It is noted that the diversions will be incurred by very few trips, as the L6657, L2627, L30371 and L30372 are all lightly trafficked. For a further 16 days a 'stop & go' facility will be operated on the R712, and on for a further 3 days on the L3037.

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 **Traffic Management Plan**, 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.

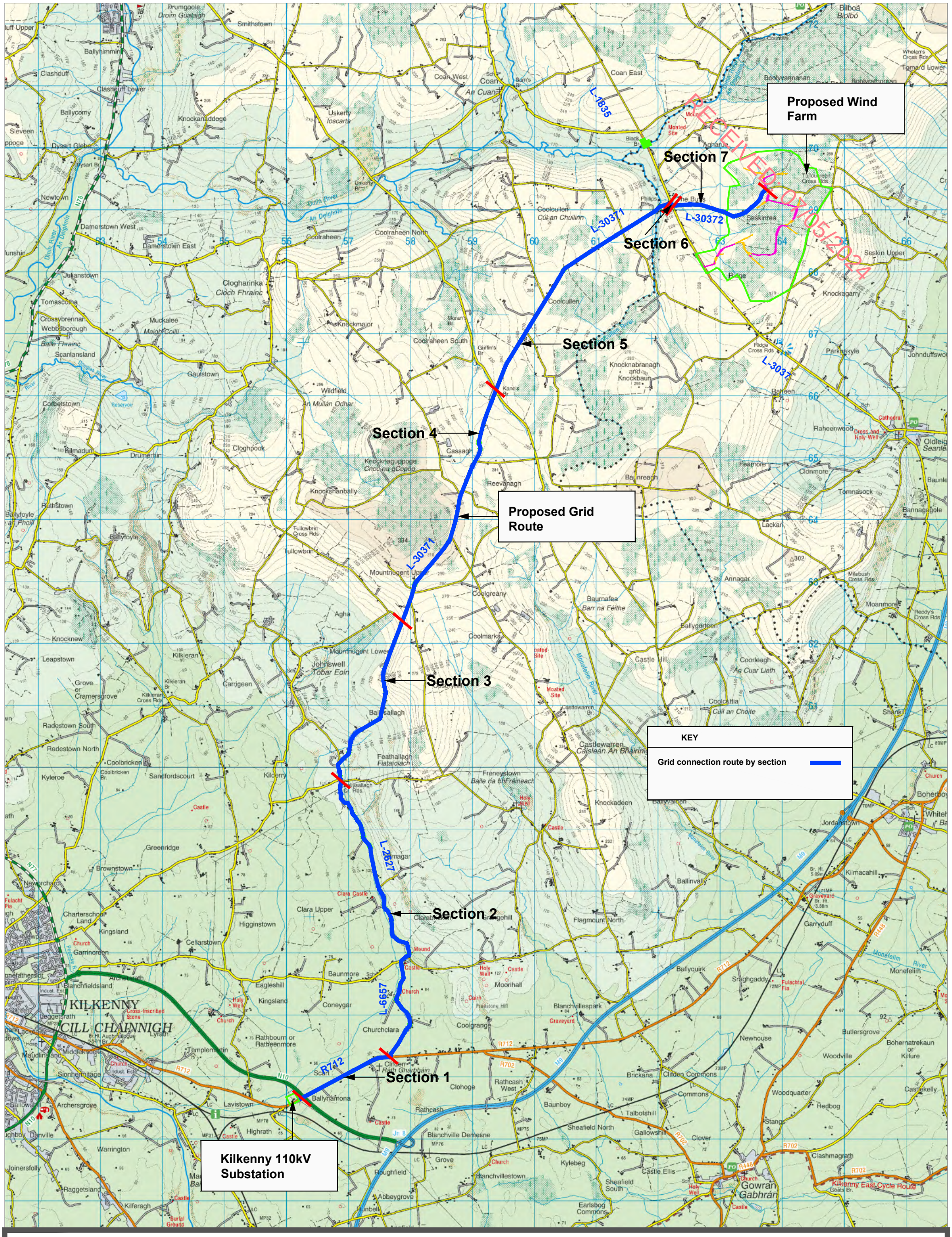

Figure 15-7a Proposed grid connection route

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

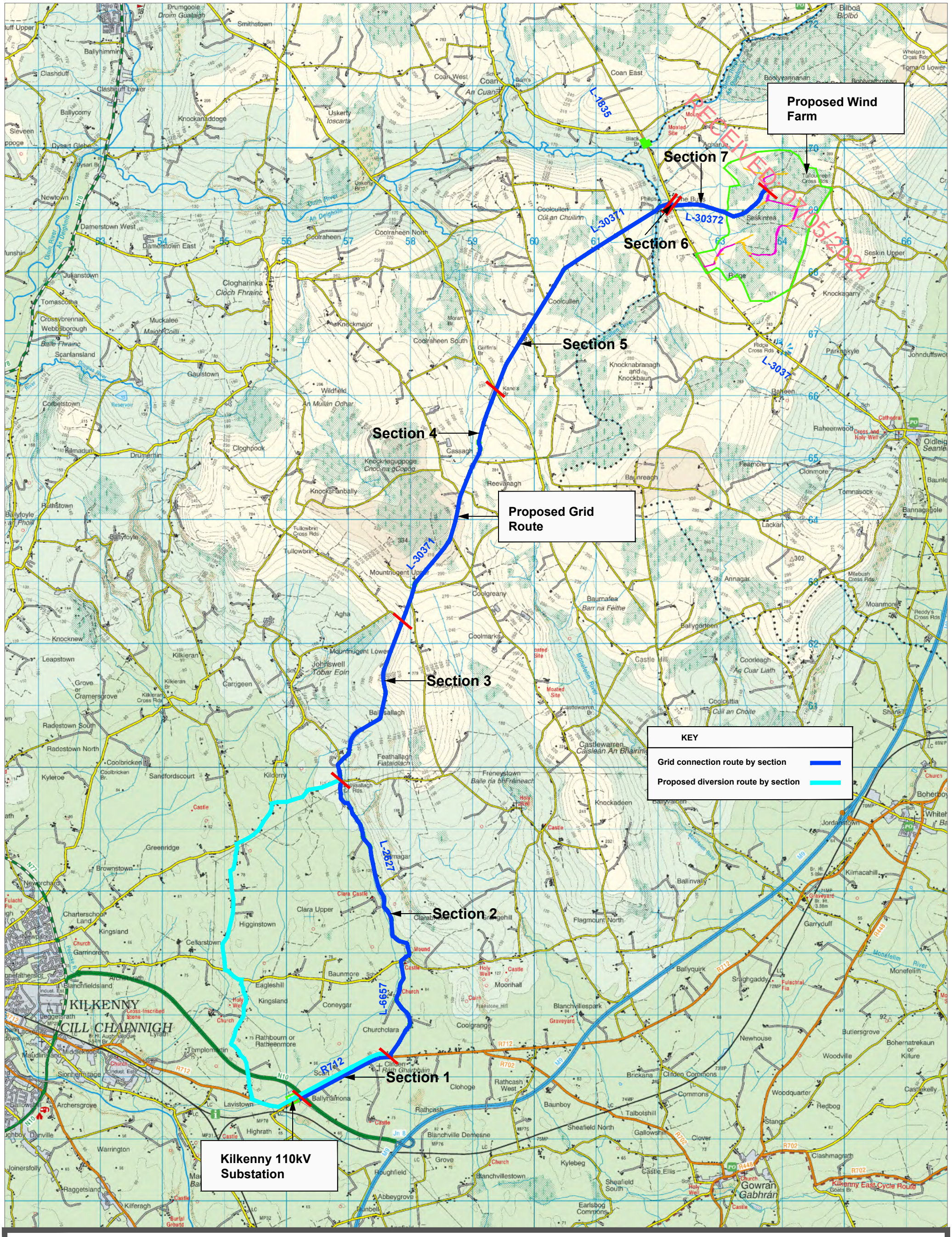

Figure 15-7b Proposed grid connection route - Diversion for Section 2

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
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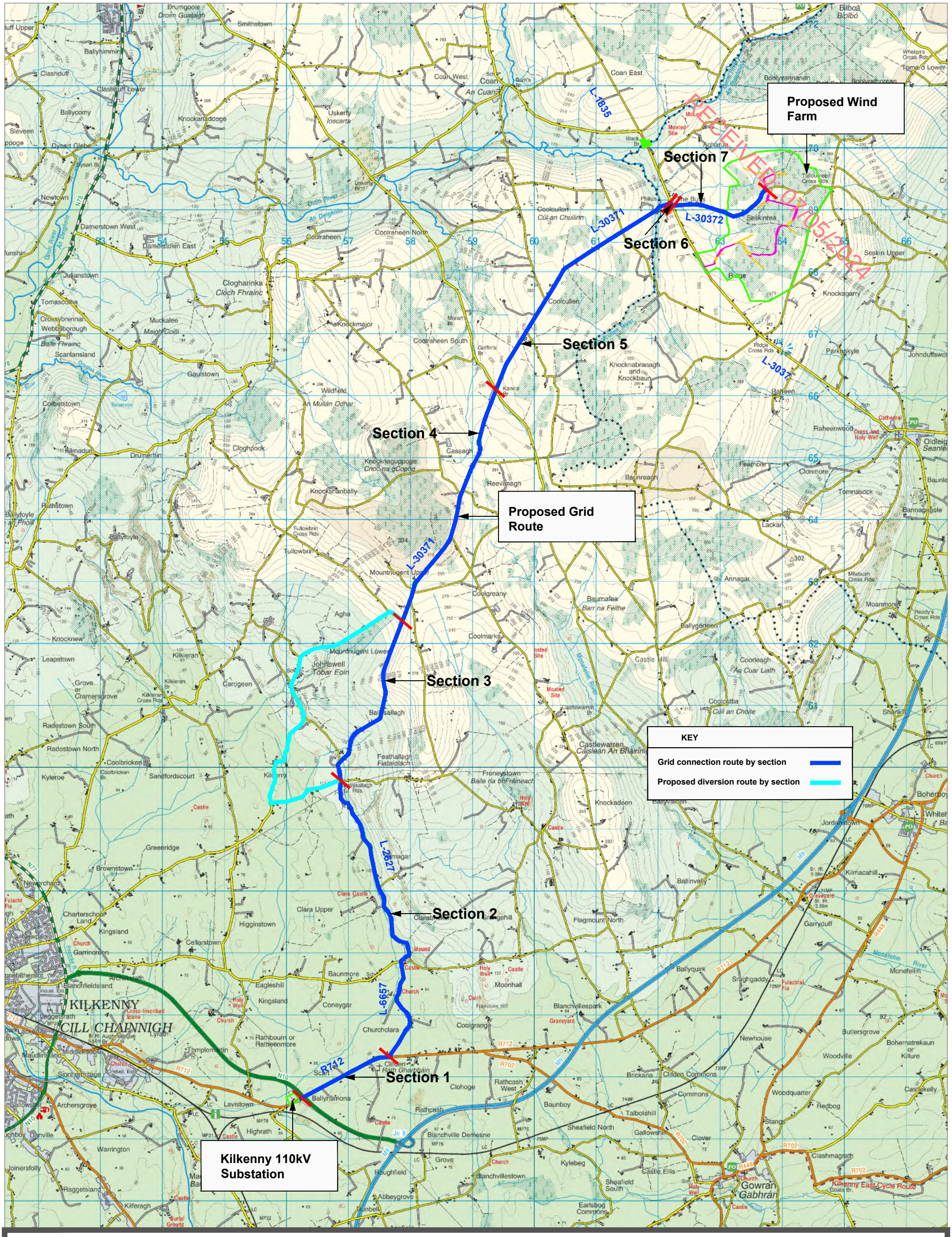

Figure 15-7c Proposed grid connection route - Diversion for Section 3

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

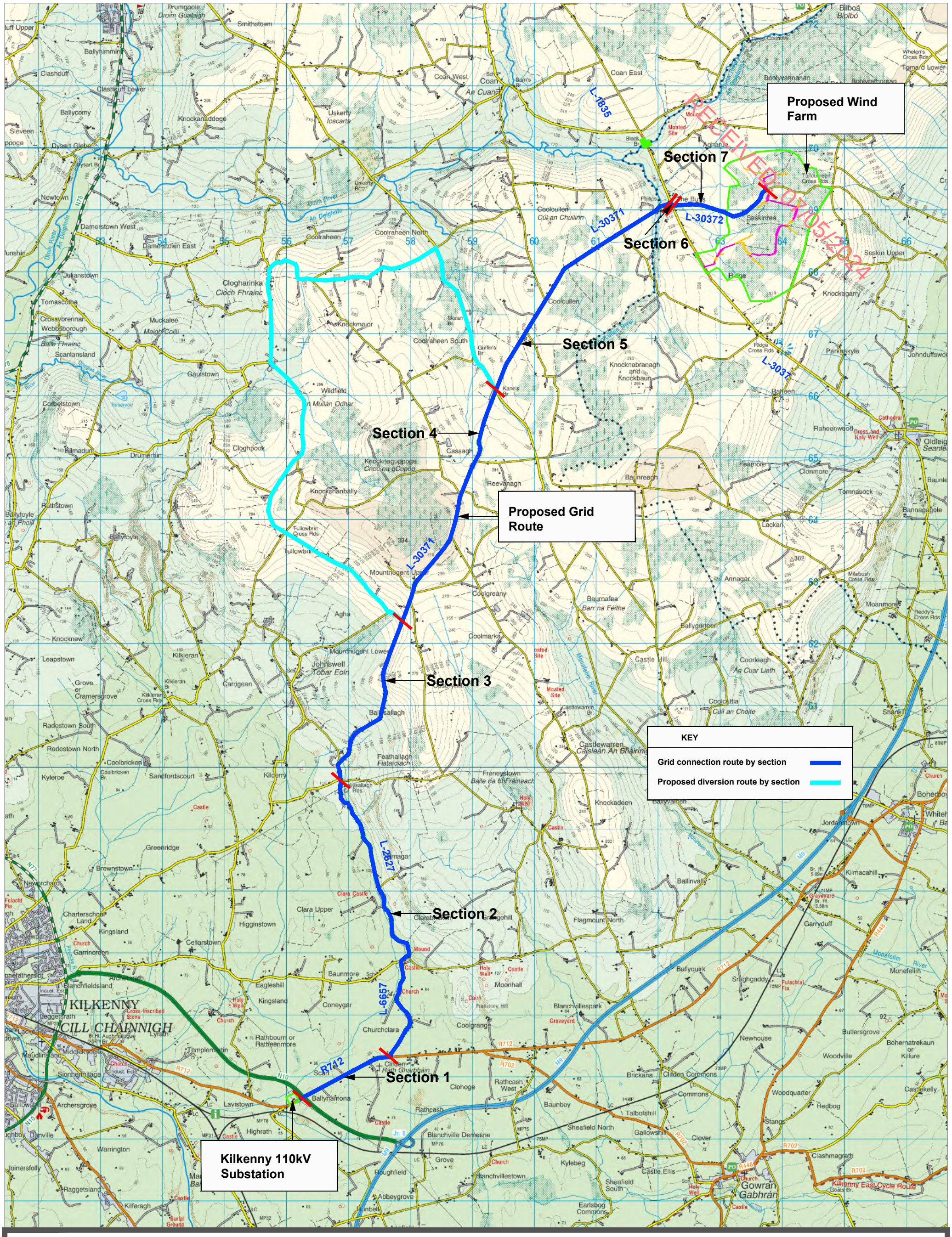

Figure 15-7d Proposed grid connection route - Diversion for Section 4

PROJECT:	Seskin Wind Farm, Co.Carlow		ALAN LIPSCOMBE TRAFFIC & TRANSPORT CONSULTANTS
CLIENT:	EDF Renewables Ireland Ltd	SCALE: NTS	
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY: AL	

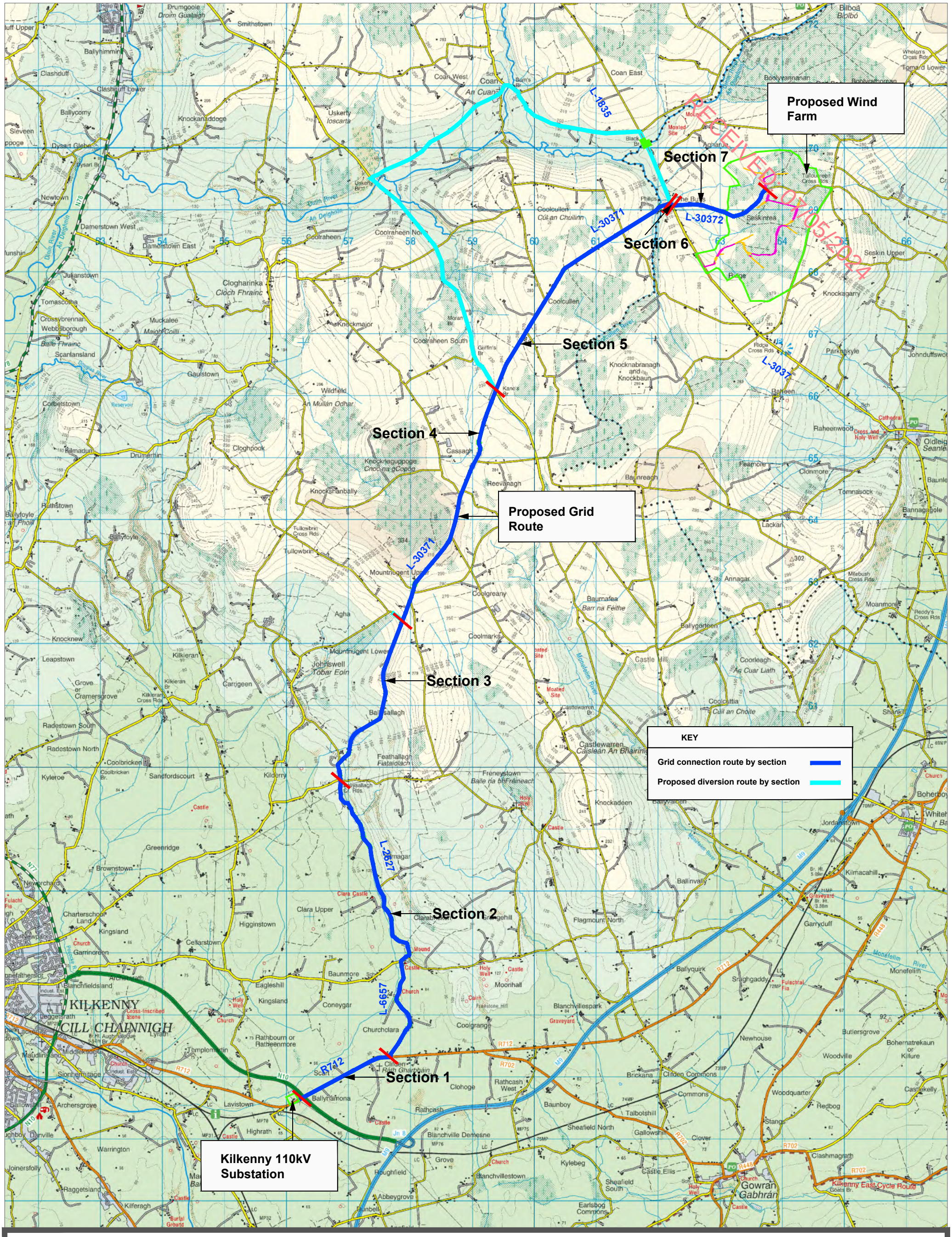

Figure 15-7e Proposed grid connection route - Diversion for Sections 5

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

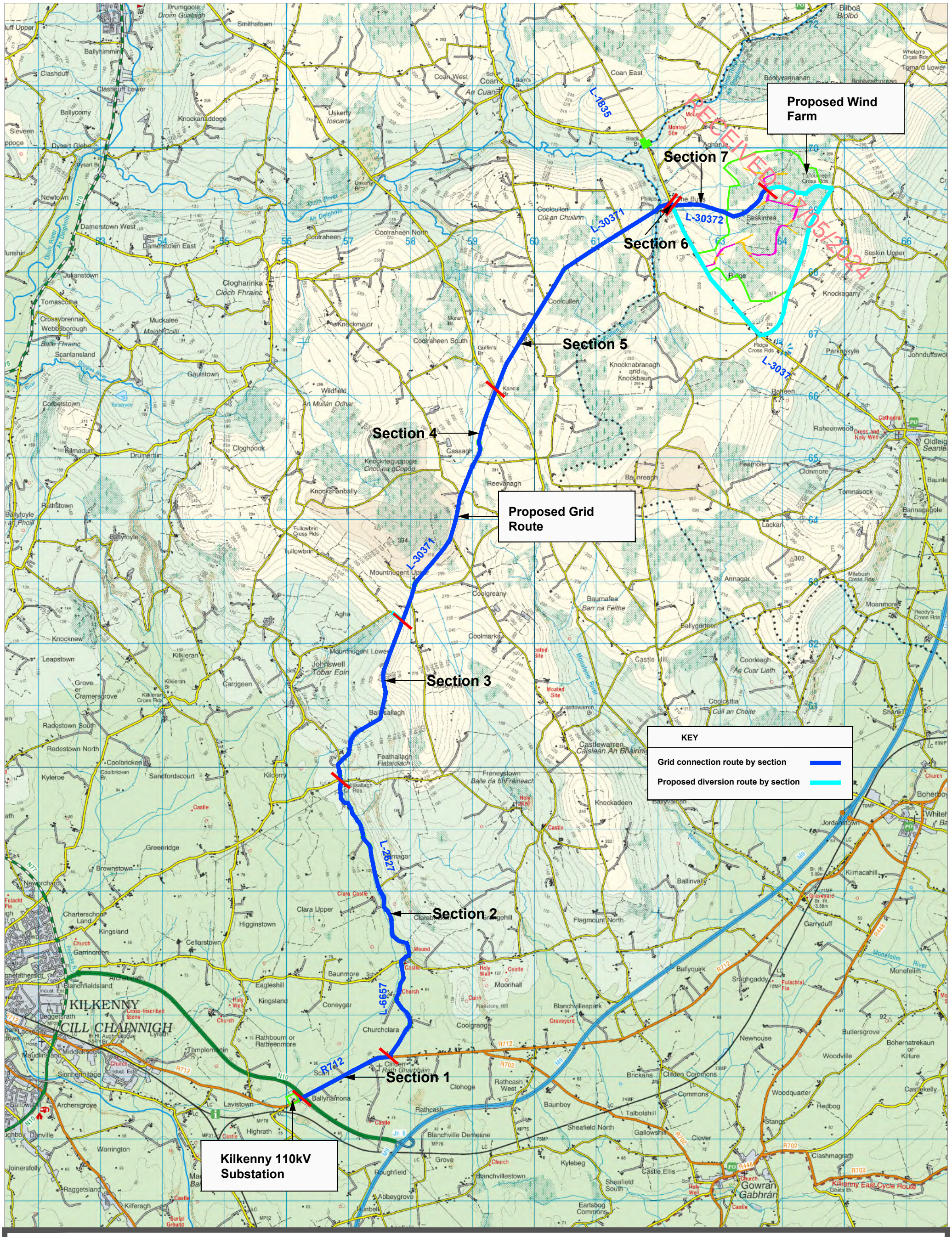

Figure 15-7f Proposed grid connection route - Diversion for Section 7

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	NTS
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

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TRAFFIC & TRANSPORT CONSULTANTS

15.1.10 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 Construction and Environmental Management Plan (CEMP), Appendix 4-4 of this EIAR and the Traffic Management Plan, Appendix 15-2 of this EIAR.

15.1.11 Abnormal Load Route Assessment

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

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 in Waterford (Belview Port) via the N29, N25, N9, and the M9 out of Waterford. Belview Port is the proposed point of arrival for the large turbine components for the Proposed Wind Farm. The port is a well-established point of arrival for wind turbine components of similar scale into the State on a regular basis, as is the road network between the port and the national road network.

The turbines will travel 96km north along the M9 before exiting onto the N78. The turbines will travel east along the N78 for approximately 11km before passing through the town of Athy, Co. Kildare. After exiting Athy, the turbines will turn south and continue along the N78 for a further 22km before exiting onto the L1834. After approximately 2km on the L1834, the turbines will continue straight onto the L1835 for approximately 5km, before entering the townland of Ridge in Co. Carlow onto the L3037. The turbines will continue straight on the L3037 for approximately 2km before turning left into the Proposed Project site entrance. This route was therefore selected as the transport route for the abnormal loads. All locations along the route referred to in this section are highlighted in Figure 15-2a. 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 4 are included in Appendix 15-3 and are summarised below.

The locations discussed are as follows;

- TDR Section 1 – Port of Waterford to the M9
  - **Location 1a** (Appendix 15-3 – Figure 1a) – Exit from Belview Port onto N29
  - **Location 1b** (Appendix 15-3 – Figure 1b) – N29/R711 Roundabout
  - **Location 1c** (Appendix 15-3 – Figure 1c) – N29/N25 Roundabout
  - **Location 1d** (Appendix 15-3 – Figure 1d) – N25/N9 Roundabout
  - **Location 1e** (Appendix 15-3 – Figure 1e) – N9/M9 Roundabout
- **Location 2** (Appendix 15-3 - Dwg No. 371609-10B0.1) – M9 Junction 3 left slip / N78 Roundabout
- **Location 3** (Appendix 15-3 - Dwg No. 371609-20B1.1) - N78/R418 Roundabout
- **Location 4** (Appendix 15-3 - Dwg No. 371609-60B1.1) – N78 Right Bend in Crettyard
- **Location 5** (Figure 15-8 to 15-10) - N78/L1834 Junction
- **Location 6** (Figure 4-26 in Chapter 4 of this EIAR, and in Appendix 15-3) Black Bridge on the L1835/L3037
- **Location 7** (Figure 15-11 to 15-15) - Access Junction A - Proposed access junction on the L-3037 for all traffic during construction and operation of Proposed Project
- **Location 8** – (Figure 15-16 to 15-19) Access Junction B – Proposed crossing and access junctions on the L-30372

TDR Section 1 – Port of Waterford to the M9

The preliminary swept path analysis was undertaken for the section of the proposed TDR between Belview Port to the east of Waterford City and the M9 motorway. These locations are shown in Figure 15-2a and are as follows:

Location 1a – Exit from Belview Port onto N29

Appendix 15-3 – Figure 1a

The swept path analysis undertaken for the port exit onto the N29 shows that the turning requirements of the 77.5m blade transporter will be accommodated at this location.

Location 1b – N29 / R711 roundabout

Appendix 15-3 – Figure 1b

The swept path analysis undertaken at the N29 / R711 roundabout shows that the turning requirements of the 77.5m blade transporter will be accommodated at this location with the vehicles negotiating the roundabout contraflow, which will be undertaken with an escort provided by An Garda Siochana.

Location 1c – N29 / N25 roundabout

Appendix 15-3 – Figure 1c

The assessment shows that the left tuning movement from the N29 onto the N25 will be accommodated at this roundabout. It is noted that the blade will require to overhang the southwest corner of the roundabout.

Location 1d – N25 / N9 roundabout

Appendix 15-3 – Figure 1d

The assessment shows that the large 77.5m blade transporter may access the N9 from the N25 via the westbound off ramp from the N25 with the vehicle circulating the roundabout in the standard clockwise direction. For this route the assessment indicates that a modest temporary over-run area will be required at the southern edge of the roundabout.

Location 1e – N9 / M9 roundabout

Appendix 15-3 – Figure 1e

The swept path analysis undertaken at the N9 / M9 roundabout shows that the 77.5m blade transporter will be accommodated at this location with the vehicles negotiating the roundabout contraflow accompanied by a Garda escort.

Location 2 – M9 Junction 3 left slip / N78 Roundabout

Appendix 15-3 – Collett Drawing No. 371609-10B0.1

The swept path analysis indicates that minor temporary alterations will be required to the existing streetscape, including a temporary over-run area on the southwest segment of the roundabout centre island and the southern and western splitter islands during the delivery of the abnormally sized loads.

Location 3 – N78/R418 Roundabout

Appendix 15-3 – Collett Drawing No. 371609-20B1.1

The swept path analysis indicates that minor temporary alterations will be required to the existing streetscape, roadside vegetation and roundabout island. The assessment shows that a temporary route through the island will be required during the delivery of the abnormally sized loads.

Location 4 – N78 Right Bend in Crettyard

Appendix 15-3 – Collett Drawing No. 371609-60B1.1

The preliminary swept path analysis indicates that minor temporary alterations will be required to the existing streetscape, and roadside vegetation during the delivery of the abnormally sized loads.

Location 5 – N78/ L1834 Junction

It is proposed that a temporary access road will be constructed linking the N78 to the L-1834 in order to bypass the existing junction to the southeast. The sole purpose of this temporary access road will be to facilitate the delivery of the turbine components only, which will be made during night-time hours accompanied by an escort provided by An Garda Siochana and the haulage company.

Once the construction of the Proposed Project is complete the temporary road will be closed by means of fencing and the land and existing boundary treatments re-instated. The proposed link will only be re-opened for the replacement of turbine components.

All other traffic generated by the Proposed Project, including standard HGVs, trucks and construction staff cars will use the existing N78 / L-1834 junction.

The area of land that is available for the proposed temporary access is shown in Figure 15-8 with the Autotrack assessments undertaken for the blade and tower extended artics included as Figures 15-9 and 15-10 respectively. The figures show that the turning requirements of both vehicles will be accommodated within the confines of the land available.

It is noted that while there are no junction designs or visibility splays required at the access junction off the N78, or at the exit from the L-1834, as all deliveries will be accompanied by a Garda escort, traffic management measures will be put in place during the construction of the accommodation works. It is

proposed that the accommodation works will be constructed via the L-1834 in order to ensure that there are no impacts to the operation of the N78 National Secondary Road.

The temporary link road along the N78/L1834 junction is part of the planning application being made to the Kilkenny County Council and is assessed as part of this EIAR.

While there are no permanent measures proposed at this location and the impacts on the N78 will be minimal, as set out above a TII DN-GEO-03030 Design Report has been prepared for this element of the Proposed Project, which is included as Appendix 15-4 of this EIAR and has been uploaded to the TII Departures Portal.

Location 6 – Black Bridge on the L1835/L3037

Appendix 15-3 – Jennings O'Donovan & Partners Ltd Drawing No. S100-1

While there is no swept path analysis undertaken at this location it is noted that there are carriageway strengthening works proposed on the Black Bridge as part the planning application being made to Carlow County Council and Kilkenny County Council, with these works assessed as part of this EIAR. The proposed works are set out Section 4.8.9 and illustrated in Figure 4-26 of this EIAR.

Location 7 – Access Junction A – Proposed access junction on the L-3037 for all traffic during construction and operation of Proposed Development

Upgrades to an existing junction will provide access to the Proposed Wind Farm site from the L-3037 for all vehicle types. The nature and extent of the proposed works at this location are described in Chapter 4 - Description of the Proposed Project.

The proposed junction on the L-3037 will provide access to the Proposed Wind Farm for all traffic during the construction phase, including abnormally sized loads, standard HGV deliveries and construction staff. When the Proposed Project is operational, the junction will provide for all maintenance trips.

The junction design includes 13m junction radii and 1:10 tapers in accordance with TII Junction Design Guidelines (TII DN-GEO-03060) for junctions with HGV turning movements. The junction design also includes a temporary run-over area required to accommodate the abnormally sized loads. The proposed junction design is shown in Figure 15-11.

The designated speed limit of the L-3037 in the proximity of the Proposed Wind Farm site access junction is 80 km/h. Visibility splay requirements are set out in the current Carlow County Development Plan 2022 – 2028, with splays of 2.5m x 90m required on a local road with an 80 km/h design speed. The visibility splays that will be provided are in accordance with requirements and are shown in Figure 15-12.

The Autotrack assessments undertaken for the blade and tower extended artics are included as Figures 15-13 and 15-14 respectively. The figures show that the turning requirements of both vehicles will be accommodated within the confines of the land available. An Autotrack of a large articulated HGV is included as Figure 15-15, which demonstrates that Proposed Wind Farm site access junction will accommodate all standard delivery vehicles.

Location 8 – Access Junction B - Proposed crossing and access junctions on the L-30372

It is proposed to provide a crossroads type junction on the L-30372 to serve as a crossing point for all construction traffic crossing from the southern part of the Proposed Wind Farm (Turbines 3 to 7) to the northern section (to Turbines 1 and 2), with the proposed design shown in Figure 15-16. The location of the crossing on the L-30372 is an existing forestry track provide access to the northern part of the

Proposed Wind Farm site and is approximately 1.7kms east of the junction with the L-3037. During the construction phase the junction will provide for construction vehicles crossing the L-30372 only. There will be no construction traffic permitted to access the Proposed Wind Farm site via the L-30372 at the proposed junction. Once operational it is proposed that the occasional maintenance car and LGV trip will be permitted to access the northern and southern parts of the Proposed Wind Farm site via the L-30372. Again, on completion of the construction phase, the Proposed Wind Farm site entrances will be gated for security.

Visibility splays that will be kept clear during the construction and operational stages of the Proposed Wind Farm are shown in Figure 15-17. Splays of 50m at a setback of 2.5m will be provided which is appropriate for a 42 km/h operational speed.

The Autotrack assessment shown in Figures 15-18 and 15-20 demonstrate that the proposed junction will accommodate the blade and tower extended artics crossing the L-30372, and Figure 15-20 shows that the junction will provide for the occasional HGV trip turning off the L-30372 into the northern and southern parts of the Proposed Wind Farm site during the operation stage.

The proposed accesses off the L-30372 will be gated and closed at all times with the exception of when it is in use during the construction and operational stages of the Proposed Wind Farm.

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-8 Location 5 - N78 / L-1834, proposed temporary access road for abnormally sized loads during construction phase

PROJECT:	Seskin Wind Farm, Co.Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

N78

L-1834

Area to be surfaced for the duration of the turbine delivery phase.

N78 / L-1834 temporary access road for abnormal loads during construction

The temporary link road will be used solely for the purpose of the delivery of the abnormally sized loads transporting the large turbine components. These deliveries will be made at night with a Garda escort. The temporary access road will be closed by means of fencing at all other times.

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-9 Location 5 - N78 / L-1834, proposed temporary access road for abnormally sized loads - blade extended artic

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

N78

L-1834

Area to be surfaced for the duration of the turbine delivery phase.

N78 / L-1834 temporary access road for abnormal loads during construction

The temporary link road will be used solely for the purpose of the delivery of the abnormally sized loads transporting the large turbine components. These deliveries will be made at night with a Garda escort. The temporary access road will be closed by means of fencing at all other times.

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-10 Location 5 - N78 / L-1834, proposed temporary access road for abnormally sized loads - tower extended artic

PROJECT:	Seskin Wind Farm, Co.Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Access Junction A

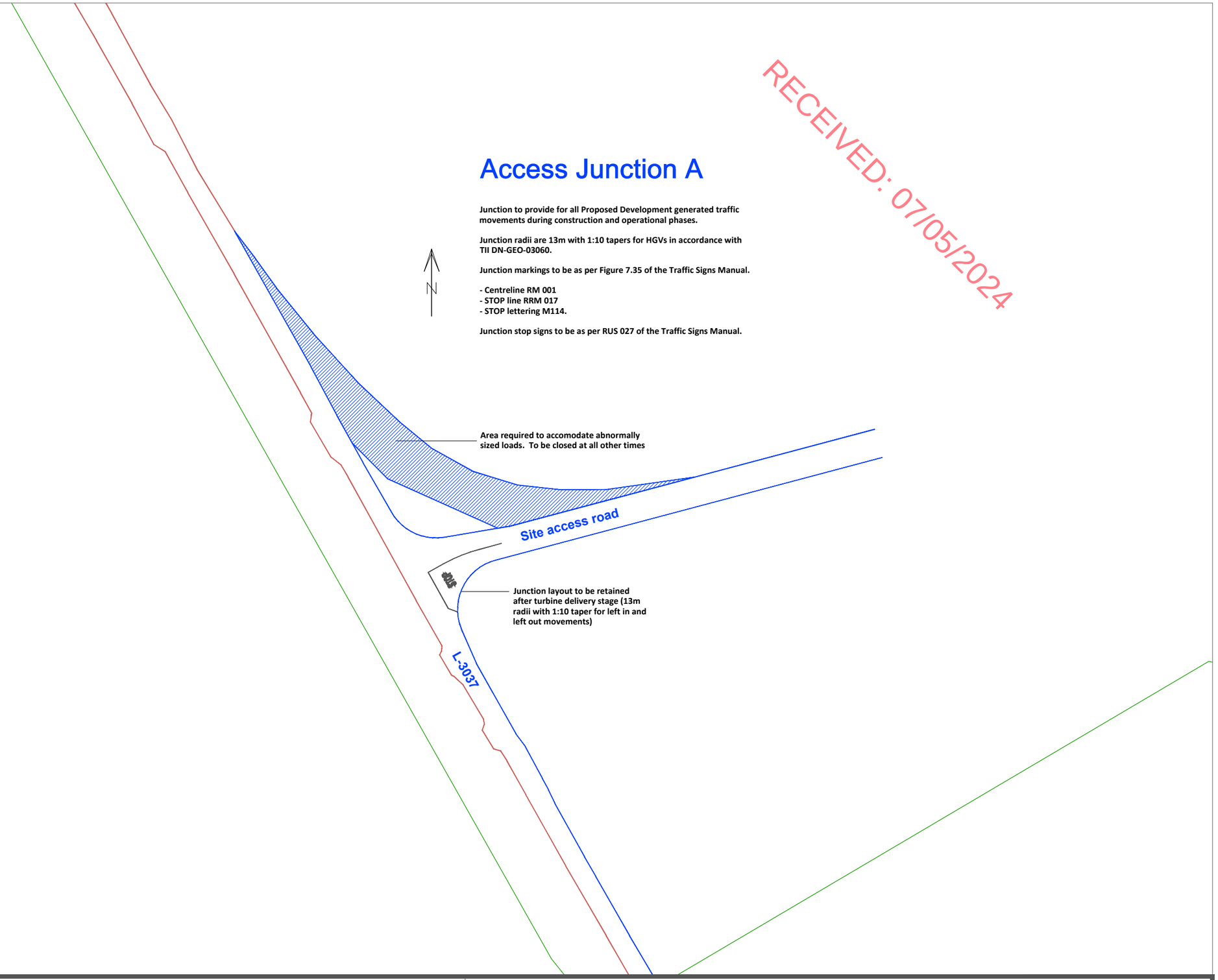
Junction to provide for all Proposed Development generated traffic movements during construction and operational phases.

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

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

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

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



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-11 Location 7 - Access junction A - Proposed access junction off the L-3037

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Access Junction A

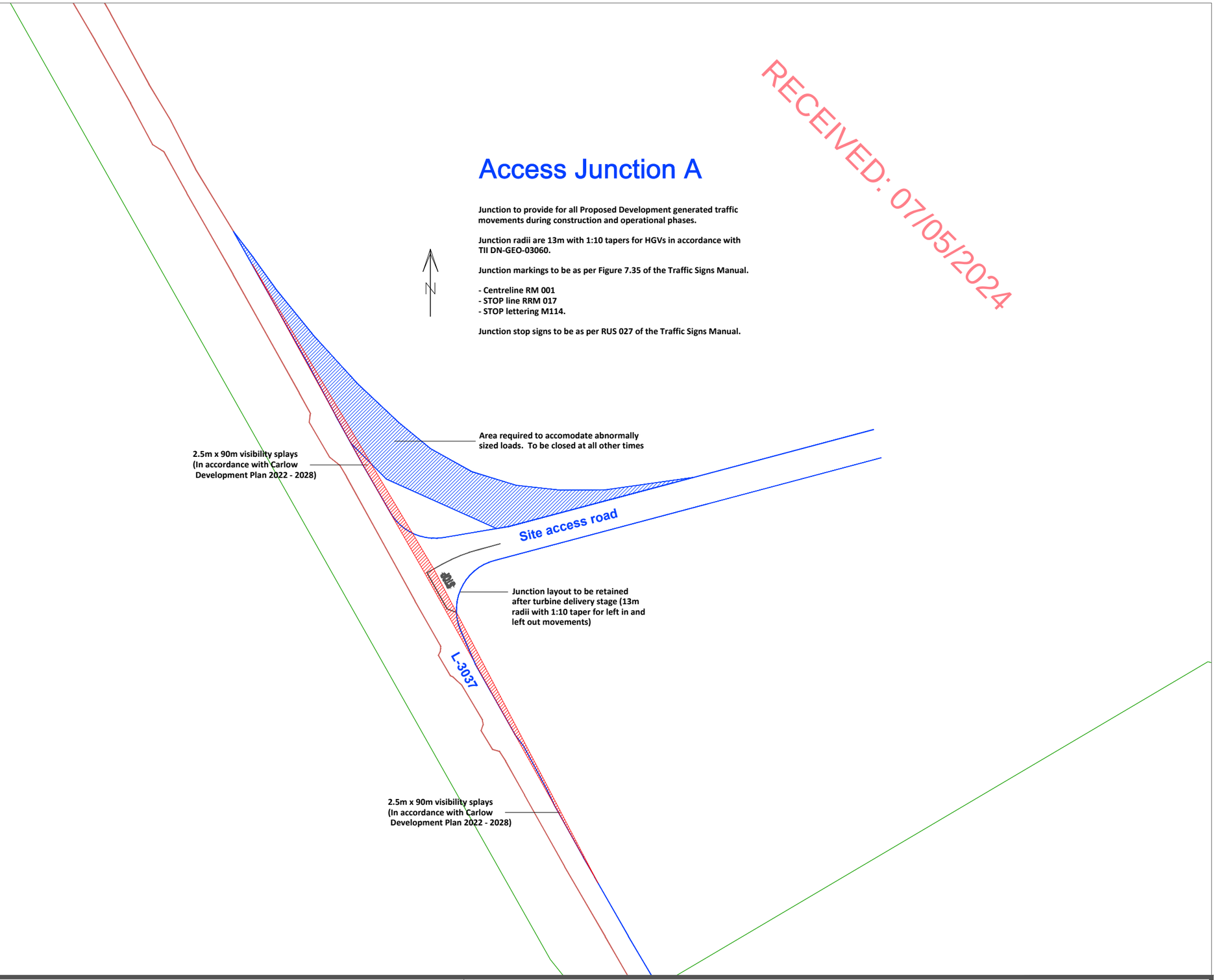
Junction to provide for all Proposed Development generated traffic movements during construction and operational phases.

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

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

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

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



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-12 Location 7 - Access junction A - Proposed access junction off the L-3037 - visibility splays

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Access Junction A

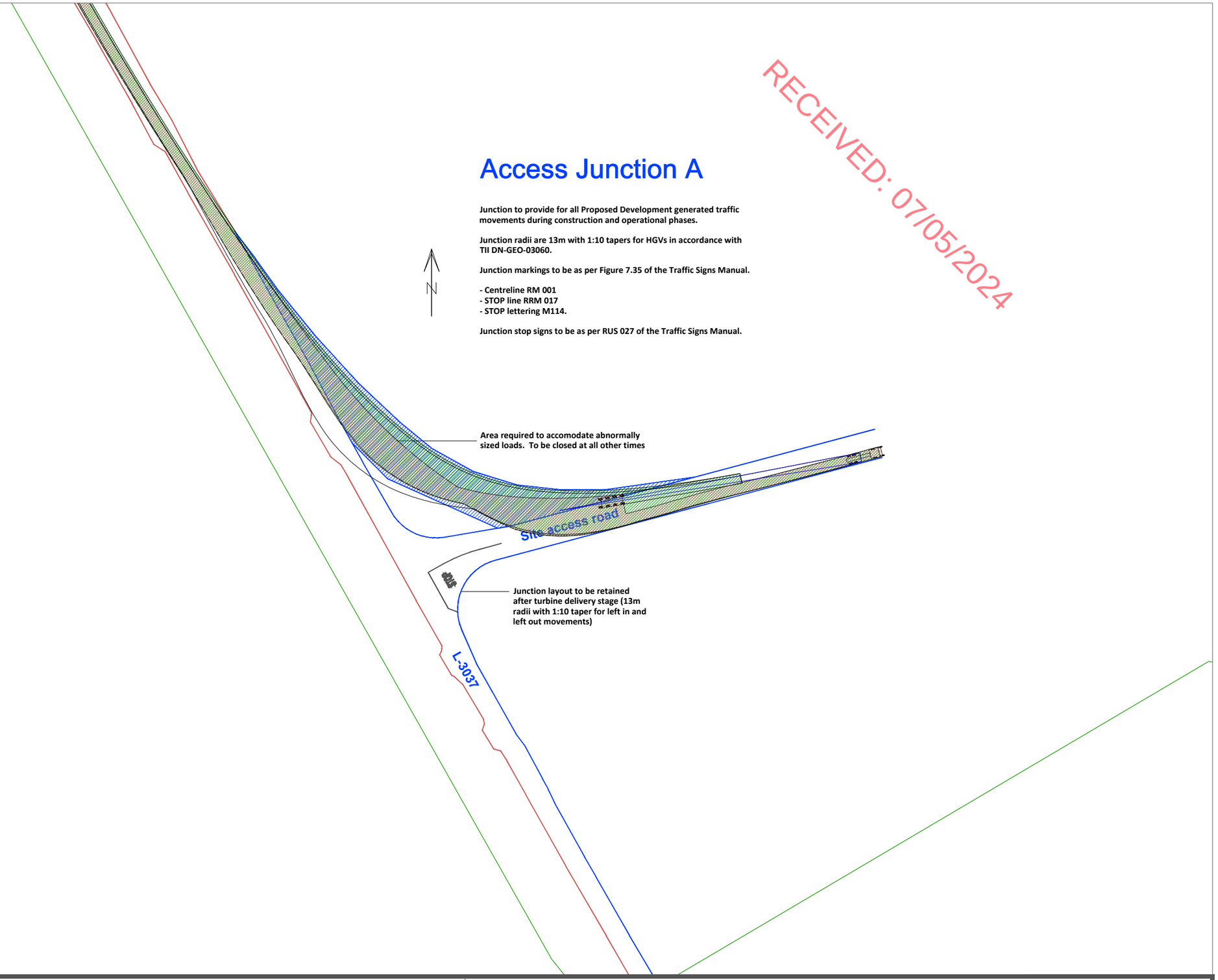
Junction to provide for all Proposed Development generated traffic movements during construction and operational phases.

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

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

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

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



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-13 Location 7 - Access junction A - Proposed access junction off the L-3037 - blade extended artic

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Access Junction A

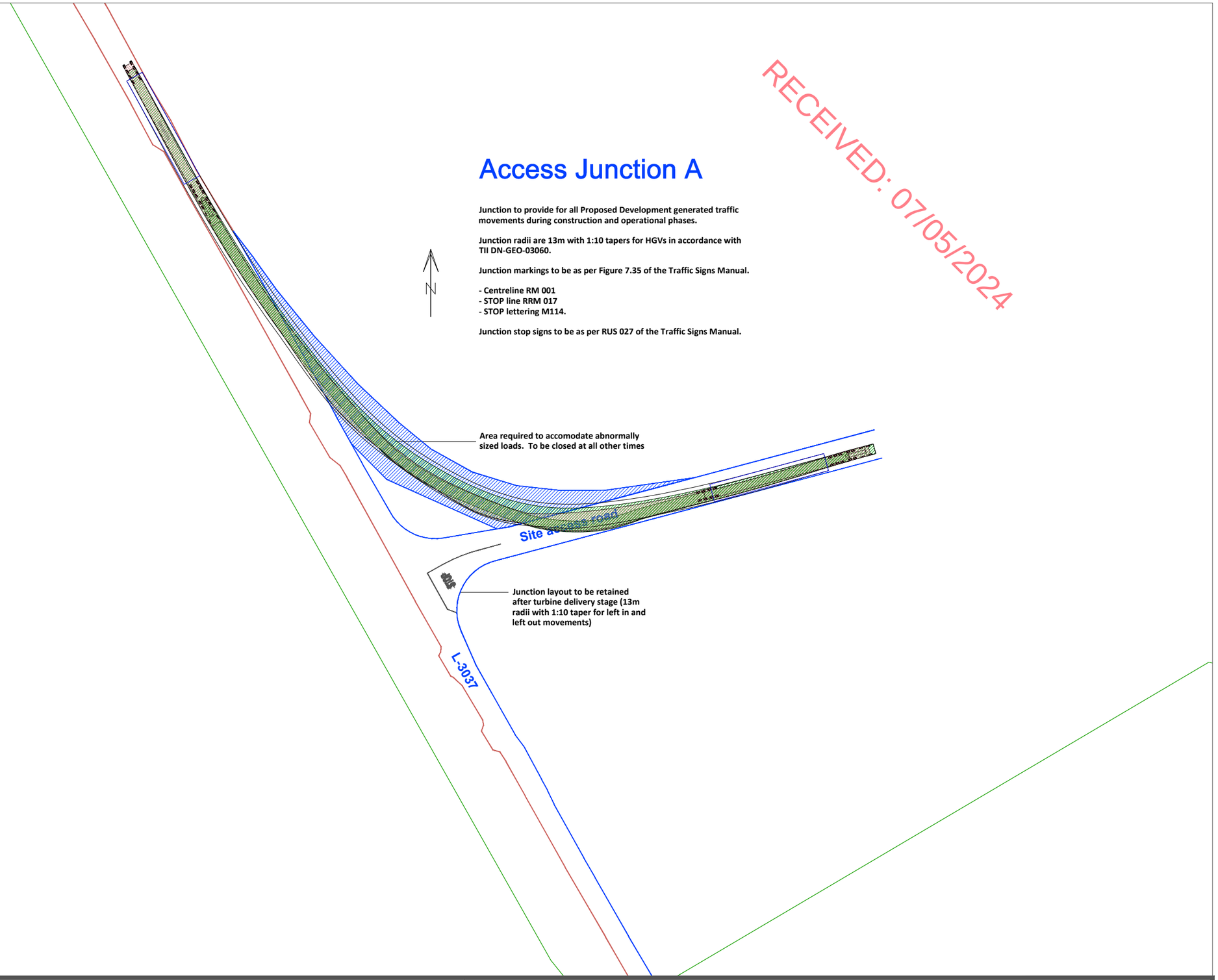
Junction to provide for all Proposed Development generated traffic movements during construction and operational phases.

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

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

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

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



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-14 Location 7 - Access junction A - Proposed access junction off the L-3037 - tower extended artic

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Access Junction A

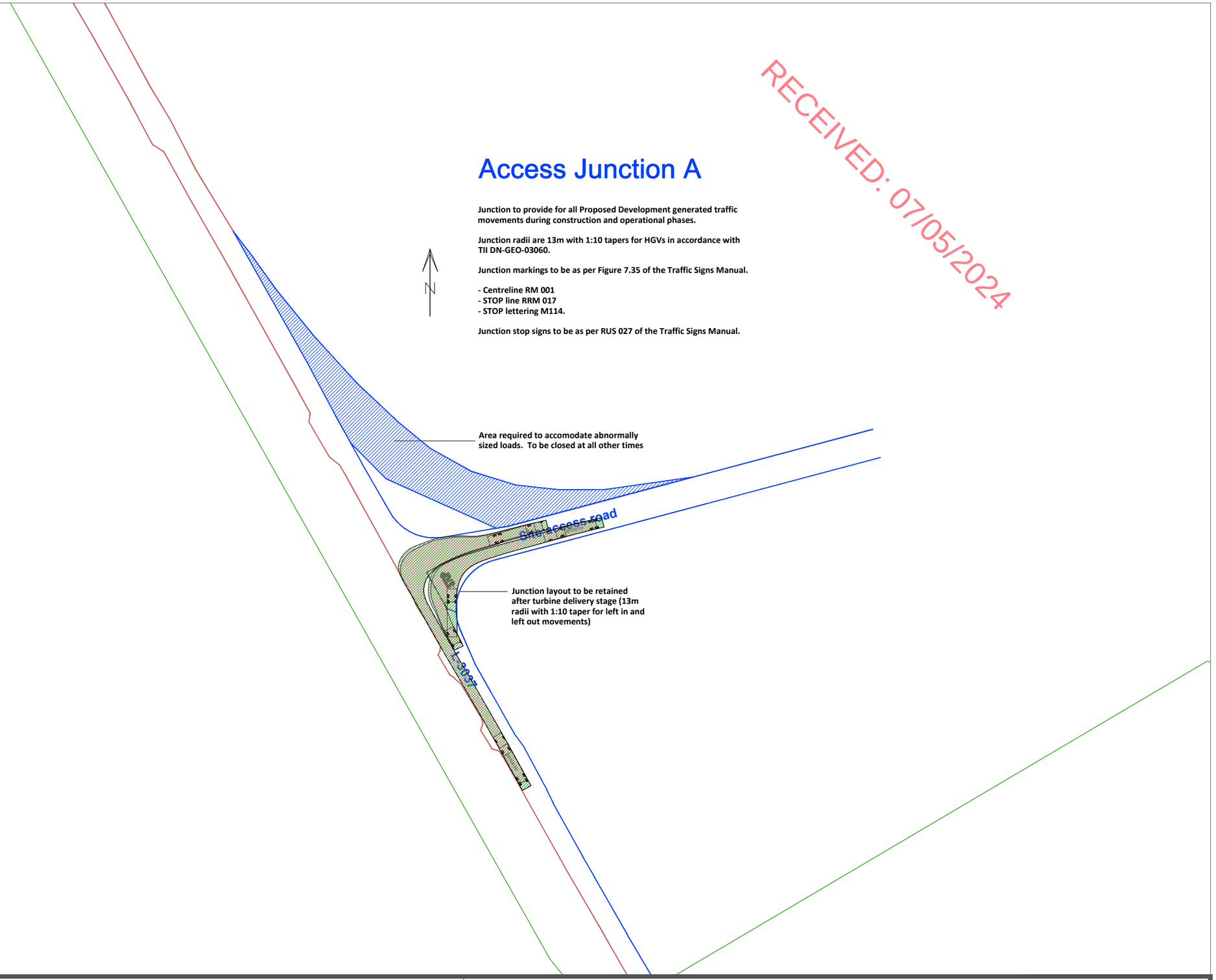
Junction to provide for all Proposed Development generated traffic movements during construction and operational phases.

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

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

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

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



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-15 Location 7 - Access junction A - Proposed access junction off the L-3037 - large articulated HGV

PROJECT:	Seskin Wind Farm, Co.Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Access Junction B

N

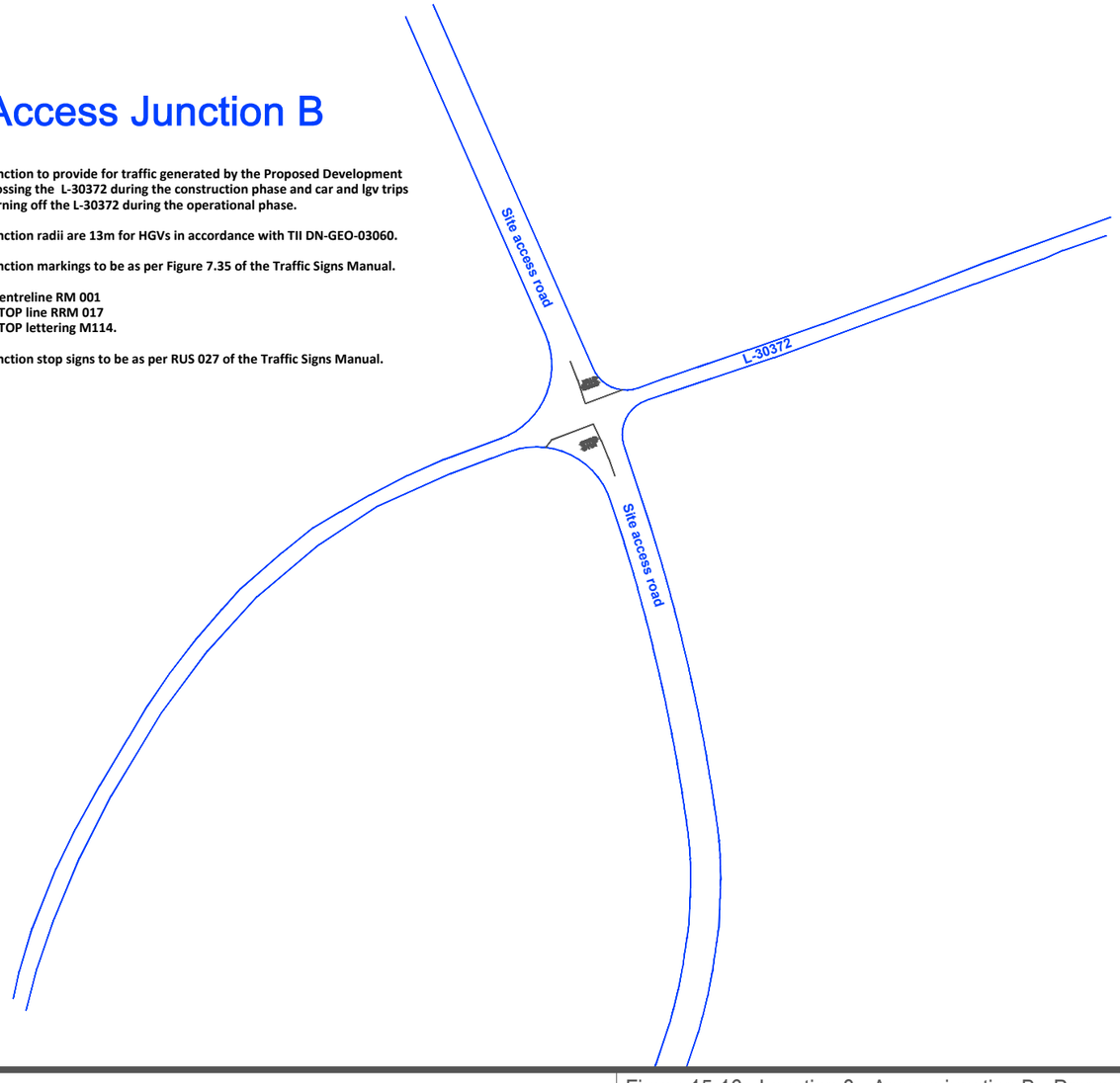
Junction to provide for traffic generated by the Proposed Development crossing the L-30372 during the construction phase and car and lgv trips turning off the L-30372 during the operational phase.

Junction radii are 13m for HGVs in accordance with TII DN-GEO-03060.

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

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

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



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-16 Location 8 - Access junction B - Proposed access junction off the L-30372

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Access Junction B

N

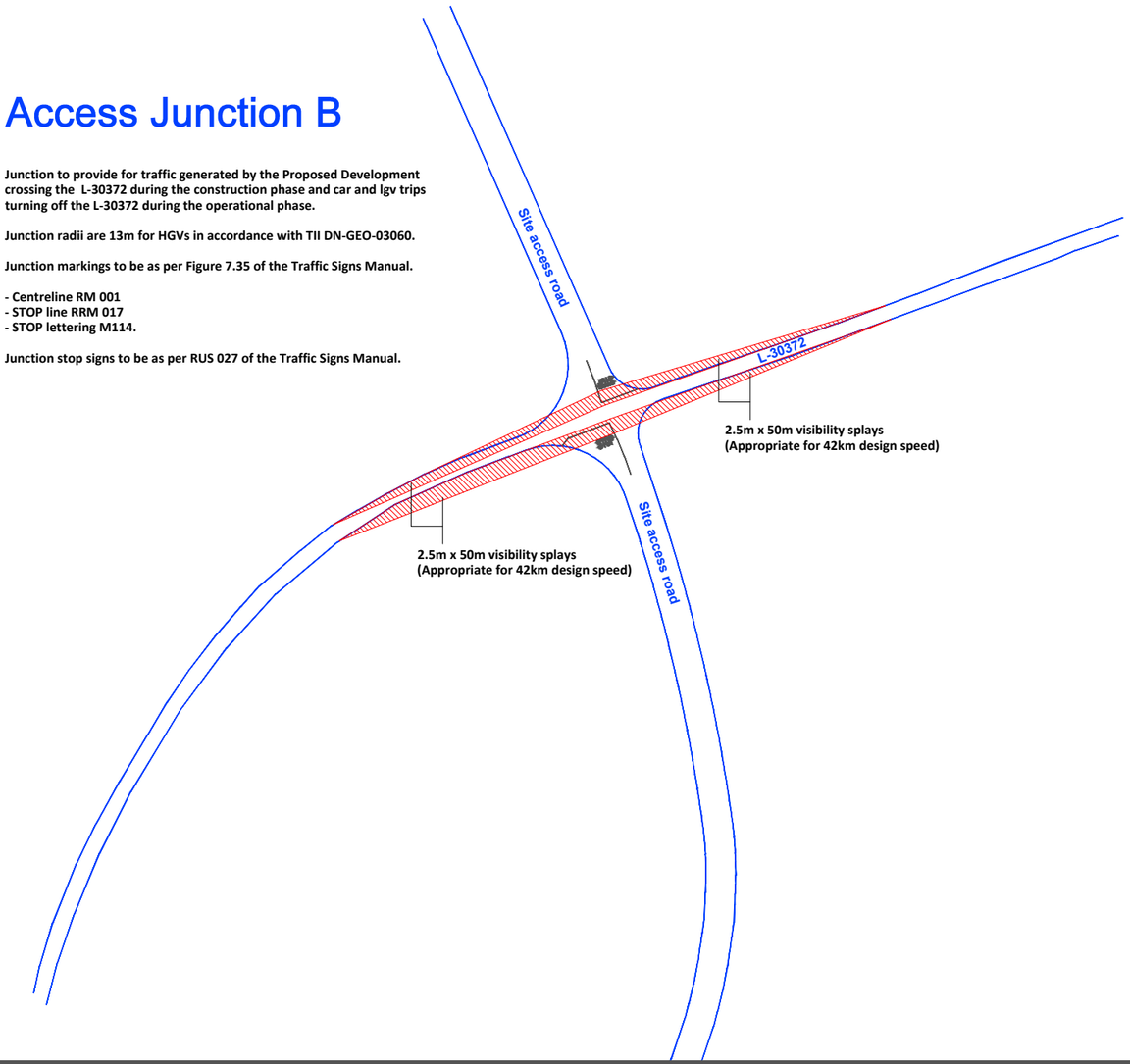
Junction to provide for traffic generated by the Proposed Development crossing the L-30372 during the construction phase and car and lgv trips turning off the L-30372 during the operational phase.

Junction radii are 13m for HGVs in accordance with TII DN-GEO-03060.

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

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

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



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-17 Location 8 - Access junction B - Proposed access junction off the L-30372 - visibility splays

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Access Junction B

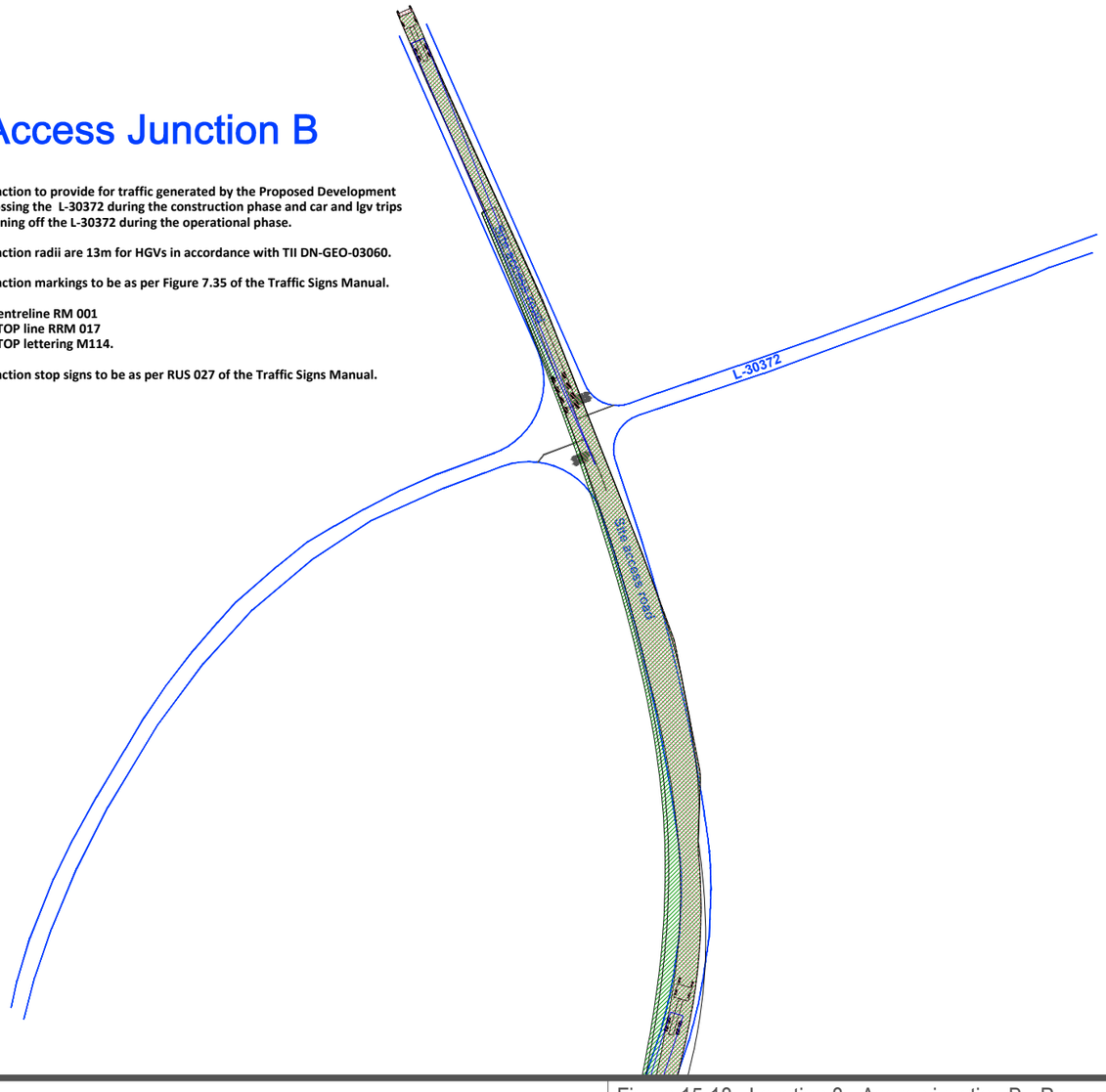
Junction to provide for traffic generated by the Proposed Development crossing the L-30372 during the construction phase and car and lgv trips turning off the L-30372 during the operational phase.

Junction radii are 13m for HGVs in accordance with TII DN-GEO-03060.

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

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

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



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-18 Location 8 - Access junction B - Proposed access junction off the L-30372 - blade extended artic

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Access Junction B

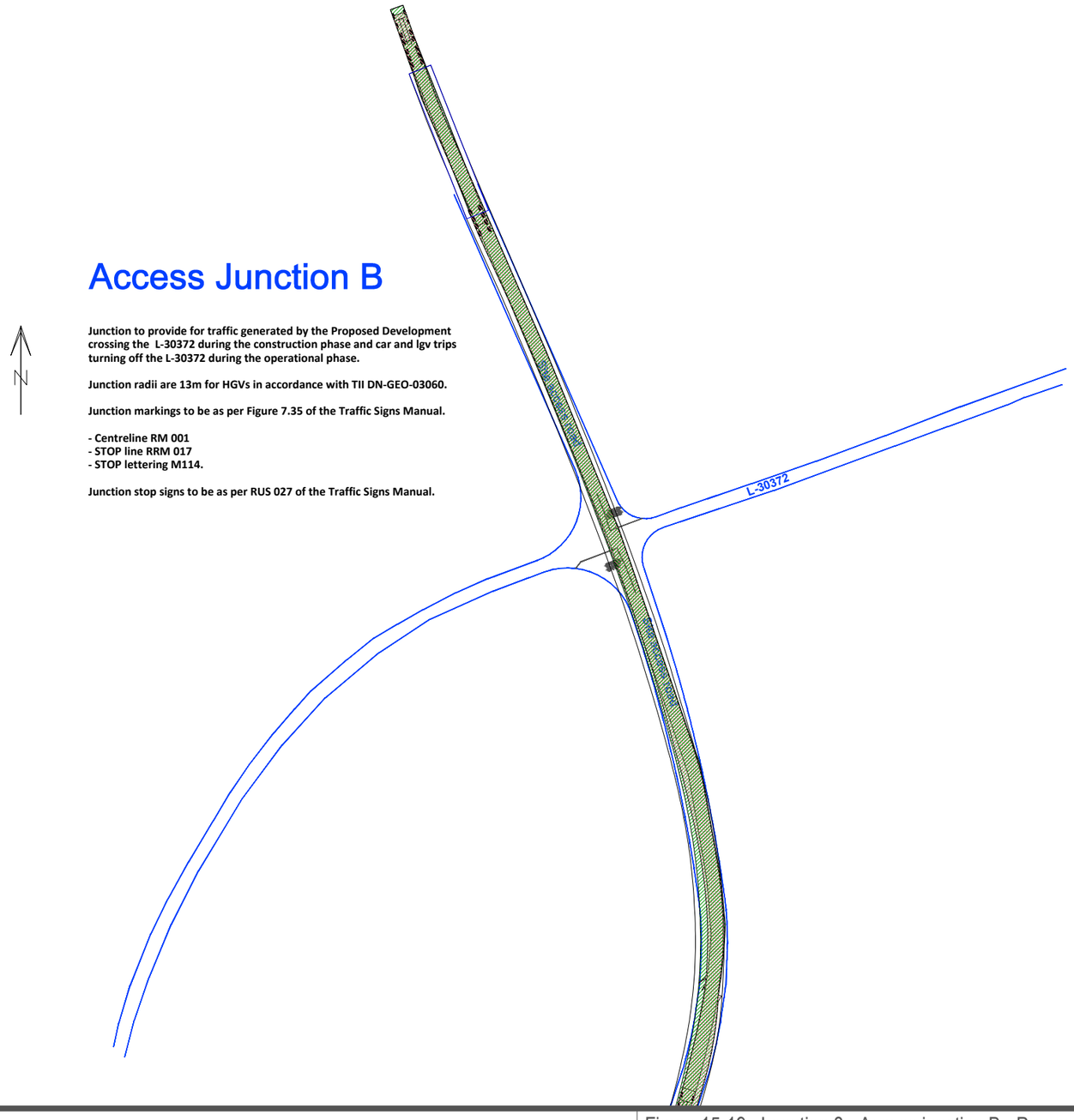
Junction to provide for traffic generated by the Proposed Development crossing the L-30372 during the construction phase and car and lgv trips turning off the L-30372 during the operational phase.

Junction radii are 13m for HGVs in accordance with TII DN-GEO-03060.

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

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

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



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-19 Location 8 - Access junction B - Proposed access junction off the L-30372 - tower extended artic

PROJECT:	Seskin Wind Farm, Co. Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Access Junction B

N

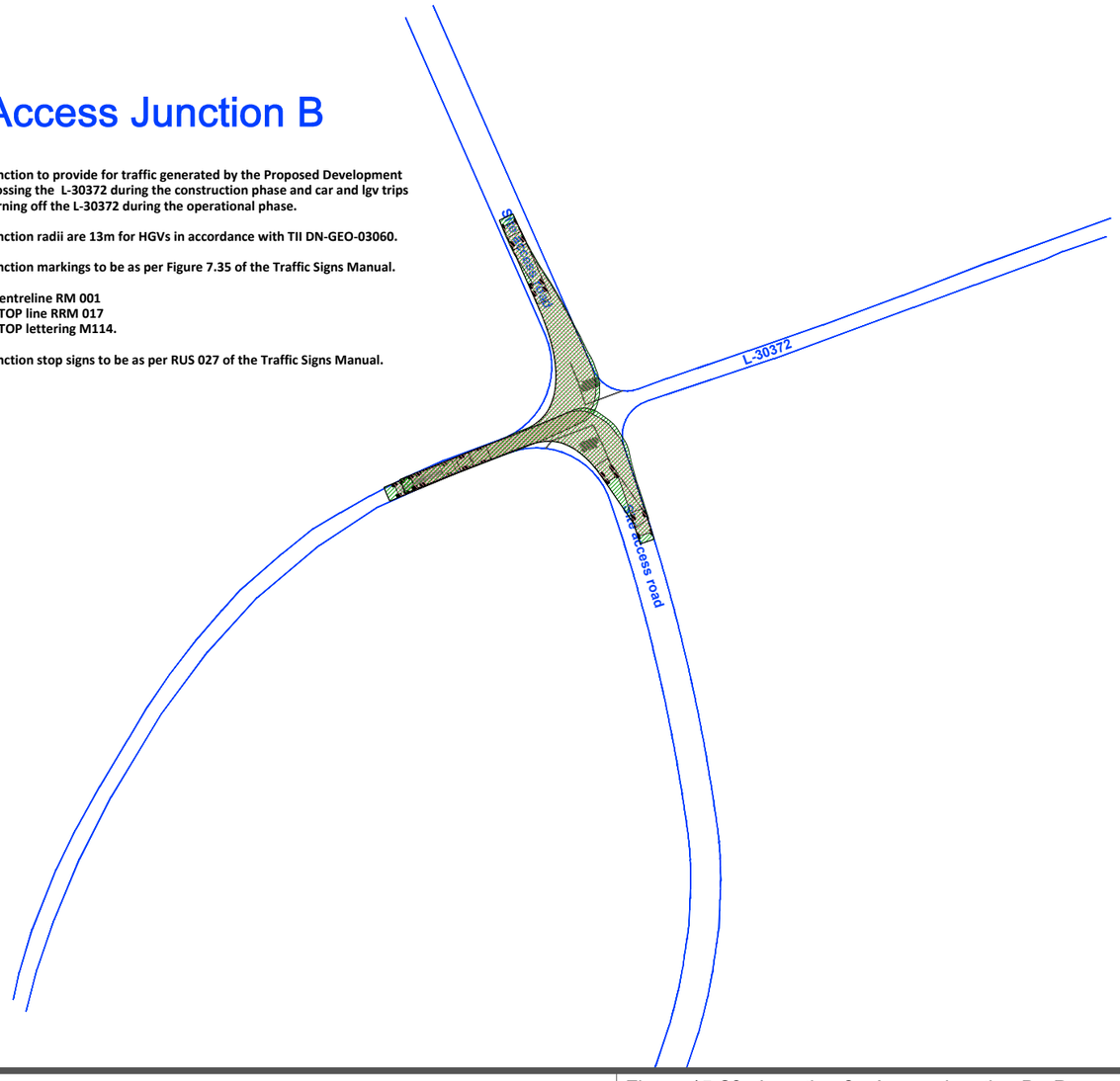
Junction to provide for traffic generated by the Proposed Development crossing the L-30372 during the construction phase and car and lgv trips turning off the L-30372 during the operational phase.

Junction radii are 13m for HGVs in accordance with TII DN-GEO-03060.

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

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

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



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-20 Location 8 - Access junction B - Proposed access junction off the L-30372 - large articulated HGV

PROJECT:	Seskin Wind Farm, Co.Carlow		
CLIENT:	EDF Renewables Ireland Ltd	SCALE:	1:1000
PROJECT NO: 8800	DATE: 27.04.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

15.1.12 Road Safety

A Road Safety Audit has not been undertaken at this stage, but will be undertaken as part of the Proposed Project at detailed design stage.

15.1.13 Provision for Sustainable Modes of Travel

15.1.13.1 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.

15.1.13.2 Public Transport

There are no public transport services that currently pass the Proposed Wind Farmon the L-3037, 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.

With the exception of the section of the Proposed Grid Connection Route on the R712 to the east of Kilkenny, which is on a bus route, the same applies to staff accessing the majority of the Proposed Grid Connection Route. It is proposed that construction staff will be transported to the point of construction by mini-bus.

15.1.14 Likely and Significant Effects and Associated Mitigation Measures

15.1.14.1 '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 Carlow's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

15.1.14.2 Construction Phase: Traffic and Transport

15.1.14.2.1 *Proposed Wind Farm*

During the 7 days when the concrete foundations are poured, the effect on the surrounding road network will be negative. If approaching the Proposed Wind Farm site from the north, it is forecast that the increase in traffic volumes will range from +10.4% on the N78 (Link 1), to +46.7% on the L-1834 (Link 2). If approaching from the south it is forecast that traffic flows on the R448 (Link 3) will increase by 4.9% and on the L-3037 travelling towards the Proposed Wind Farm site access (Link 4) by 16.2%. This will have a temporary negative effect on the delivery route with the impact forecast to be slight in terms of severity.

For 350 days when the general construction and groundworks are undertaken an additional 196 PCUs will travel to/from the Proposed Project. On these days it is forecast that the increase in traffic volumes

will range from +4.5% on the N78 eastern arm from the direction of Athy (Link 1), to +20.2% on the L-1834 between the N78 and the Proposed Wind Farm site access (Link 2) if accessing the Proposed Wind Farm site from the north. If approaching from the south it is forecast that traffic flows on the R448 just north of Leighlinbridge (Link 3) will increase by 2.1% and on the L-3037 travelling towards the site access (Link 4) by 7.0%. This will have a temporary negative effect on the delivery routes with the impact forecast to be slight.

During the 22 days when the various component parts of the wind turbine plant are delivered to the Proposed Wind Farm site using extended articulated HGVs, the effect of the additional traffic on these days will be slight to moderate along the proposed TDR due to the size of vehicles involved, resulting in increased traffic volumes ranging from +2.4% on the N78 from the direction of Athy (Link 1), to +10.8% on the L-1834 between the N78 and the Proposed Wind Farm site access (Link 2). 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.

During the 7 days of the turbine construction stage when general materials are delivered to the Proposed Wind Farm site, it is forecast that the increase in traffic volumes on these days will range from 1.5% on the N78 from the direction of Athy (Link 1), to +6.6% on the L-1834 between the N78 and the proposed site access (Link 2). This will have a temporary imperceptible negative effect on the N78, and temporary slight negative effect on the L-1834 leading to the Proposed Wind Farm site access.

15.1.14.2.2 *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 Kilkenny 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. 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.

15.1.14.3 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.

15.1.14.4 Decommissioning Phase: Traffic and Transport

15.1.14.4.1 *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, covered over with local soil/subsoil and allowed to re-vegetate naturally, if required. 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.

15.1.14.4.2 *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 4-8 of this EIAR.

15.1.14.5 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).

15.1.14.5.1 *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 15.1.1.
- Selection of the shortest underground Proposed Grid Connection Route, minimising the impacts on the existing road network and traffic.

15.1.14.5.2 *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.

It is proposed that a temporary access road will be constructed linking the N78 to the L1834 in order to bypass the existing junction to the southeast. The sole purpose of this temporary access road will be to facilitate the delivery of the turbine components only, which will be made during night-time hours accompanied by an escort provided by An Garda Siochana and the haulage company.

The default for the temporary road connecting the N78 to the L1834 will be that it is closed to all traffic by means of temporary gates / fencing / traffic barriers. During times when this area is being used for construction traffic the access at both ends will be opened and will be managed at all times by means of signing and site staff (Flagmen), and during the delivery of the abnormally sized loads, by Garda escort vehicles. On completion of the construction phase the temporary road will be permanently closed with boundary fencing re-instated. The temporary road will only be re-established in the unlikely event of the replacement of large turbine component parts during the operational phase.

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

- Introduction of signage on northbound and southbound approaches to the Proposed Wind Farm site access junction on the L-3037 warning of approaching construction site (TMS Traffic Signs WK001).
- Signage on the L-3037 northbound and southbound indicating the temporary construction access approaching on the left (TMS traffic Sign WK052) and similar on southbound lane indication the temporary link approaching on the right (TMS Traffic Signs WK053).
- Signage on the L-3037 northbound and southbound approaches to temporary provision of Flagmen (TMS traffic Sign WK061).
- It is also proposed that temporary signage indicating the overtaking is not permitted during the construction phase (TMS traffic Sign RUS 014).
- It is proposed that the temporary speed limit of 60 km/h is indicated on this section of the L-3037 during construction using Variable Message Signs.
- Similarly, temporary signage will be introduced on the L-30372, including signage on eastbound and westbound approaches to the Proposed Wind Farm site access junctions / crossing points (TMS Traffic Signs WK001), signage indicating the temporary construction access approaching on the L-30372 (TMS traffic Signs WK052 and WK053), signage on the L-30372 warning of the presence of Flagmen (TMS traffic Sign WK061).

The detailed TMP will also include 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 Carlow 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 temporary access linking the N78 and L-1837 and Proposed Wind Farm site access junction off the L-3037 and the Proposed Wind Farm construction crossing and operational access junctions on the L-30372. 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 15.1.7 of this EIAR.
- **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.

15.1.14.5.3 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.

15.1.14.5.4 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 4-8 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).

15.1.14.6 Residual Effects

15.1.14.6.1 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 to moderate and temporary negative effect on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed Traffic Management Plan included as Appendix 15-2.

15.1.14.6.2 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.

15.1.14.6.3 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 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.

15.1.14.7 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).

15.1.14.7.1 *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 15-30 there are 2 permitted wind farms which are considered to have a high potential risk of traffic related cumulative impacts with the Proposed Project (Bilboa Wind Farm, and White Hills Wind Farm) and 3 proposed wind farms that are determined to have a medium risk of cumulative traffic related impacts with the Proposed Project (Coolglass Wind Farm, Freneystown Wind Farm and Pinewood 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 15-30 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 – Bilboa Wind Farm (5 Turbines	Permitted	High	Medium	High
2 – White Hill Wind Farm (7 Turbines)	Permitted	High	Medium	High
3 – Coolglass Wind Farm (13 Turbines)	Permitted	Medium	Medium	Medium

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
5 – Freneystown Wind Farm (8 Turbines)	Permitted	Medium	Medium	Medium
6 – Pinewood Wind Farm (11 Turbines)	Permitted	Medium	Medium	Medium
7 – Craoghaun Wind Farm (7 Turbines)	Proposed	Low	Medium	Low
8 – Ballynalacken Wind Farm (9 Turbines)	Proposed	Low	Medium	Low
9 – Gathabawn Wind Farm (15 Turbines)	Proposed	Low	Medium	Low

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 7 developments listed in Table 15-31 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 7 of the 9 developments is low to medium with the resulting cumulative impacts being negative, short term and slight. There are 2 developments, the proposed Kilderry Solar Farm and the permitted Brownstown Solar Farm, for which it is considered the that the potential risk of cumulative impacts with the Proposed Project is high. This is in relation to the overlapping of the grid connection routes for each of these developments. It is noted that the construction of each grid connection route will be in the control of the Local Authority and, as a result, it is unlikely that the construction of the 3 grid connections will overlap. In the event that construction of these grid connections did occur concurrently it is considered that the resulting cumulative impacts would be negative, short term and slight.

Table 15-31 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 – Ridge, County Carlow, CCC Planning Reference 23/60220.	Further information	High	Low	Low

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
For the erection of a temporary 100m high lattice type meteorological mast and hardstanding area.				
2 – Oldleighlin Quarry, Bannagagole, County Carlow, CCC Planning Reference 22/238 For the installation of a Roof Mounted Solar PV Panel Array consisting of up to 2200m2 of solar panels and all associated works.	Permitted	Medium	Low	Low
3 – Knocknabranagh and Knockbaun , County Carlow, CCC Planning Reference 21/316. Permision for 1) Retention of the existing 80 metre meteorological mast; and 2) the increase in height of the existing meteorological mast from 80 metres to a height of 100 metres.	Permitted	Medium	Low	Low
4 – Bilboa Wind Farm , Land in the townlands of Boolyvannan Coolnakisha Boolyrathornan , Ballinabranagh Tomard Upper Tomard Lower, CCC Planning Reference 20/180 For the installation of approximately 4.6 kilometres (km) of underground cables within the Carlow County Council (CCC) boundary and approximately 2.0 km within the Laois County Council (LCC) boundary with a voltage of up to 38	Permitted	High	Medium	Medium

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
kilovolts and associated works, including a new substation within LCC, for the connection of the consented Bilboa Wind Farm to the national electricity grid; upgrading of an existing forestry track within CCC; construction of two new onsite access tracks within CCC; re-orientation and increasing in size of a crane hardstanding within CCC; and road strengthening and widening along an updated turbine delivery route, within LCC, pursuant to the consented Bilboa Wind Farm.				
5 – Tomnaslough , Leighlinbridge , Co Carlow CCC Planning Reference 19/322 Permission for the erection of a 22.5m monopole to support telecommunications antennae for use by Eir and other operators, which together with the installation of dishes, access track, security fencing and ground based equipment cabinets will provide 2G, 3G and 4G mobile electronic communication services from the installation at land to the north of the R448.	Permitted	Medium	Low	Low
6 – Bannagagole, Old Leighlin, Co. Carlow. ABP Planning Reference 319198 Demolition of existing disused building and	Decision Pending	Medium	Low	Low

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
development of a dimension stone quarry				
7 – Tomnaslough , Leighlinbridge , Co Carlow. ABP Planning Reference 307085 Erection of a monopole to support telecommunications antennae for use by Eir and other operators.	Permitted	Medium	Low	Low
8 - Kilderry and adjoining townlands of Scart, Ballynamona, Rathgarvan (or Clifden), Churchclara, Clarabricken, Clara Upper, Clara, Kilmagar, Feathallagh and Ballysallagh, Co. Kilkenny. County. Kilkenny. KCC Planning Reference 2360382. Permission for a Solar Array, ancillary works and grid connection	Proposed	High	Low	High
9 – for a Solar Farm and Storage Park consisting of linear arrays of solar photovoltaic (PV) panels mounted on steel supported structures with associated cabling and ducting (including underground cable connection to the proposed on-site 110kV substation); and all ancillary infrastructure County. Kilkenny. KCC Planning Reference 22644.	Permitted	High	Low	High

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative traffic effects
Permission for a Solar Array, ancillary works and grid connection				

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 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 15.2.5.

15.2.1.1 Statement of Authority

This section of the EIAR has been prepared by Brandon Taylor and reviewed by Ellen Costello, both of MKO. Brandon Taylor is an Environmental Scientist with MKO with over one year of private consultancy experience. Brandon holds a BSc (Hons) in Geography from McGill University, and a MSc (Hons) in Coastal & Marine Environments from the University of Galway. Ellen Costello is a Project Environmental Scientist with MKO with over four years of experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen's key strengths and expertise are Environmental Protection and Management, Environmental Impact Statements, Project Management, and GIS Mapping and Modelling. Since joining MKO, Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Ellen is a Practitioner Member of the Institute of Environmental Management & Assessment. Ellen has completed numerous Material Assets (Other Material Assets) sections of EIARs for wind farm developments. This section has also been reviewed by Sean Creedon (B.Sc., M.Sc.). Sean has 22 years' experience in planning and environmental impact elements within all stages of wind farm project delivery.

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 nearest operational airport is Kilkenny Airport located approx. 20km southwest of the Proposed Wind Farm and the nearest operational airfield is Kilrush Airfield which is located approx. 36km northeast of the Proposed Wind Farm. The closest large international airport is Dublin Airport which is located over 90km northeast of the Proposed Wind Farm.

Both airports listed above are outside the range at which such issues would be expected, and as detailed in Table 15-32 below, the Irish Aviation Authority noted no issues with the Proposed Project however they issued observations as discussed in Section 15.2.4.3.

15.2.3.5 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 15-32; full details are provided in Section 2.7 in Chapter 2 of this EIAR.

15.2.3.6 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 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 15-32; 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.

The responses received from the telecommunications and aviation consultees are summarised below in Table 15-32.

Table 15-32 Telecommunications and Aviation Scoping Responses

Consultee	Response	Potential for Interference Following Consultation Exercise
Ajisko Ltd	Received 10th May 2022	No
Broadcasting Authority of Ireland	Received 11th May 2022	No
BT Communications Ireland	Received 24th May 2022	No
ComReg (Commission for Communications Regulation)	Received 17th May 2022	N/A – Provided list of Telecommunications Operators in vicinity of site.
Department of Defence	Received 2nd February 2023	The Proposed Wind Farm lies within 3 Nautical Miles of the M9 which is identified as a critical low level route used by state aircraft on operational tasking's
Eir	Received 13th May 2022	No
ENET	Received 10th May 2022	Yes, link located within the Proposed Wind Farm site, however re-routing of the link has been agreed and is further detailed in Section 15.2.4.2.
ESB Telecoms	No response received	N/A
Irish Aviation Authority (IAA)	Received 11th January 2023	IAA noted observations as discussed in Section 15.2.4.3.
Imagine Group	Received 10th May 2022	No
Integrated Media Solutions	Received 10th May 2022	No
Lighthouse Networks Ltd	Received 10th May 2022	No
RTE Transmission Network	Received 10th May 2022	No
St. Canices Credit Union Ltd	Received 26th May 2022	No
Three Ireland Ltd	Received 1st June 2022	No
Towercom	Received 11th May 2022	No
Viatel	No response received	N/A
Virgin Media	No response received	N/A

Consultee	Response	Potential for Interference Following Consultation Exercise
Vodafone Ireland	Received 11th May 2022	Yes, three links in area, however there is no overlap

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

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 10th May 2022 to a scoping request from MKO stating that the operation of the Proposed Wind Farm will not have any impact on RTÉ fixed linking services.

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.

There was no reply from Viatel or Virgin Media to scoping requests from MKO in May 2022.

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 scoping, operate links either outside the Proposed Wind Farm site, and therefore are not subject to any interference risk, or do not operate any links in the area.

ENET

At the time of the initial scoping with the telecoms operators during May 2022, ENET identified one planned link in the northwest corner of the Proposed Wind Farm site that could potentially be affected by the Proposed Wind Farm. This link was subsequently commissioned and ENET requested a clearance distance of 70 metres from the core wireless link between Johnswell and HCN Rossmore Bog. It was confirmed that the Proposed Wind Farm turbine (T01) will affect this link. Following identification of this, the Applicant (EDF Renewables Ireland Ltd.) and ENET have been in discussions regarding a mitigation plan for this link prior to the construction of the Proposed Wind Farm. ENET has proposed that:

ENET will decommission the existing Johnswell and HCN Rossmore Bog link, and build 2 no. new core wireless links between:

1. *Johnswell and VDF Leighlinbridge, and;*
2. *VDF Leighlinbridge and Cignal Delmec Engineering*

The Applicant (EDF Renewables Ireland Ltd.) has agreed to the mitigation plan set out above and will provide ENET with a minimum of three months advanced written notice prior to construction works on

the Proposed Project to ensure the new core wireless links are built prior to the completion of the Proposed Project.

Imagine

Imagine responded to a scoping request from MKO on the 10th of May 2022, noting that they had no links that would be affected by the Proposed Wind Farm.

Vodafone

Vodafone responded to a scoping request from MKO on the 11th of May 2022, noting that they had three links in the area, however there was no overlap with proposed turbine locations and therefore no interference with their links is anticipated.

15.2.4.3 Aviation

As noted in Table 15-32 Telecommunications and Aviation Scoping Responsesabove, scoping responses were received from the following aviation consultees:

- Irish Aviation Authority (IAA)
- Department of Defence (DoD)

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

Irish Aviation Authority

In January 2023, a scoping response was received from the Irish Aviation Authority (IAA). They noted the IAA is not involved in the planning process but must inform the aerodrome operator of erecting a manmade object at least 30 days in advance if the structure will be erected in the vicinity of the aerodrome. A list of general observations likely to be proffered during the formal planning process by the Authority were also included.

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 Kilkenny Airport located approx. 20km southwest of the Proposed Wind Farm, and the nearest operational airfield is Kilrush Airfield which is located approx. 36km northeast of the Proposed Wind Farm. The nearest large international airport is Dublin Airport which is located approximately 91.4km to the northeast of the Proposed Wind Farm. The airports and airfields listed above are therefore outside the range at which such issues would be expected.

The IAA also noted that the Proposed Wind Farm is 20km northeast of the licenced Aerodrome – Kilkenny Aerodrome, Holdenstrath, Co. Kilkenny and as a result the aerodrome licensee, Irish Skydiving Club Ltd. must be engaged with directly and be made aware of the Proposed Wind Farm. The IAA identified that the licensee is to determine if it is necessary to undertake an aeronautical safety

assessment to consider the effect of the Proposed Wind Farm on the safety of aircraft operations at Kilkenny Airfield.

In response to the IAA's scoping reply, Irish Skydiving Club Ltd were contacted and made aware of the Proposed Project in January 2023 and February 2023, as identified in Appendix 2-1. Though there was no reply, any potential effects of the Proposed Project on the safety of aircraft operations were assessed in an Aviation Impact Assessment included as Appendix 15-6 and outlined in Section 15.2.5 below. 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.

Department of Defence

In February 2023, a scoping response was received from the Department of Defence (DoD). They noted the DoD is not involved in the planning process but are responsible for the regulation of military aviation as opposed to safety regulation of civil aviation by the IAA.

The observations by the DoD include the following:

- The Proposed Wind Farm lies within 3 Nautical Miles (NM) of the M9 which is identified as a critical low level route used by state aircraft on operational tasking's. This follows the guidance referenced in the IAC Position Paper.
- A wind farm or any other tall structure within a low-level route will be an obstacle to state aircraft not operating within the civil rules of the air.
- Any IAC requirements are separate to IAA requirements.
- When specific locations of the turbines are made available, additional observations may be made by the DoD if applicable.

Additionally, the DoD stated that they cannot support, based on military advises, the erection of wind farms or other tall structures within 3 NM of roads identified as critical low level routes in support of operational requirements. In response to their scoping reply, the DoD was provided with the final turbine layout on March 13th 2024, the correspondence of which can be seen in Appendix 2-1 Scoping Responses. Additionally, an Aviation Impact Assessment included as Appendix 15-6 was carried out for the Proposed Project and is further detailed in Section 15.2.5 below.

15.2.5 Aviation Impact Assessment

An Aviation Impact Assessment (AIA) was conducted by Cyrrus Limited and is included as Appendix 15-6. The AIA 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.

The AIA identifies potential impacts on 4 no. identified receptors; Airspace, General Aviation, the Air Corps Activity within MOA3, and the Air Corps Activity within the 3NM from motorways. The airspace above the Proposed Wind Farm is a Special Use Airspace designated as MOA3, which requires awareness of the risk of its use at or below 1370m above ground level (AGL) and cooperation with military air traffic control above that altitude. Regarding general aviation, the Proposed Wind Farm's maximum AGL of 180m is below the minimum height regulations required by aircraft in the area of 590m AGL. MOA3 is designated by the IAC for use in general flight and manoeuvring training.

The assessment identifies that airspace and civil and/or military aviation are not impacted to any degree that may be deemed unsafe or inconvenient to users. Furthermore, the low flying areas as designated by the Air Corps are substantial distances away from the Proposed Wind Farm and are therefore not impacted to any degree whatsoever. These receptors and the assessed impact of the Proposed Wind Farm on each is listed in Table 15-33 below.

Table 15-33 Impact receptors and assessed significance as detailed in Section 8 of the AIA.

Receptor	Assessed Impact	Definition
Airspace	Low impact	The Project will have little impact on the aviation stakeholder, or the level of impact will be acceptable to the aviation stakeholder.
General Aviation	Low impact	The Project will have little impact on the aviation stakeholder, or the level of impact will be acceptable to the aviation stakeholder.
Irish Air Corps Activity within MOA 3	Low impact	The Project will have little impact on the aviation stakeholder, or the level of impact will be acceptable to the aviation stakeholder.
The Air Corps 3NM Buffer Zone from Motorways	Moderate impact	Receptor able to continue safe operations but with some restrictions or non-standard mitigation measures in place.

The impact on the Air Corps 3NM Buffer Zone from Motorways was assessed as such due to the potential that the IAC may take the position that the Proposed Wind Farm places their aircraft in an unsafe situation. The benefit of the buffer zones from motorways are access for military aviation support and missions and visual navigation during poor weather conditions. The AIA notes that in order to visually navigate by motorway, pilots must keep the motorway in sight while also looking for obstacles. The Proposed Wind Farm is approx. 2.24NM from the M9 motorway and the risk time an aircraft may be exposed to within the 3NM buffer is low.

If one places a 3NM arc on the Proposed Wind Farm turbine positions nearest the motorway it shows a small section of motorway that would be inside the buffer zone. If an aircraft flying at 130 KIAS (Knots Indicated Air Speed) flew along this 'compromised' section of road, the 'time of exposure' of the aircraft not being 'protected' by the 3NM buffer would be just over 1 minute, 30 seconds. If a higher speed were used, such as which may be relevant for one of the Air Corps fixed-wing training aircraft, the time would drop to approximately 55 seconds. These times certainly do not represent a high degree of 'risk exposure time', and flight along this small section of road could be pre-planned by pilots in accordance with any internal procedures put into place by the Air Corps. The Proposed Wind Farm is also situated in a high ridge area to be avoided by aircraft following the motorway in any weather condition.

The AIA argues aircrafts displaced 3NM from the motorway preclude any chance of flight with visual reference to it and recommends challenging the IAC position, as it is not envisioned that flight operations along this route would no longer be able to take place as a result of the Proposed Wind Farm.

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 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 confirmed that one turbine is proposed within the areas requested to be left clear of turbines, that being T01 interfering with ENET's core wireless link between Johnswell and HCN Rossmore Bog. This could have a potential negative, moderate, 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, ENET have proposed mitigation measures for the core wireless link that overlaps with the Proposed Wind Farm T01.

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 AIA notes that the Proposed Wind Farm will have a low impact on airspace, general aviation and the IAC Activity within MOA 3, and a moderate impact on the IAC 3NM Buffer Zone from Motorways. When all the aspects above are taken as a sum, this is considered a negative, moderate, long-term effect on aviation.

However, as detailed in Section 15.2.5 above, the AIA identifies that aircrafts displaced 3NM from the motorway preclude any chance of flight with visual reference to it and recommends challenging the IAC position, as it is not envisioned that flight operations along this route would no longer be able to take place as a result of the Proposed Wind Farm. Similarly, the aviation industry is highly regulated and subject to numerous mandatory standards, checks and safety requirements, many of which are international in nature (ICAO) and requiring the issue of operating licences. When taking this into account, the effect of the Proposed Wind Farm on aviation is in reality less severe.

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, slight, 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 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 existing wind farm is Gortahile Wind Farm located approx. 3.1km north of the Proposed Wind Farm. The closest permitted wind project in development is Bilboa Wind Farm located approx. 1.2 km north of the Proposed Wind Farm followed by the White Hills Wind Farm located approx. 1.5km southwest of the Proposed Wind Farm.

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

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. There are existing underground electricity cables present along the Proposed Grid Connection Route, and in the vicinity of the Proposed Wind Farm. 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 Kilkenny 110kV substation.

There are no other known existing services (i.e. water supply, sewage, telecommunications) present 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 TLI Group 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 of this EIAR. The

Proposed Project comprises the provision of a wind farm of 7 no. wind turbines, which is capable of generating and providing a significant amount of renewable energy onto the national grid and capture an additional part of County Carlow's valuable renewable energy resource.

15.3.3 Waste Management

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

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 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 or 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 4-4 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. The mitigation measures include the following:

- Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works.
- Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified.

- Excavation permits will be completed and all plant operators and general operatives will be inducted and informed as to the location of any services.
- The contractor must comply with and standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks.

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 129,507 MWh of electricity. This would be sufficient to supply approximately 30,835 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 4-8.

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.

15.3.6 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 Kilkenny 110kV substation:

- Proposed Brownstown Solar Farm
  - Grid connection assessed in EIAR supporting the planning application appealed to An Bord Pleanála, however this project component was not part of the planning application
- Permitted White Hills Wind Farm
  - Grid connection assessed in EIAR supporting the planning application made to An Bord Pleanála, however this project component was not part of the planning application
- Proposed Kilderry Solar Farm
- Proposed Freneystown Wind Farm (Public Domain)

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 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..