Environmental Impact Assessment Report

Briskalagh Renewable Energy Development, Co. Kilkenny

Chapter 15 - Material Assets

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15. MATERIAL ASSETS

Material Assets are defined in the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022) *'*as '*built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure'.* They may be either of human or natural origin. The cultural assets of Archaeology and Cultural Heritage are addressed in Chapter 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: Hydrology and Hydrogeology, Chapter 10: Air Quality, and Chapter 11: Climate. Tourism and amenity resources, which are also considered material assets, are addressed in Chapter 5 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 4.4.6 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.

For the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Wind Farm', 'Proposed Grid Connection', 'Proposed Wind Farm site' and the 'Site'. Please see Section 1.1.1 of this EIAR for further details. A detailed description of the Proposed Project is provided in Chapter 4 of this EIAR.

15.1 Traffic and Transport

15.1.1 Introduction

15.1.1.1 Background and Objectives

This section of the EIAR assesses 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 the additional traffic volumes that will be generated on the road network, and the geometric requirements of the abnormally large loads associated with the wind turbine components. The requirements of the additional traffic and abnormal loads generated during the construction phase were assessed for the external highway network that will provide access to the Site.

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 traffic management plan is also provided in Section 15.1.11.5.2 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 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, Derrinlough, Knocknamork, Shehy More, Cloncreen, Derrykillew, Ballyhorgan, Lettergull, Barnadivane, Cleanrath, Knockalough, Sheskin South and Borrisbeg.

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, established in 2014, 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 Ltd., 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 Section 1.2 of Chapter 1 Introduction. The assessment uses standard terminology to describe the likely significant effects associated with the Proposed Project. Further information on the classification of effects used in this assessment is presented in Section 1.7.2 of this EIAR.

15.1.1.4 Scoping and Consultation

Transport Infrastructure Ireland

Transport Infrastructure Ireland (TII) responded to scoping via an email dated 6th of December 2023, 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.

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

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

ID	Comment/Recommendation	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.	Consultation has been undertaken with Kilkenny County Council as set out in Section 15.1.1.4 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 construction material and turbine component delivery routes in terms of link flows are set out in Sections 15.1.4.2 and 15.1.6.2 of the EIAR, while an assessment of the capacity of the N76 / R695 and R695 / L1009 junctions is set out in Section 15.1.6.4.2. An assessment of the impacts during the construction of the Proposed Grid Connection underground cable route is set out in Section 15.1.7 while a swept path analysis undertaken for the abnormally large loads on the Turbine Delivery Route 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 13 of this EIAR.
4	The developer should have regard to any EIAR / EIS and all conditions and or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should, in particular, have regard to any potential cumulative impacts.	All conditions imposed by An Bord Pleanála will be adhered to, and the cumulative traffic related impacts are assessed in Section 15.2.16.1.
5	The developer, in preparing an EIAR, should have regard to TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works).	The design of the access junctions is in accordance with TII guidelines. The proposed design and visibility splays for the proposed access junction on the L-5024 are shown in Figures 15-23 and 15-24 respectively.
6	The developer, in conduction the Environmental Impact Assessment, 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).	The potential impacts of the Proposed Project with regards air quality is set out in Chapter 10 of this EIAR.

ID	Comment/Recommendation	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).	The potential 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 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 this section 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.	A Road Safety Audit has not been undertaken at this stage as there are no permanent new junctions or alteration proposed on the regional or national road network. A Stage 1 Road Safety Audit will be undertaken for the proposed construction and operational access on the L5024 local road prior to construction.
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.	It is noted that only minor temporary works, including temporary overruns and the temporary removal of street furniture, are proposed on the national road network during the abnormal load

ID	Comment/Recommendation	Response
		delivery phase. All construction works on the local road network 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 Section 15.1.9 below. While the construction phase 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 15.1.11.5.2.
12	In addition, the haul route should be assessed to confirm capacity to accommodate abnormal 'length' loads and any temporary works required.	A swept path analysis of the proposed turbine delivery route has been 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.	Consultation will be undertaken with these bodies prior to the delivery of abnormally large loads.
14	Where temporary works within any MMaRC Contract Boundary are required to facilitate the transport of turbine components to the Site, the applicant/developer shall contact thirdpartyworks@tii.ie in advance, as a works specific Deed of Indemnity will be needed by TII before the works can take place.	The applicant agrees with this condition.
15	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 15.1.11.5.2 of this EIAR.

ID	Comment/Recommendation	Response
16	TII notes the proposed grid connection to the Ballyragget 110 kV substation, though the EIAR scoping report confirms that neither the on-site substation nor the grid connection cabling route will form part of the planning application. TII noted that any grid connection and cable routing proposals should be developed to safeguard proposed road schemes as TII will not be responsible for costs associated with future relocation of cable routing where proposals are catered for in an area of a proposed national road scheme. In that regard, consideration should be given to route options, use of existing crossings, depth of cable laying etc.	This was the case at the time that the EIAR scoping exercise was being undertaken, however, the Proposed Grid Connection underground cabling route and 38kV on-site substation do form part of this planning application.

Department of Transport

A response to scoping was received from the Department of Transport (DoT) on the 19th December 2023. The response refers to issues relating to the Proposed Grid Connection underground cabling route and works within the public road network. The issues raised and the Applicants responses are provided in Table 15-1b as follows:

Table 15-2b Issues raised by DoT in relation to the Proposed Project and Responses

ID	Comment/Recommendation	Response
1	Their [grid connection cables] 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.	The Applicant and their Contractor will work with the Road Authority to minimise impacts on construction and maintenance of the road network through the scheduling of construction of sections of the route and agreement with diversion routes where required. It should be noted that any works within the public road corridor will be subject to a Road Opening Licence. .This is a formal process through which the specific requirements of the Road Authority will be agreed.
2	Their [grid connection cables] 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 soil conditions.	As set out in Section 15.1.12.5.2 all roads will be re-instated in line with the specification of the Roads Authority. The Road Opening Licence process includes for a long-term impact and reinstatement fees, that are held for a minimum of two years following the completion of works, to cover any road maintenance works that may be required.

ID	Comment/Recommendation	Response
3	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 Proposed Grid Connection underground cabling trench will measure approximately 600mm in width. Therefore, there will be sufficient space for other utilities within the public road corridor.
4	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.	Once the Proposed Grid Connection underground cabling works have been completed, it will be become an ESBN asset and be treated no differently to any other existing service or utility within the public road corridor.
5	Examination of options other than the routing of cables along the public road.	Refer to Chapter 3: Consideration of Reasonable Alternatives
6	Examination of options for connection to the national grid network at a point closer to the wind farm in order to reduce the adverse impact on public roads.	Refer to Chapter 3: Consideration of Reasonable Alternatives
7	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,	The location of the Proposed Grid Connection underground cabling within the public road corridor is shown on the detailed site layout drawings in Appendix 4-1 of this EIAR. As noted above, any works within the public road corridor will be subject to a Road Opening Licence. .This is a formal process through which the specific requirements of the Road Authority will be agreed.
8	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,	The proposed locations of joint bays, communication chambers and earth sheath link chambers are shown in the detailed site layout drawings in Appendix 4-1 of this EIAR.
9	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,	Joint Bays are subject to standard ESBN specification and cannot be eliminated from the Proposed Grid Connection underground cabling design. Once the sections of cabling have been connected within each joint bay, the chamber will be backfilled and the road surface will

ID	Comment/Recommendation	Response
		be reinstated as per Road Authority specifications.
10	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).	The Proposed Grid Connection underground cabling design is subject to ESBN specification and no deviation from this will be acceptable to ESBN, who will take ownership of the cabling, once complete.

It is confirmed that the above points raised by the DoT have been considered in the route selection and design of the Proposed Grid Connection underground cable route as set out in Chapter 3 of this EIAR.

The DoT considers the following should 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 to require the elimination of jointing bays and the use of temporary removable jointing bays instead, to protect the integrity of the road structure, thereby improving safety for those driving on the public road by eliminating hard spots and preserving the road width for other utilities. (See response to Point 9 in Table 15-1c above).
- 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.

Kilkenny County Council

A scoping response was received from Kilkenny County Council on 8th December, 2023, with the traffic and roads related issues raised, together with the Applicants responses, set out in Table 15-1c as follows;

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

ID	Comment/Recommendation	Response
1	› The main issues arising for any proposed wind farm development from a road perspective will occur during the construction phase of the project for both the wind farm construction itself and method of connection to the preferred grid connection point. I note that a ducted route following public routes in preferred.	The assessment of effects due to traffic associated with the Proposed Grid Connection underground cabling route are outlined in Section 15.1.7 below.
2	An additional key consideration is cumulative effects. The Roads Authority is significantly concerned about multiple applications for wind and solar farms proposing broadly similar and, in some cases, exactly the same cable connection routes. Rationalisation of routes and co-ordination and amalgamating such individual cable routes seems a minimum requirement and consideration that needs to be made as part of the EIAR process.	The Proposed Grid Connection underground cabling design is subject to ESBN specification and no deviation from this will be acceptable to ESBN, who will take ownership of the cabling, once complete.
3	The applicant will be required to provide a detailed surveyed drawing of the proposed temporary and permanent site access arrangements showing the required sightlines in accordance with the TII Design Manual for Roads and Bridges. In general, where the access off the local road network is proposed a minimum visibility splay/sightline of 90m to the nearside road edge both directions from a point 2.4m back from the proposed entrance will be required as a minimum. In the case of regional roads this should be 145m. It is preferable to minimise the number of permanent accesses onto the road network.	The proposed design and visibility splays for the proposed access junction on the L-5024 are shown in Figures 15-23 and 15-24 respectively. The design is based on a detailed survey base and the required 90m visibility splays are achieved. The proposed design of the temporary junction on the L-1099 is shown in Figure 15-22 of the EIAR. As set out in Section 15.1.10 of the EIAR, this temporary access will be used only on 19 nights when abnormal loads will be delivered to the site accompanied by a Garda escort, and on 7 days when concrete foundation will be poured, during which temporary traffic management measures will be put in place, including signage and the presence of a flagman, in order to provide a safe access and egress to and from the site. On the completion of the construction phase this location will be fenced off and re-instated to its original state and will be opened only for the purpose of replacing large turbine component parts.

ID	Comment/Recommendation	Response
4	The construction make-up of the entrance area shall be detailed. At a minimum the first 5m off the roadway edge should be a tarmac surface falling away from the public road to avoid ponding on the public road. The drainage arrangements shall also be detailed for both the entrance area and the access roads within the development site. The existing roadside drainage shall remain unaffected and where necessary accommodated for.	The first 5m off the existing public roadway edge will be a tar & chip surface. The proposed drainage arrangement at the site entrance is shown on the drainage drawings in Appendix 4-3 of this EIAR. The same will be achieved at the proposed temporary junction on the L-1099.
5	The applicant should be requested to provide a photographic & FWD survey of TDR in the case of the local and regional roads network. This would be carried out prior to construction and on completion of the TDR phase of the development and the extent of any repairs to the road network if any arising from this development shall be determined and agreed with the Municipal District Engineer and the applicant shall cover the costs of any required repairs.	The Applicant agrees with this condition as set out in Section 15.1.11.5.2 of the EIAR.
6	Where temporary works are required to the TDR on third party lands to facilitate the delivery of wind turbine elements, demonstration of landowner consent is required. [It is noted] any references to, for example, over-sail requirements on private lands, temporary works on private lands, affecting private roadside boundaries in respect of the delivery of turbine components. It shall be the applicant's responsibility to ensure that permissions are in place at the time of applying for any necessary road openings, etc. Where such works are required, proposals shall be designed using a detailed survey for each temporary works area. Depending on the nature, complexity and duration of proposed temporary works a Road Safety Audit may be required. This can be advised upon as proposals are developed.	A swept path assessment is included as Section 15.1.9 of this EIAR. Discussions will be held with Kilkenny County Council to discuss the extent of the Road Safety Audit to be prepared prior to construction.
7	Identify and structurally assess structures on the route of the TDR, in particular when crossing the regional and local road network. Where structures on National Routes will be impacted consultation and approval from the TII Structures Section will be required. Where structural works are required on the road network these will need to be detailed. To note for example in order to increase depths of cover to increase the structural	While it is proposed that abnormally sized loads will be delivered to the Site the loading on each axle will not exceed standard limits, therefore impacts on structures along proposed TDR are not anticipated.

ID	Comment/Recommendation	Response
	strength an overlay may be suggested. However, the structural strength of in particular masonry structure may not be adequate for same and alternative proposals may be required. Parapets will also need to be considered if raising of road levels in being considered.	
8	The applicant shall be conditioned to prepare and agree a construction and traffic management plan with the Municipal District Engineer prior to commencement of the development works. (Likely will be included as a condition but the principle of assessing the route would need to be included. This will also form part of the road opening licence.	A TMP is included as Appendix 15-2 of this EIAR. This will be developed in detail with the Municipal District Engineer prior to commencement of the development works.
9	Depending on the access route proposed and its suitability it may be necessary for the applicant to submit proposals for the provision of passing bays along the local road for example and provide a drawing indicating the locations and construction detail.	As set out in Section 3.1 of the TMP included as Appendix 15-2 of this EIAR, it is proposed to implement a one way delivery and exit system, for Proposed Project-generated traffic only, on the local road network in order that opposing HGVs do not meet during the construction. This will be developed in detail with the Municipal District Engineer, as discussed above. The delivery of abnormally large loads will occur at night in order to minimise disruption to general traffic during the construction stage.
10	The applicant shall provide details of the proposed development traffic generation for the construction, operational and decommissioning phases in order to assess the potential impact on the road network.	Estimates of the traffic generation during the construction of the Proposed Project are set out in Section 15.1.4 of this EIAR, with the impacts addressed in Section 15.1.6.
11	Where it is necessary to remove existing road signage to facilitate abnormal loads to the development site careful consideration to the provision and location of temporary signage or retrofitting of existing signage with socketed bases to aid removal/replacement. The precise details of these will be addressed in the context of the road opening permission but reference to what is intended or proposed should be contained in the planning documentation.	The applicant has vast experience in successfully engaging with the relevant authorities in this regard and is agreeable to retrofitting of existing signage with socketed bases, as deemed necessary.
12	Where service diversions are required (ESB, Eircom, etc) the Applicant shall liaise with the	It is currently not proposed to divert any existing services. As stated in Chapter 4,

ID	Comment/Recommendation	Response
	relevant service providers and reference any changes proposed in the planning documentation.	Section 4.8.2.3 of this EIAR, before works on the Proposed Grid Connection underground cabling commences, updated surveying will take place along the proposed cable route, with existing culverts and services identified. Relevant bodies will be contacted and up to date information for existing services sought.
13	The expected time period for any TDR phase should be referenced within the context of the overall expected construction period.	Details in relation to timing and sequencing of the construction phase (including turbine component delivery) is outlined in Chapter 4, Section 4.7.2 and Section 15.1.4.2, below, of this EIAR.

15.1.1.5 Methodology and Section Structure

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

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

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

- A review of the existing and future transport infrastructure in the vicinity of the Proposed Project, including the proposed turbine delivery route, an assessment of base 2023/2024 traffic flows and traffic forecasts during an assumed construction year of 2028 (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 Site (Section 15.1.5 Construction Traffic Vehicles),
- A review of the effects of Proposed Project-generated traffic on links and junctions during construction and when the facility is operational (Section 15.1.6 –Traffic Effects During Construction and Operation),
- An assessment of the effects during the Proposed Grid Connection underground cable route (Section 15.1.7 – Effect on Network of Grid Connection),
- 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 15.1.11 – Provision for Sustainable Modes of Travel),
- A description of potential effects of the Proposed Project on Roads and Traffic (Section 15.1.12 – Likely Effects and Associated Mitigation Measures).

15.1.2 Receiving Environment

15.1.2.1 Site Location

The Proposed Project is located in County Kilkenny in the townlands listed in Table 1-1 of Chapter 1 and is shown in Figure 15-1a. The Proposed Wind Farm is located within a rural, agricultural setting in northwest Kilkenny, approximately 8.5km west of Kilkenny City. The settlement of Kilmanagh is located approximately 1.2km south of the nearest proposed turbine, and the settlement of Tullaroan is located approximately 2.7km north of the nearest proposed turbine. The R695 regional road, which originates from the N76 national secondary road, runs immediately south of the Site in an east-west orientation entering Kilmanagh and then heading south from Kilmanagh towards Callan, passing within 1.3km of the nearest proposed turbine. Existing access into the Proposed Wind Farm Site is via farm entrances off the L5023 local road to the northwest, L5024 to the north, and L1009 to the south. The site is traversed by a number of existing agricultural roads and tracks.

Landuse within the Proposed Wind Farm site currently comprises a mix of pastoral agriculture and small-scale, private forestry. The surrounding land uses predominantly comprises pastoral agriculture and residential within Kilmanagh and Tullaroan.

15.1.2.2 Proposed Turbine Delivery Route

The proposed port of entry for the large wind turbine components is the Belview Port in Waterford City. The proposed turbine delivery route (TDR) for the abnormally sized turbine components from the M9 to the Proposed Wind Farm site is shown in Figure 15-1a.

The proposed TDR is as follows;

- From Belview Port the route travels north on the N29 for approximately 4km before heading west on the N25 for approximately 6 km.
- The route the turns off the N25 at the Grannagh Roundabout to access the N9 heading west for a further 0.8 km to the Quarry Roundabout that connects with the M9.
- From the Quarry Roundabout the route heads north on the M9 for approximately 35 km exiting at Junction 9 onto the N10.
- From this point the route travels north on the N10 for approximately 7.2 km to the Waterford Roundabout on the southern section of the Kilkenny City ring road.
- The route then heads northwest on the N76 Kilkenny City ring road for approximately 1.2 km to the Callan Road roundabout.
- From the Callan Road roundabout the TDR travels southwest on the N76 for approximately 14.2 km to the junction with the R695 just north of the town of Callan.
- At this point the route turns right off the N76 and heads north on the R695 for approximately 9.4 km to the priority junction with the local L1009 in Kilmanagh.
- At this junction the TDR turns left to head west for approximately 0.2 km to a point where the abnormally sized loads will turn right off the L-1009 to access the Proposed Wind Farm Site at a temporary access junction.

An assessment of the turning requirements of the abnormally large vehicles, transporting the turbine components, was undertaken at the various pinch points along the TDR from the N76 / R695 junction to the site, as identified in Figure 15-2a. It is noted that all potential pinch points at locations between Belview Port and the N76 were also assessed and are included in Appendix 15-3. The swept path assessment for the entire route is discussed in Section 15.1.9.

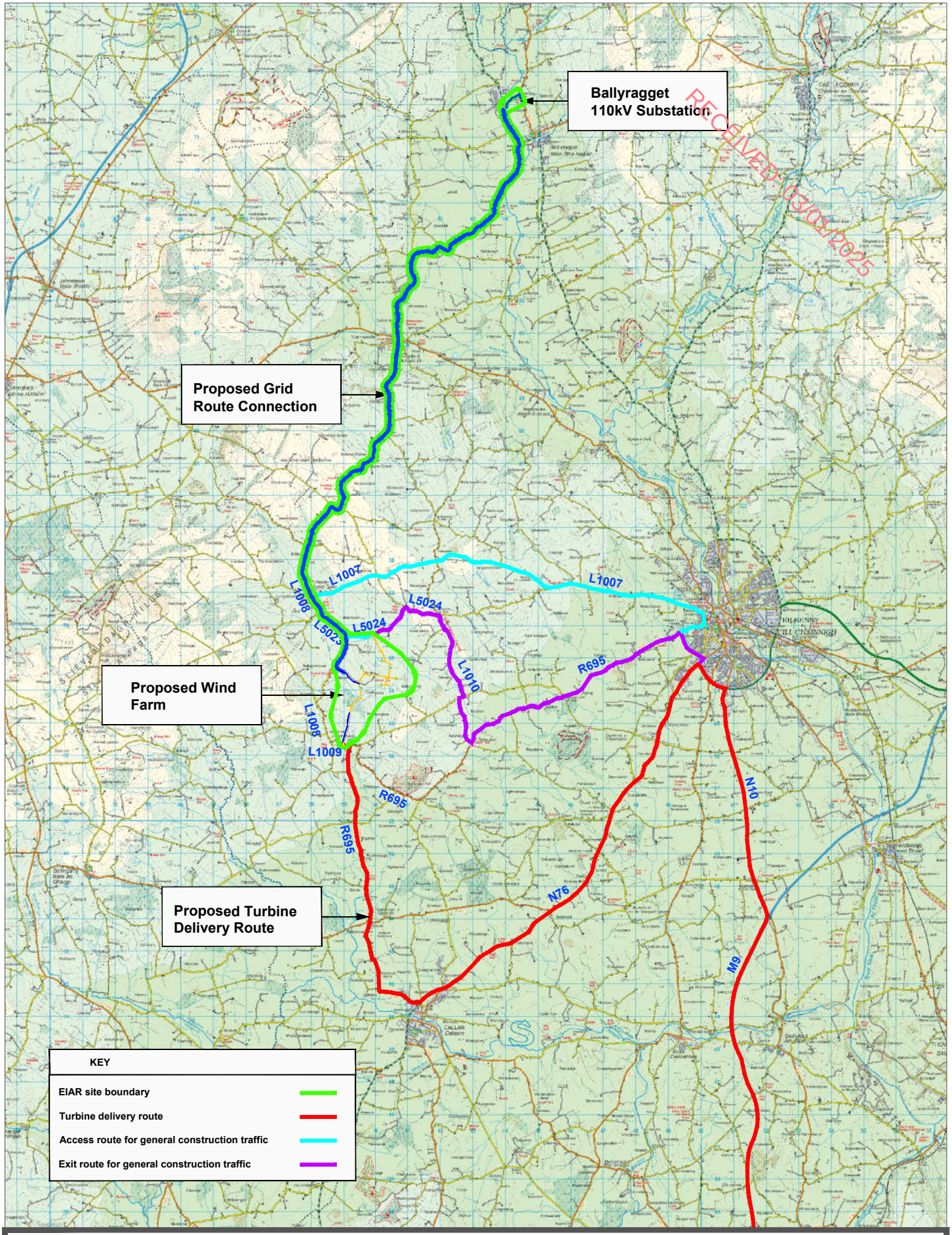

Figure 15-1a Site location, turbine delivery route, general construction traffic routes and grid connection route

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 19.09.24	DRAWN BY:	AL

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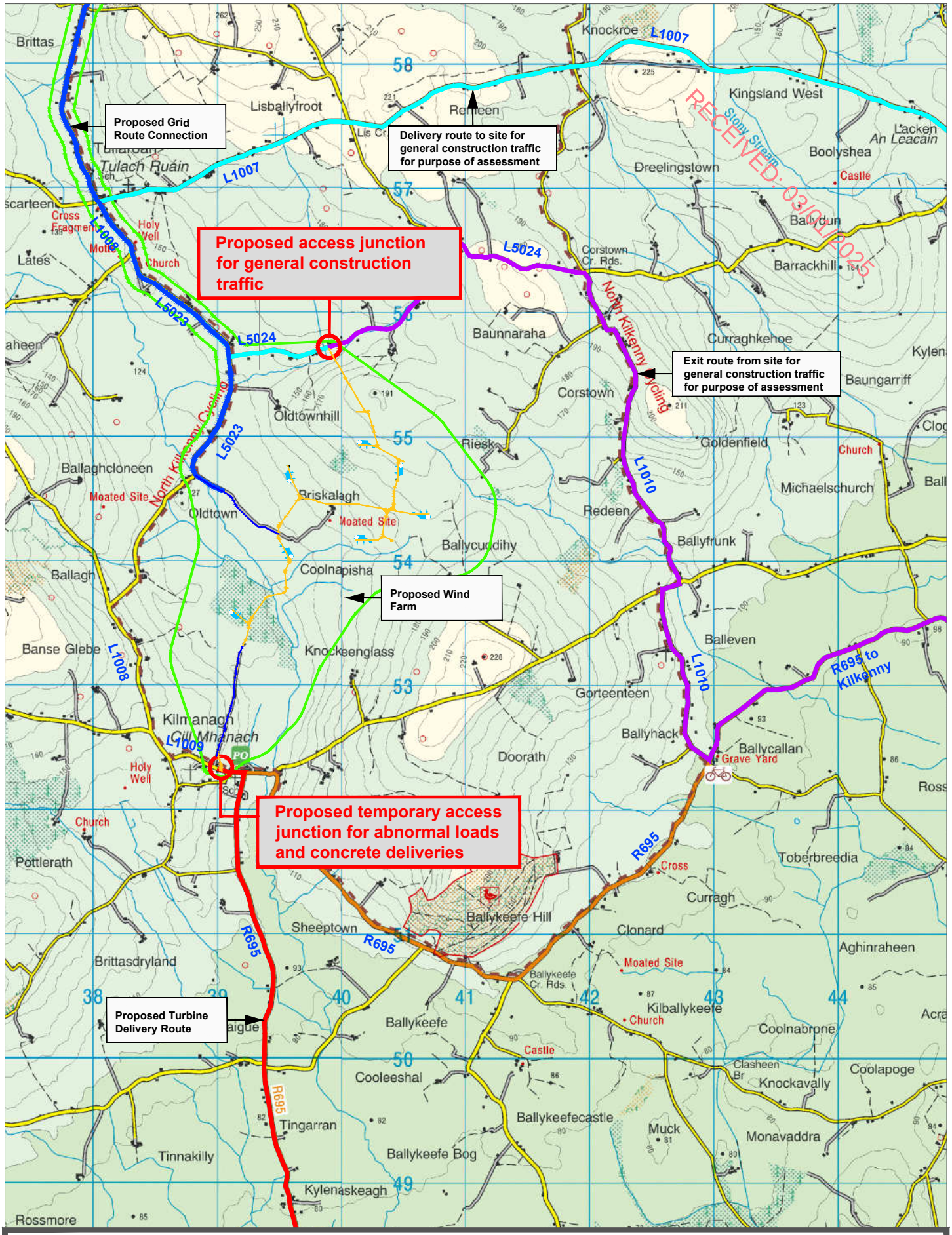

Figure 15-1b Location of Wind Farm access junctions

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 19.09.24	DRAWN BY:	AL

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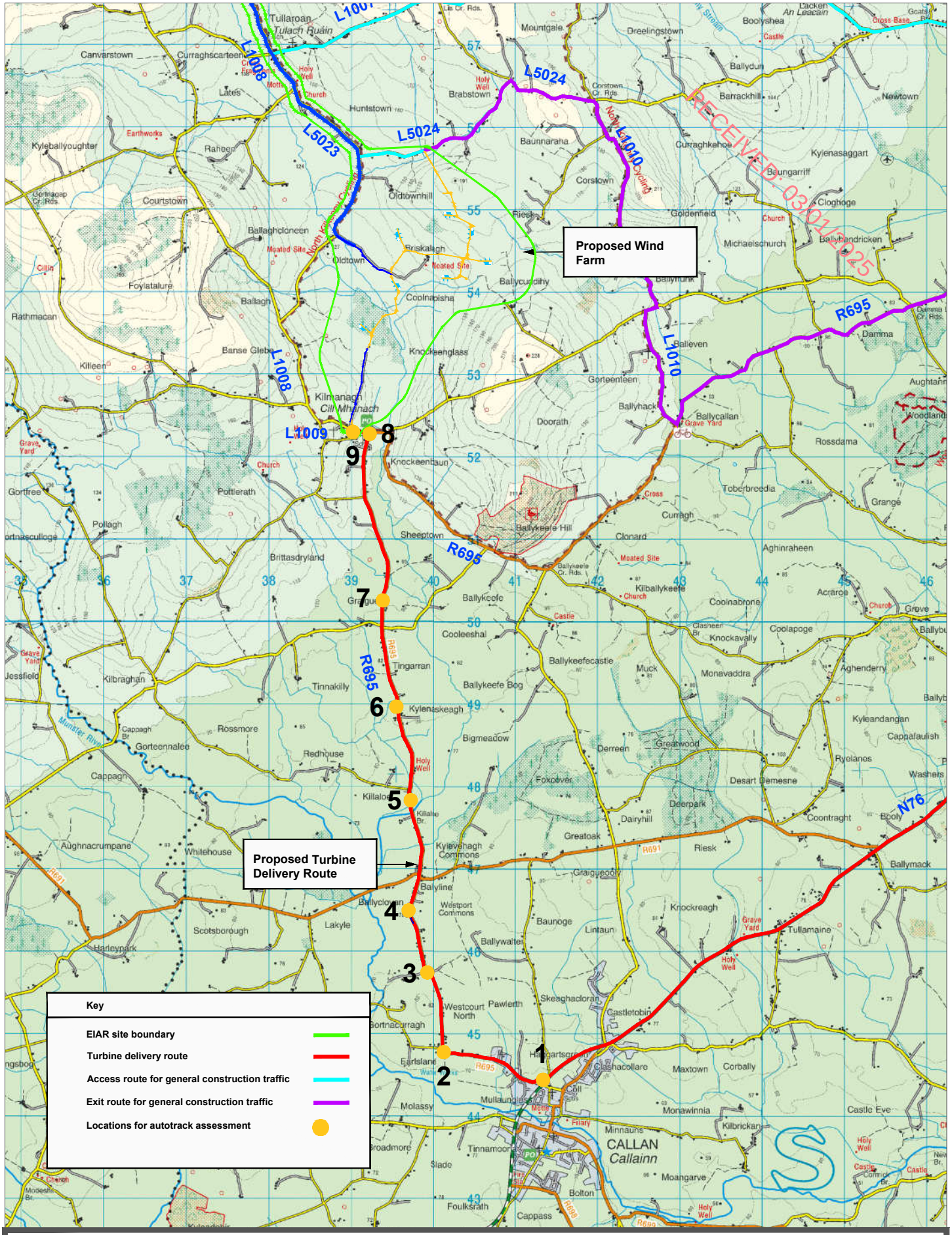

Figure 15-2a Locations on turbine delivery route for autotrack assessment

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 19.08.24	DRAWN BY:	AL

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15.1.2.3 Proposed Construction Traffic Haul Route

All concrete required for each turbine foundation will be delivered to the site in one day per foundation for a total of 7 days. The concrete (and some crushed stone) required for the turbine foundations will be sourced from local, appropriately authorised quarries as shown in Figure 4-28 in Chapter 4 of this EIAR. All concrete deliveries provided by local quarries will access the Site via the temporary access off the L1009 located at the southern end of the site, as shown in Figure 15-1b.

It is proposed that all other materials will be accessed via the proposed new permanent access junction off the L5024 located at the northern end of the Proposed Wind Farm site, also shown in in Figure 15-1b.

While the access routes for all other materials will be agreed with Kilkenny County Council prior to construction, it is confirmed that these routes will avoid the settlement of Kilmanagh. For the purpose of this assessment it is assumed that the proposed delivery routes for all other materials required for the construction of the Proposed Wind Farm and the Proposed Grid Route are to and from the direction of Kilkenny with a different route designated for deliveries accessing the site and for those exiting the site in order to minimise the impact on the local road network and to ensure that HGV trips generated by the Proposed Project do not meet travelling in opposing directions. The proposed route, for the purpose of this assessment, between Kilkenny and the Site are as follows;

- **To the Proposed Wind Farm site** (shown as light blue in Figure 15-1a) – Travels westbound on the L1007 for approximately 13km before turning left and heading south on the L1008 and L5023 for approximately 1.7km. The route them heads east for approximately 0.8 km on the L5024 to turn right into the site at the proposed site access junction.
- **From the Proposed Wind Farm site** (shown as magenta in Figure 15-1a) – A right turn out of the site exit onto the L5024. The route travels east on the L5024 for approximately 2.5km before turning right onto the L1010 heading south for approximately 4.4 km. The route then turns left onto the R695 to head eastbound for approximately 7.6 km in the direction of Kilkenny.

The design of the proposed new permanent access junction is discussed in Section 15.1.9 of this EIAR.

15.1.2.4 Proposed Grid Connection

The Proposed Grid Connection includes for the proposed onsite 38kV substation, temporary construction compound and an associated 38kV underground cabling route connecting to the existing 110kV Ballyragget Substation, located in the townland of Moatpark. The Proposed Grid Connection underground cabling route measures approximately 23 km, of which 22.1 km is located within the public road corridor. The Proposed Grid Connection and associated traffic related impacts are discussed in Section 15.1.7.

15.1.3 Existing Traffic Volumes

Traffic volumes are discussed in terms of either vehicle numbers, or Passenger Car equivalent Units (PCUs), where each vehicle is expressed in terms of its demand on the network relative to the equivalent number of cars. For example, an articulated 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.

15.1.3.1 Background Traffic Flows

The six locations included in the link flow assessment and for which base year 2023/2024 traffic count data was collated are shown in Figure 15-2b. The locations included in the assessment are as follows,

- Link 1 – N10 between M9 and Kilkenny,
- Link 2 – N76 east of Callan,
- Link 3 – R695 north of Callan,
- Link 4 – R695 south of Kilmanagh,
- Link 5 – L-1009 west of R695 in Kilmanagh,
- Link 6 – R695 east of Kilmanagh.

Two sources of data were used to provide all day traffic flows for the links included in the assessment, as set out in Table 15-1. For Link 1 on the N10 between the M9 and Kilkenny the data was obtained from an automatic traffic counter maintained by Transport Infrastructure Ireland (TII). For the remaining five links, 12 hour (07:00 to 19:00) traffic counts were undertaken at two junctions to provide 2-way links flows and junction turning count data. The 12 hour traffic counts were converted to all day 24 hour counts using an expansion factor determined from the ATC data used for the N10 (24 hour = 1.18 x 12 hour). The traffic counts were undertaken by Traffinomics Ltd on Tuesday 28th May 2024.

All base year traffic count data is included as Appendix 15-1.

The all-day traffic flows observed for the base year 2023/2024 are shown in terms of vehicle numbers in Table 15-2. As would be expected the figures show that there is a considerable range in existing traffic volumes on the proposed turbine delivery route and construction traffic routes, ranging from 8,764 vehicles per day on the N76 to the east of Callan, to 814 vehicles per day on the R695 south of Kilmanagh.

Table 15-1 Count locations and data source.

Link	Data source
1 – N10 – between M9 and Kilkenny	TII ATC site
2 – N76 – east of Callan	Classified count
3 – R695 – north of Callan	Classified count
4 – R695 – south of Kilmanagh	Classified count
5 – L1009 – west of R695 in Kilmanagh	Classified count
6 – R695 – east of Kilmanagh	Classified count

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

Link	2023	2024
1 – N10 – between M9 and Kilkenny	8,695	NA
2 – N76 – east of Callan	NA	8,764

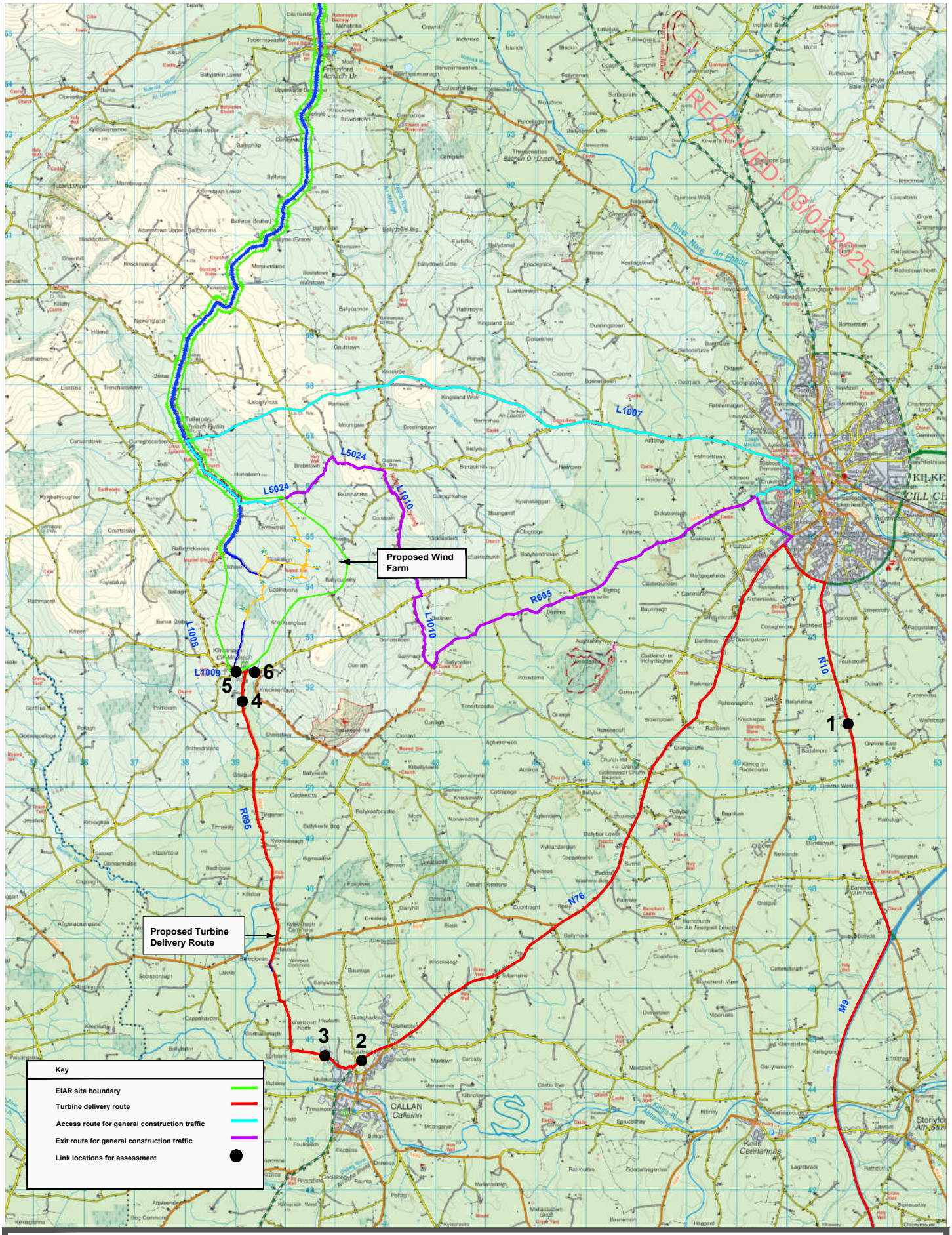

Figure 15-2b Locations of links included in trafficimpact assessment

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 26.09.24	DRAWN BY:	AL

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Link	2023	2024
3 – R695 – north of Callan	NA	3,074
4 – R695 – south of Kilmanagh	NA	814
5 – L1009 – west of R695 in Kilmanagh	NA	1,175
6 – R695 – east of Kilmanagh	NA	998

15.1.3.2 Background Traffic Volumes for the Assumed Construction Year 2028

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

Revised guidelines for forecasting annual growth in traffic volumes were produced by TII in October 2021, as set out by count in the Project Appraisal Guidelines (Unit 5.3 – Travel Demand Projections). The annual growth rates for light vehicles for County Kilkenny and factors for the years relevant to this study are shown in Tables 15-3 and 15-4. Based on TII growth rates it is estimated that traffic volumes will increase by 6.4% from 2023, and 5.1% from 2024 to the year 2028, when the construction of the Proposed Project is forecast to take place. Traffic flows for the base years 2023/2024 and the construction year of 2028 are compared in Table 15-5.

It should be noted that while the assumed construction year of 2028 may vary within the 10-year period for which planning permission is sought, this will not alter the forecast outcomes and effects presented in this section of the EIAR. This is due to the annual growth rate for background traffic being just 1.24% by the year 2028 (as shown in Table 15-3 as 1.0124) and the traffic volumes generated by the Proposed Project will remain unchanged regardless of construction year, as presented subsequently in Section 15.2.4. For example, in the event that the construction year is 2030 rather than 2028, background traffic volumes will increase from the base year of 2023 by 8.1% rather than 6.4%, as also shown in Table 15-3.

TII traffic count data recorded at the TII count site on the N10, together with the classified traffic count undertaken for the purpose of this assessment, were also used to determine the existing percentage of HGVs on the proposed delivery routes. The observed percentage of HGVs are shown in Table 15-6 and range from a minimum of 3.1% observed on Link 1 on the N10 between the M9 and Kilkenny, to a maximum of 9.2% observed on the N76 to the east of Callan.

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

Year	Lights – Annual Factor			Lights – Cumulative Factor		
	Low	Medium	High	Low	Medium	High
2023	1.0108	1.0124	1.0157	1.000	1.000	1.000
2024	1.0108	1.0124	1.0157	1.011	1.012	1.016
2025	1.0108	1.0124	1.0157	1.022	1.025	1.032
2026	1.0108	1.0124	1.0157	1.033	1.038	1.048

Year	Lights – Annual Factor			Lights – Cumulative Factor		
	Low	Medium	High	Low	Medium	High
2027	1.0108	1.0124	1.0157	1.044	1.051	1.064
2028	1.0108	1.0124	1.0157	1.055	1.064	1.081
2029	1.0108	1.0124	1.0157	1.067	1.077	1.098
2030	1.0108	1.0124	1.0157	1.068	1.081	1.106

Table 15-4 TII traffic growth rates by growth scenario

Period	New Factors		
	Low	Medium	High
2023 - 2028	1.055	1.064	1.081
2024 - 2028	1.044	1.051	1.064

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

Link	2023	2024	2028
1 – N10 – between M9 and Kilkenny	8,695	NA	9,251
2 – N76 – east of Callan	NA	8,764	9,211
3 – R695 – north of Callan	NA	3,074	3,231
4 – R695 – south of Kilmanagh	NA	846	889
5 – L1009 – west of R695 in Kilmanagh	NA	1,175	1,235
6 – R695 – east of Kilmanagh	NA	998	1,049

Table 15-6 All day flows, percentage HGVs and flows by vehicle type, year 2028.

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / lgvs	HGVs	Cars / lgvs	Total
1 – N10 – between M9 and Kilkenny	9,251	3.1%	287	8,965	688	8,965	9,653

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / lgvs	HGVs	Cars / lgvs	Total
2 – N76 – east of Callan	9,211	9.2%	847	8,363	2,034	8,363	10,397
3 – R695 – north of Callan	3,231	6.7%	216	3,014	519	3,014	3,534
4 – R695 – south of Kilmanagh	889	4.2%	36	820	86	820	906
5 – L1009 – west of R695 in Kilmanagh	1,285	4.9%	61	1,175	145	1,175	1,320
6 – R695 – east of Kilmanagh	1,049	4.3%	45	1,004	108	1,004	1,112

15.1.4 Proposed Project and Traffic Generation

15.1.4.1 Proposed Access Junctions

While the design of the junctions that will provide access to the Proposed Wind Farm are discussed in Sections 15.1.9, a summary of the proposed access junctions is provided below. The 2 proposed access junctions that will provide access to the Proposed Wind Farm site are shown in Figure 15-1b.

Temporary Access Junction for Abnormally Sized Loads and concrete deliveries on the L-1009

It is proposed that a temporary access will be constructed on the northern side of the L-1009 at the southern boundary of the Site approximately 0.2 km west of the L-1009 / R695 junction in Kilmanagh.

This junction will only be used on

- the 19 nights that a convoy of abnormally sized loads will be delivered to the Site accompanied by an escort provided by An Garda Siochana and the haulage company, and,
- the 7 days that the concrete deliveries will be to the site for the construction of the turbine foundations.

During the construction phase of the Proposed Project, when the temporary access junction is not in use, it will be closed off by means of temporary fencing, as shown in Appendix 4-1 of Chapter 4 of this EIAR.. Once the construction of the Proposed Project is complete this temporary access will be closed and the land and existing boundary treatments re-instated. The proposed access will only be re-opened for the replacement of abnormally large turbine components, which is an unlikely occurrence.

Main Construction and Operational Site Entrance off the L-5024

The access for general construction traffic and for maintenance traffic during the operational phase will be off the L-5024 located at the northern boundary of the Proposed Wind Farm site. This entrance will be established for general construction traffic and construction staff access and will be retained as the operational access for the Proposed Project.

15.1.4.2 Development Trip Generation – During Construction

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

- Stage 1 – Proposed Project construction: groundworks, construction of temporary construction compounds, turbine foundations, met mast foundations, onsite 38kV substation, internal electrical cabling and construction of the Proposed Grid Connection underground cable route.
- Stage 2 – Wind turbine component delivery and construction.

For the purpose of the traffic impact assessment, projections based on trip generation data collected from other wind farm construction projects regarding the numbers of trips per quantum of material, the number of turbine component parts based on 7 no. turbines, the length of the construction phase and work periods etc. were made to inform the assessment. These projections allow for assessment using the precautionary principle but should not be inferred as prescriptive limitations to the construction phase. There are numerous variables which can affect a construction project programme, including weather. The construction phase of the Proposed Project will be carried out in accordance with the CEMP, included as Appendix 4-2 of this EIAR, which will be agreed, where required, with the relevant Local Authority.

The traffic generation estimates set out in the following paragraphs is based on a total construction period of 12 months. The shortest potential construction phase duration of 12 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.

15.1.4.2.1 *Stage 1 – Site Preparation and Groundworks (general construction = 222 days, concrete foundation pours = 7 days)*

For assessment purposes, this stage of the Proposed Project construction, which includes the site preparation and ground works, construction of temporary construction compounds, turbine foundations, met mast foundations, and internal electrical cabling is assumed to last approximately 11 months (229 days), during which a total of 8,222 deliveries will be made to the Site, as shown in Table 15-7. During this construction phase there will be two distinct types of days with respect to trip generation.

A total of 7 working days will be used to pour the 7 concrete wind turbine foundations. Foundations will likely be poured one per day, with circa 107 concrete loads required for each turbine delivered to the Proposed Wind Farm site over a 12-hour period, resulting in 9 HGV trips to and from the site per hour.

On the remaining 222 working days for this stage other general materials will be delivered to the Proposed Wind Farm site and will use the proposed new permanent site access junction located to the north of the Proposed Wind Farm site.

The estimated additional daily traffic generated on the road network during these days are shown in Tables 15-8 and 15-9. The figures show that on the 7 working days that concrete will be delivered to the

Site, an additional 514 two-way PCUs will be added to the network (comprising 107 two-way HGV trips with 2.4 PCUs per movement), as shown in Table 15-8. Similarly, on the 222 working days when other materials will be delivered to the Site, traffic volumes on the local network will increase by an average of 71 PCUs, as set out in Table 15-9.

15.1.4.2.2 Stage 1 – Proposed Grid Connection (230 days)

This stage of the Proposed Project construction, includes works related to the construction of the Proposed Grid Connection, including, construction of atemporary construction compound, the onsite 38kV substation and the underground cable route. The construction of the of the Proposed Grid Connection is discussed further in Section 15.1.7 of the EIAR. It is forecast that the construction of the Proposed Grid Connection and associated works will take 230 working days during which a total of 4,212 HGV trips will travel to and from the Site, as shown in Table 15-7. On the 230 days when deliveries for the Proposed Grid Connection and associated works will be delivered to the Site, traffic volumes generated by deliveries on the local network will increase by an average of 88 PCUs, as set out in Table 15-10.

Table 15-7 Trip generation - Stage 1 - Site preparation and groundworks – total loads – Proposed Project

Material	Total no. Truck Loads	Truck type
Proposed Wind Farm		
Concrete	749	Trucks
Delivery of plant	31	Large artic
Fencing & gates	3	Large artic
Compound setup	28	Large artic
Steel	19	Large artic
Sand / binding / stone / pile foundation	153	Trucks
Ducting and cabling (internal)	206	Large artic
Crane (to lift steel)	1	Large artic
Cranes for turbines	12	Large artic
Refuelling for plant	165	Large artic
Stone for Proposed Wind Farm	2,400	Trucks
Tree felling	43	Trucks
Site maintenance	120	Large artic
Miscellaneous	80	Large artic
Proposed Wind Farm - Total	4,010	
Proposed Grid Connection		

Material	Total no. Truck Loads	Truck type
Stone for Grid Connection	747	Trucks
Stone for Substation	652	Trucks
Stone for Temporary construction compound	138	Trucks
Materials for Proposed Grid Connection	2,675	Large artic
Proposed Grid Connection - Total	4,212	
Total	**8,222**	

Table 15-8 Trip generation - Stage 1 – Concrete foundation pouring – total movements and volumes per delivery day – Proposed Wind Farm

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2- way PCUs/day
Concrete	749	Trucks	2.4	1,798	256.8	513.6
* Estimation based on 7 concrete pouring days						

Table 15-9 Trip generation - Stage 1 – Site preparation and groundworks – total movements and volumes per delivery day – Proposed Wind Farm

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Proposed Wind Farm						
Delivery of plant	31	Large artic	2.4	74.4	0.34	0.67
Fencing & gates	3	Large artic	2.4	7.2	0.03	0.06
Compound setup	28	Large artic	2.4	67.2	0.30	0.61
Steel	19	Large artic	2.4	45.6	0.21	0.41

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Sand / binding / stone / pile foundation	153	Trucks	2.4	367.2	1.65	3.31
Ducting and cabling (internal)	206	Large artic	2.4	494.4	2.23	4.45
Crane (to lift steel)	1	Large artic	2.4	2.4	0.01	0.02
Cranes for turbines	12	Large artic	2.4	28.8	0.13	0.26
Refuelling for plant	165	Large artic	2.4	396.0	1.78	3.57
Stone for Proposed Wind Farm	2,400	Trucks	2.4	5,760.0	25.95	51.891
Tree felling	43	Trucks	2.4	103.2	0.46	0.93
Site maintenance	120	Large artic	2.4	288.0	1.30	2.59
Miscellaneous	80	Large artic	2.4	192.0	0.86	1.73
Total	3,261			7,826.4	35.25	70.51

Table 15-10 Trip generation - Stage 1 – Construction of grid connection – total movements and volumes per delivery day – Proposed Grid Connection

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Stone for Grid Connection	747	Truck	2.4	1,792.8	7.79	15.59
Stone for Substation	652	Truck	2.4	1,564.8	6.80	13.61
Stone for Temporary construction compound	138	Truck	2.4	331.2	1.44	2.88
Materials for Proposed Grid Connection	2,675	Large artic	2.4	6,420.0	27.91	55.83

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2-way PCUs/day
Total	4,212			10,108.8	44.00	87.9

15.1.4.2.3 Stage 2 – Turbine Construction (abnormal loads = 19 nights, smaller components = 7 days)

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 15-11, which summarises that a total of 56 trips will be made to and from the Site by extended artics, with a further 28 trips made by standard large articulated HGVs.

Table 15-11 Trip generation - Stage 2 – Wind turbine plant – total loads – Proposed Wind Farm

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
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 5-week period with all deliveries made during the night. The actual trip number will be determined following consultations with An Garda Síochána. On a further two working 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 15-12 and 15-13. In Table 15-12 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 15-13, during the turbine construction phase.

Table 15-12 Trip generation - Stage 2 – Wind turbine plant, extended artics – total movements and volumes per delivery day – Proposed Wind Farm

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 15-13 Trip generation - Stage 2 - Wind turbine plant, standard artic HGVs - total movements and volumes per delivery day – Proposed Wind 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
*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 up to 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 of the Proposed Project, reducing to 45 PCU trips during the turbine construction stage.

15.1.4.2.4 Summary of construction days and trip generation by delivery route

A summary of the 2-way delivery trips in terms of pcus that will be generated on the 5 typical delivery days, together with the duration in days and the proposed access route, is shown in Table 15-14.

Table 15-14 Summary of trip generation by delivery day and delivery route

Delivery day	Days	2-way HGV pcus	2-way car pcus	2-way total pcus	Delivery route
General construction days	222	71	70	141	General construction materials delivery route
Concrete foundation delivery days	7	384	70	454	TDR
Grid connection construction days	230	88	16	104	General construction materials delivery route
Turbine delivery (abnormally sized loads)	19	60	45	105	TDR
Turbine delivery (standard HGVs)	7	19	45	64	Alternative route

It is proposed that the construction of the proposed Grid Connection (230 days) will be undertaken concurrently with the general construction days (222 days) and the turbine delivery standard HGV deliveries resulting in the 4 types of days for the purpose of the network traffic impact assessment as set out in Table 15-15. It is noted that the days are not in the order that they will occur, but provide a realistic representation of the delivery days that will occur within the 1 year construction period.

The first 2 types of construction days are;

- General construction + grid connection construction (222 days), and,
- Turbine delivery (standard HGVs) + grid connection construction (7 days).

For both of these days the traffic impacts resulting from the Proposed Project-generated traffic will occur on the delivery route between the northern access junction on the L5024 and Kilkenny. As inbound and outbound construction traffic will travel on different routes the 2-way traffic flows to be added to these routes are halved, as shown in the first 2 rows of Table 15-15. While these routes may vary and will be agreed with Kilkenny County Council, it is confirmed that no Proposed Project-generated development on these days will travel through the settlement of Kilmanagh.

The 3rd and 4th types of construction days are;

- Concrete foundation pouring days (7 days), and,
- Turbine delivery days (abnormal loads) (19 days).

For these delivery days all trips will travel to and from the site via the temporary access road off the L1009 to the west of Kilmanagh.

Table 15-15 Summary of trip generation test scenarios

Delivery day	Days	2-way HGV pcus	2-way car pcus	2-way total pcus	Delivery route
General construction + grid connection construction days	222	159 (*80)	86 (*43)	245 (*123)	Alternative route
Turbine delivery (standard HGVs) + grid connection construction days	7	107 (*54)	61 (*31)	168 (*84)	Alternative route
Concrete foundation delivery days	7	384	70	454	TDR
Turbine delivery (abnormally sized loads)	19	60	45	105	TDR

*Note: * Additional 2-way development traffic on road network is halved as one way in and one way out*

15.1.4.3 Development Trip Generation – During Operation

There will be no staff permanently present on the Site once the Proposed Project is operational as it will be remotely monitored. The only traffic associated with the operational phase of the Proposed Wind Farm will be from maintenance personnel that will gain access to the site via the northern access junction off the L5024.

While there will be no scheduled trips required for the Proposed Grid Connection underground cabling, 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 Wind Farm 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 15.1.12

15.1.4.4 Development Trip Generation – During Decommissioning

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

During this phase, there will be no traffic generation as a result of the Proposed Grid Connection as it will not be decommissioned.

15.1.5 Construction Traffic Vehicles

The delivery of turbine components including blades, tower sections and nacelles is a specialist operation owing to the oversized loads involved. As detailed in in Chapter 4 of this EIAR, the turbine model to be installed on the Proposed Wind Farm site will have an overall ground-to-blade tip height of 185 metres; blade rotor diameter of 163 metres and hub height of 103.5 metres. The turbine blades are the longest turbine component and a blade length of 81.5 metres has been assessed for the turbine delivery assessment for the Proposed Wind Farm.

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 15-3a for the blade transporter and 15-3b for the tower transporter.

The key dimensions are as follows:

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

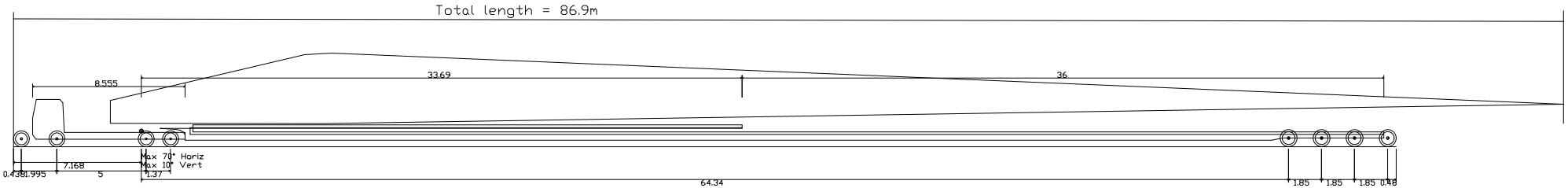
Total length	86.9 m
Length of blade	81.5 m
Inner radius	28.0 m

Transport of Tower – Using low-bed or drop deck trailers (See Figure 15-3b)

Total length (with load)	46.7 m
Length of load	34.9 m
Inner radius	25.0 m

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

All other vehicles requiring access to the Site will be standard HGVs or LGVs and will be significantly smaller than the design test vehicles. Standard HGVs and LGVs will navigate the National, Regional and Local Road networks and access the Proposed Wind Farm site off the L-5024.



81.5m blade

Overall Length excluding blade	77.537m
Overall Length including blade	86.900m
Overall Width	2.550m
Overall Body Height	2.661m
Min Body Ground Clearance	0.375m
Track Width	2.500m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

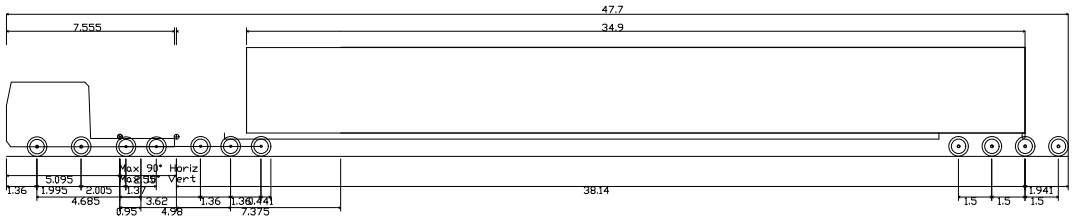
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

FIGURE 15-3a Design blade extended artic profile

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 18.09.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



Tower section 34.9m

Overall Length	47.726m
Overall Width	2.550m
Overall Body Height	4.900m
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 15-3b Design tower extended artic profile

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 18.09.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

15.1.6 Traffic Effects During Construction, Operation and Decommissioning of the Proposed Project

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 TDR and delivery routes shown in Figure 15-1a and discussed in Sections 15.1.2.2 and 15.1.2.3 of this EIAR.

15.1.6.1.1 *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 15.1.4.2.4 and shown in Tables 15-16 to 15-19, 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 15-20 to 15-23. 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:

General construction and grid connection construction (222 days)

- For 222 days, when general construction works will take place at the same time as the construction of the grid connection route, an additional 123 PCUs will travel to/from the Proposed Wind Farm site. On these days Proposed Project-generated traffic will travel on routes other than the TDR through the settlement of Kilmanagh, with potential routes via Kilkenny identified in Section 15.1.2.3 of this EIAR.

During these days it is forecast that the increase in traffic volumes will range from +1.3% on the N10 between the M9 and Kilkenny (Link 1), to +1.2% on the N76 just to the east of Callan (Link 2) and +3.5% on the R695 just to the north of Callan (Link 3). Travelling north toward the site background traffic volumes decrease resulting in a 13.6% increase on the R695 approaching Kilmanagh (Link 4), a 9.3% increase on the L-1009 just west of Kilmanagh (Link 5).

Turbine delivery (standard HGVs) and grid connection construction (7 days)

For 7 days when the delivery of smaller turbine components are made to the site by standard HGVs at the same time as the remaining 7 days required for the construction of the grid connection, it is forecast that an additional 85 PCUs will travel to/from the Proposed Wind Farm site.

On these days it is forecast that the increase in traffic volumes will range from +0.9% on the N10 between the M9 and Kilkenny (Link 1), to +0.8% on the N76 just to the east of Callan (Link 2) and +2.4% on the R695 just to the north of Callan (Link 3). Travelling north toward the site it is forecast that there will be a 9.4% increase on the R695 approaching Kilmanagh (Link 4), a 6.4%% increase on the L-1009 just west of Kilmanagh (Link 5).

Concrete foundation pouring days (7 days)

For 7 days when concrete is delivered to the site for the construction of the turbine foundations via the TDR and the temporary junction on the L1009 west of Kilmanagh, an additional 584 PCUs will travel to/from the site.

On these days it is forecast that the increase in traffic volumes will range from +6.0% on the N10 between the M9 and Kilkenny (Link 1), to +5.6% on the N76 just to the east of Callan (Link 2) and +16.5% on the R695 just to the north of Callan (Link 3). Travelling north toward the site it is forecast that there will be a 64.5% increase on the R695 approaching Kilmanagh (Link 4) and a 44.2% increase on the L-1009 just west of Kilmanagh (Link 5).

Turbine delivery days (abnormal loads) (19 days)

On the 19 nights that the abnormal loads carrying the large turbine components travel to the Proposed Wind Farm, an additional 105 PCUs will travel to/from the site.

On these days the volumes of traffic will remain at similar level in terms of pcus when it is forecast that the increase in traffic volumes will range from +1.1% on the N10 between the M9 and Kilkenny (Link 1), to +1.0% on the N76 just to the east of Callan (Link 2) and +3.0% on the R695 just to the north of Callan (Link 3). Travelling north toward the site it is forecast that there will be a 11.6% increase on the R695 approaching Kilmanagh (Link 4) and an 8.0% increase on the L-1009 just west of Kilmanagh (Link 5).

Table 15-16 Daily traffic volumes on delivery route – background, development traffic, with development traffic – general construction & grid connection (PCUs)

Link	Background PCUs			Proposed Project PCUs			Total PCUs (Background + Proposed Wind Farm)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N10 – between M9 and Kilkenny	8,965	688	9,653	43	80	123	9,008	768	9,776
2 – N76 – east of Callan	8,363	2,034	10,397	43	80	123	8,406	2,114	10,520
3 – R695 – north of Callan	3,014	519	3,534	43	80	123	3,057	599	3,657
4 – R695 – south of Kilmanagh	820	86	906	43	80	123	863	166	1,029
5 – L1009 – west of R695 in Kilmanagh	1,175	145	1,320	43	80	123	1,218	225	1,443
6 – R695 – east of Kilmanagh	1,004	108	1,112	43	80	123	1,047	188	1,235

Table 15-17 Daily traffic volumes on delivery route – background, development traffic, with development traffic – turbine delivery (standard HGVs) & grid connection (PCUs)

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

Link	Background PCUs			Proposed Project PCUs			Total PCUs (Background + Proposed Wind Farm)		
1 – N10 – between M9 and Kilkenny	8,965	688	9,653	31	54	85	8,996	742	9,738
2 – N76 – east of Callan	8,363	2,034	10,397	31	54	85	8,394	2,088	10,482
3 – R695 – north of Callan	3,014	519	3,534	31	54	85	3,045	573	3,619
4 – R695 – south of Kilmanagh	820	86	906	31	54	85	851	140	991
5 – L1009 – west of R695 in Kilmanagh	1,175	145	1,320	31	54	85	1,206	199	1,405
6 – R695 – east of Kilmanagh	1,004	108	1,112	31	54	85	1,035	162	1,197

Table 15-18 Daily traffic volumes on delivery route – background, development traffic, with development traffic – concrete foundation delivery (PCUs)

Link	Background PCUs			Proposed Project PCUs			Total PCUs (Background + Proposed Wind Farm)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N10 – between M9 and Kilkenny	8,965	688	9,653	70	514	584	9,035	1,202	10,237
2 – N76 – east of Callan	8,363	2,034	10,397	70	514	584	8,433	2,548	10,981
3 – R695 – north of Callan	3,014	519	3,534	70	514	584	3,084	1,033	4,118
4 – R695 – south of Kilmanagh	820	86	906	70	514	584	890	600	1,490
5 – L1009 – west of R695 in Kilmanagh	1,175	145	1,320	70	514	584	1,245	659	1,904
6 – R695 – east of Kilmanagh	1,004	108	1,112	70	514	584	1,074	622	1,696

Table 15-19 Daily traffic volumes on delivery route – background, development traffic, with development traffic – turbine delivery (abnormal loads) (PCUs)

Link	Background PCUs			Proposed Project PCUs			Total PCUs (Background + Proposed Wind Farm)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 – N10 – between M9 and Kilkenny	8,965	688	9,653	45	60	105	9,010	748	9,758
2 – N76 – east of Callan	8,363	2,034	10,397	45	60	105	8,408	2,094	10,502
3 – R695 – north of Callan	3,014	519	3,534	45	60	105	3,059	579	3,639
4 – R695 – south of Kilmanagh	820	86	906	45	60	105	865	146	1,011
5 – L1009 – west of R695 in Kilmanagh	1,175	145	1,320	45	60	105	1,220	205	1,425
6 – R695 – east of Kilmanagh	1,004	108	1,112	45	60	105	1,049	168	1,217

Table 15-20 Summary daily effects of Proposed Wind Farm traffic – general construction & grid construction - % increase and number of days

Link	Background	Proposed Project	Total	% increase	Estimated No. of days
1 – N10 – between M9 and Kilkenny	9,653	123	9,776	1.3%	222
2 – N76 – east of Callan	10,397	123	10,520	1.2%	222
3 – R695 – north of Callan	3,534	123	3,657	3.5%	222
4 – R695 – south of Kilmanagh	906	123	1,029	13.6%	222
5 – L1009 – west of R695 in Kilmanagh	1,320	123	1,443	9.3%	222
6 – R695 – east of Kilmanagh	1,112	123	1,235	11.1%	222

Table 15-21 Summary daily effects of Proposed Wind Farm traffic – turbine delivery (standard HGVs) & grid construction - % increase and number of days

Link	Background	Proposed Project	Total	% increase	Estimated No. of days
1 – N10 – between M9 and Kilkenny	9,653	85	9,738	0.9%	7
2 – N76 – east of Callan	10,397	85	10,482	0.8%	7
3 – R695 – north of Callan	3,534	85	3,619	2.4%	7
4 – R695 – south of Kilmanagh	906	85	991	9.4%	7
5 – L1009 – west of R695 in Kilmanagh	1,320	85	1,405	6.4%	7
6 – R695 – east of Kilmanagh	1,112	85	1,197	7.6%	7

Table 15-22 Summary daily effects of Proposed Wind Farm traffic – concrete foundation delivery - % increase and number of days

Link	Background	Proposed Project	Total	% increase	Estimated No. of days
1 – N10 – between M9 and Kilkenny	9,653	584	10,237	6.0%	7
2 – N76 – east of Callan	10,397	584	10,981	5.6%	7
3 – R695 – north of Callan	3,534	584	4,118	16.5%	7
4 – R695 – south of Kilmanagh	906	584	1,490	64.5%	7
5 – L1009 – west of R695 in Kilmanagh	1,320	584	1,904	44.2%	7
6 – R695 – east of Kilmanagh	1,112	584	1,696	52.5%	7

Table 15-23 Summary daily effects of Proposed Wind Farm traffic – turbine delivery (abnormal loads) - % increase and number of days

Link	Background	Proposed Project	Total	% increase	Estimated No. of days
1 – N10 – between M9 and Kilkenny	9,653	105	9,758	1.1%	19
2 – N76 – east of Callan	10,397	105	10,502	1.0%	19
3 – R695 – north of Callan	3,534	105	3,639	3.0%	19
4 – R695 – south of Kilmanagh	906	105	1,011	11.6%	19
5 – L1009 – west of R695 in Kilmanagh	1,320	105	1,425	8.0%	19
6 – R695 – east of Kilmanagh	1,112	105	1,217	9.4%	19

15.1.6.2 Link Capacity Assessment

An assessment of the impact on link capacity on the delivery route was undertaken for the various construction stages as set out in Tables 15-24 to 15-26 with the capacity of the links on the route options, as shown in Table 15-24, varying from 11,600 vehicles per day on the N10 and N76, down to <5,000 vehicles per day for local L-5024 leading to the 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. There are no available capacity estimates for the narrow section of the L-5024 which will be less than 5,000 vehicles per day, and for the purpose of this assessment is assumed to be 3,000 vehicles per day.

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 15-25, with the percentage capacity reached for each stage shown in Table 15-26.

Based on this assessment, it is forecast that all links on the delivery route are forecast to operate within capacity by the construction year 2028 without the additional traffic forecast to be generated by the Proposed Project and for all with development construction day scenarios tested.

It is forecast that the N76 to the east of Callan (Link 2) is the link that will operate closest to operational capacity. Based on this assessment, it is forecast that the N76 is forecast to operate at 90% of capacity by the year 2028 with background traffic only, increasing to a maximum of 94% for the 7 days during which the concrete foundations are poured.

For all other construction days, the Link 2 is forecast to operate at a maximum of 91% capacity, or 1% point above background levels. Similar levels of increases are forecast for the N10 between the N10 and Kilkenny (Link 1) with background traffic comprising 83% of link capacity, increasing to 87% during concrete pours, reducing to maximum of 84%, or 1% point above background levels during remainder of construction period.

All other links tested are forecast to reach a maximum of 46% capacity for the busiest construction days during concrete pours.

Table 15-24 Delivery route link type and link capacity (at Level of Service D)

Link	Link type	Link capacity (Level of Service D)
1 – N10 – between M9 and Kilkenny	Type 1 Single	11,600
2 – N76 – east of Callan	Type 1 Single	11,600
3 – R695 – north of Callan	Type 1 Single	8,600
4 – R695 – south of Kilmanagh	Type 3 Single	5,000
5 – L1009 – west of R695 in Kilmanagh	Type 3 Single	5,000
6 – R695 – east of Kilmanagh	Type 3 Single	5,000

Table 15-25 Delivery route link capacity and summary of link flows by construction delivery day

Link	Link capacity (Level of Service D)	Construction delivery day				
		Background traffic	General construction & grid connection construction	Turbine delivery (standard HGVs) & grid connection construction	Concrete foundation construction	Turbine delivery (abnormal loads)
1 – N10 – between M9 and Kilkenny	11,600	9,653	9,776	9,738	10,237	9,758
2 – N76 – east of Callan	11,600	10,397	10,520	10,482	10,981	10,502
3 – R695 – north of Callan	8,600	3,534	3,657	3,619	4,118	3,639
4 – R695 – south of Kilmanagh	5,000	906	1,029	991	1,490	1,011
5 – L1009 – west of R695 in Kilmanagh	5,000	1,320	1,443	1,405	1,904	1,425
6 – R695 – east of Kilmanagh	3,000	1,112	1,235	1,197	1,696	1,217

Table 15-26 Delivery route link capacity and % of link capacity by construction delivery day

Link	Link capacity (Level of Service D)	Construction delivery day				
		Background traffic	General construction & grid connection construction	Turbine delivery (standard HGVs) & grid connection construction	Concrete foundation construction	Turbine delivery (abnormal loads)
1 – N10 – between M9 and Kilkenny	11,600	83%	84%	84%	88%	84%
2 – N76 – east of Callan	11,600	90%	91%	90%	95%	91%
3 – R695 – north of Callan	8,600	41%	43%	42%	48%	42%
4 – R695 – south of Kilmanagh	5,000	18%	21%	20%	30%	20%
5 – L1009 – west of R695 in Kilmanagh	5,000	26%	29%	28%	38%	28%
6 – R695 – east of Kilmanagh	5,000	22%	25%	24%	34%	24%

15.1.6.3 Effect on Link Flows – During Operation

Once the Proposed Wind Farm is operational it is estimated that there will be 1-2 staff members occasionally accessing the Proposed Wind Farm site with a similar number of vehicle trips. It is considered that the traffic impact during this phase will be imperceptible.

15.1.6.4 Effect on Junctions – During Construction

The junctions most affected on the delivery route will be the junction between the N76 and the R695 and R695 / L1009 approaching the Proposed Wind Farm site access junction. For this reason a detailed junction capacity test was undertaken for both of these junction, as discussed 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.

15.1.6.4.1 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.

15.1.6.4.2 N76 / R695 Junction Capacity Test Results

The AM and PM peak hour traffic flows for the base year 2024 and the proposed construction year of 2028 are shown in Figures 15-5a and 15-5b respectively. The additional traffic movements that are forecast to be generated by construction workers are shown in Figure 15-5c, with proposed construction year 2028 traffic flows including the additional construction traffic shown in Figure 15-5d. The results of the junction capacity tests are shown in Table 15-27 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 junction from 36.8% to 37.9% during the AM peak hour, and from 34.6% to 41.2% for the movement affected during the PM peak hour. The assessment shows that the junction is forecast to operate well within the acceptable limit of 85% as specified by TII in the Traffic and Transport Assessment Guidelines.

Table 15-27- Junction capacity test results, N76 / R695 junction, AM and PM peak hours, without and with construction traffic, by time period, year 2028.

Period	Location	Without construction traffic			With construction traffic		
AM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From R695 (n) - left turn	6.0%	0.06	0.18	6.1%	0.06	0.19
	From R695 (n) – right turn	36.8%	0.57	0.31	37.9%	0.60	0.33
	From R695 (s) – left turn	35.0%	0.53	0.19	35.1%	0.54	0.19
	From R695 (s) – right turn	27.8%	0.38	0.33	28.1%	0.38	0.33
	From N76 (e) – right turn	5.2%	0.05	0.14	9.8%	0.11	0.15
	From N76 (w) – right turn	24.5%	0.32	0.17	24.5%	0.32	0.17

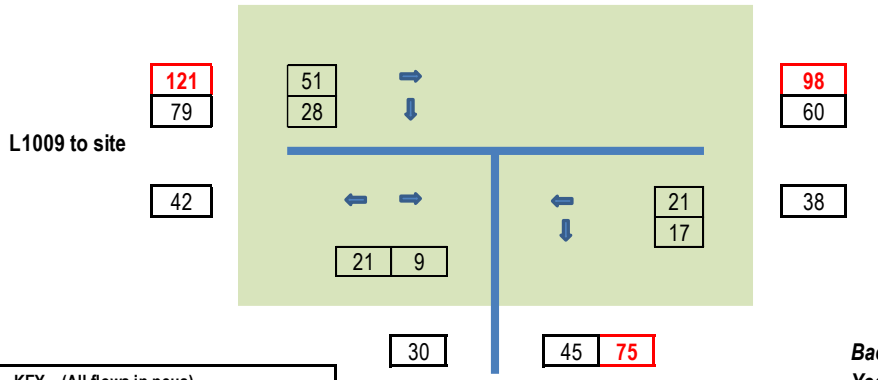
Period	Location	Without construction traffic			With construction traffic		
PM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From R695 (n) - left turn	7.8%	0.08	0.16	13.1%	0.15	0.18
	From R695 (n) – right turn	34.6%	0.52	0.29	41.2%	0.69	0.33
	From R695 (s) – left turn	16.1%	0.19	0.15	16.3%	0.19	0.16
	From R695 (s) – right turn	9.7%	0.11	0.26	9.9%	0.11	0.26
	From N76 (e) – right turn	4.8%	0.05	0.13	4.8%	0.05	0.13
	From N76 (w) – right turn	4.8%	0.05	0.15	4.9%	0.05	0.15

15.1.6.4.3 R695 / L-1009 Junction Capacity Test Results

Similarly, the AM and PM peak hour traffic flows for the base year 2024 and the proposed construction year of 2028 are shown in Figures 15-5e and 15-5f respectively with the additional traffic movements that are forecast to be generated by construction workers shown in Figure 15-5g. Year 2028 traffic flows with the additional construction traffic are shown in Figure 15-5h. The results of the tests for this junction are shown in Table 15-28 and show that the additional car trips passing through the junction will result in an increase in the maximum ratio of flow to capacity (RFC) at the junction from 6.4% to 12.9% during the AM peak hour, and from 3.6% to 10.9% during the PM peak hour. The assessment shows that even with Proposed Project-generated traffic that this junction is forecast to operate well within the acceptable limit of 85% as set out in TII guidelines for Traffic and Transport Assessments.

Table 15-28 Junction capacity test results, R695 / L1009 junction, AM and PM peak hours, without and with construction traffic, by time period, year 2028.

Period	Location	Without construction traffic			With construction traffic		
AM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From R695	6.4%	0.07	0.12	12.9%	0.15	0.12
	From L1009 (w) – right turn	6.2%	0.08	0.11	6.2%	0.08	0.11
PM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	From R695	6.0%	0.06	0.12	6.0%	0.06	0.12

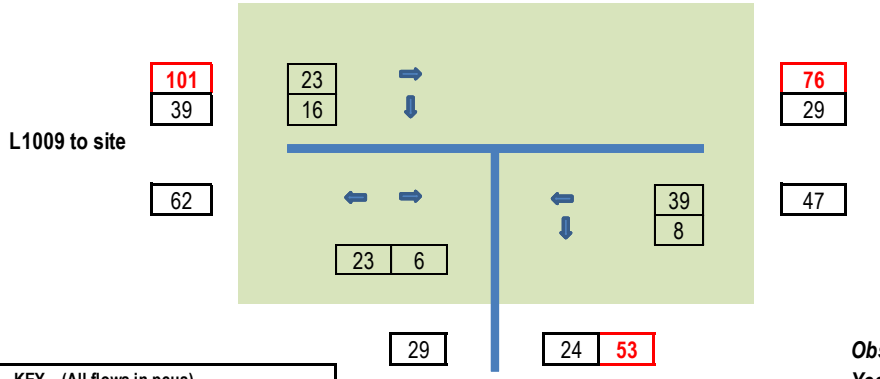


KEY (All flows in pcus)

2-way flow 150
Flow by direction 100

Flow by direction 50

Background traffic flows
Year 2024 (Tuesday 28th May)
AM peak hour (08:00 - 09:00)
No development



KEY (All flows in pcus)

2-way flow 150
Flow by direction 100

Flow by direction 50

Observed traffic flows
Year 2024 (Tuesday 28th May)
PM peak hour (17:00 - 18:00)
No development

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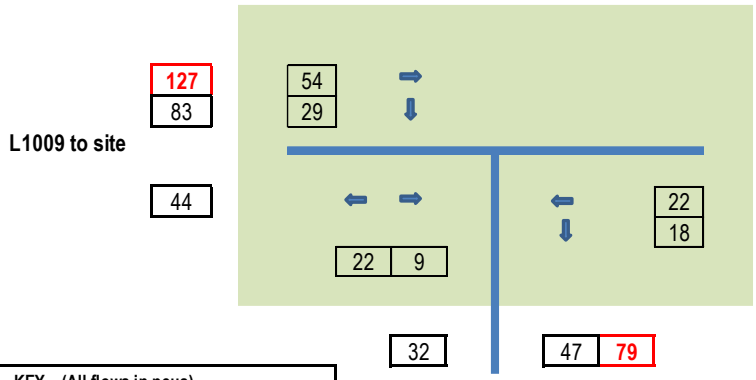
Figure 15-5a Observed traffic flows, R695 / L1009
AM and PM peak hours, year 2024, pcus

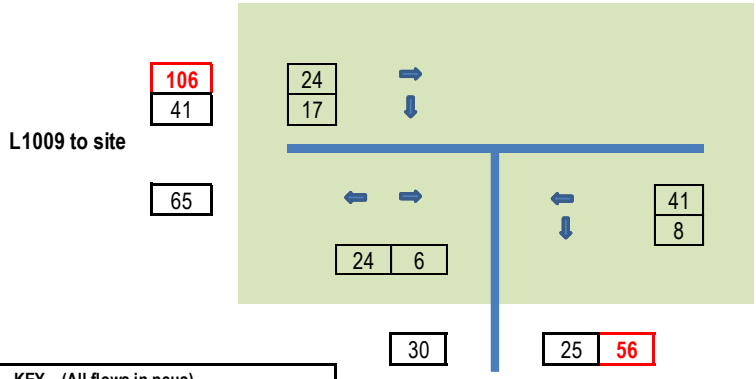


KEY (All flows in pcus)

2-way flow 150
Flow by direction 100

Flow by direction 50

Background traffic flows
Year 2028
AM peak hour (08:00 - 09:00)
No development



KEY (All flows in pcus)

2-way flow 150
Flow by direction 100

Flow by direction 50

Background traffic flows
Year 2028
PM peak hour (17:00 - 18:00)
No development

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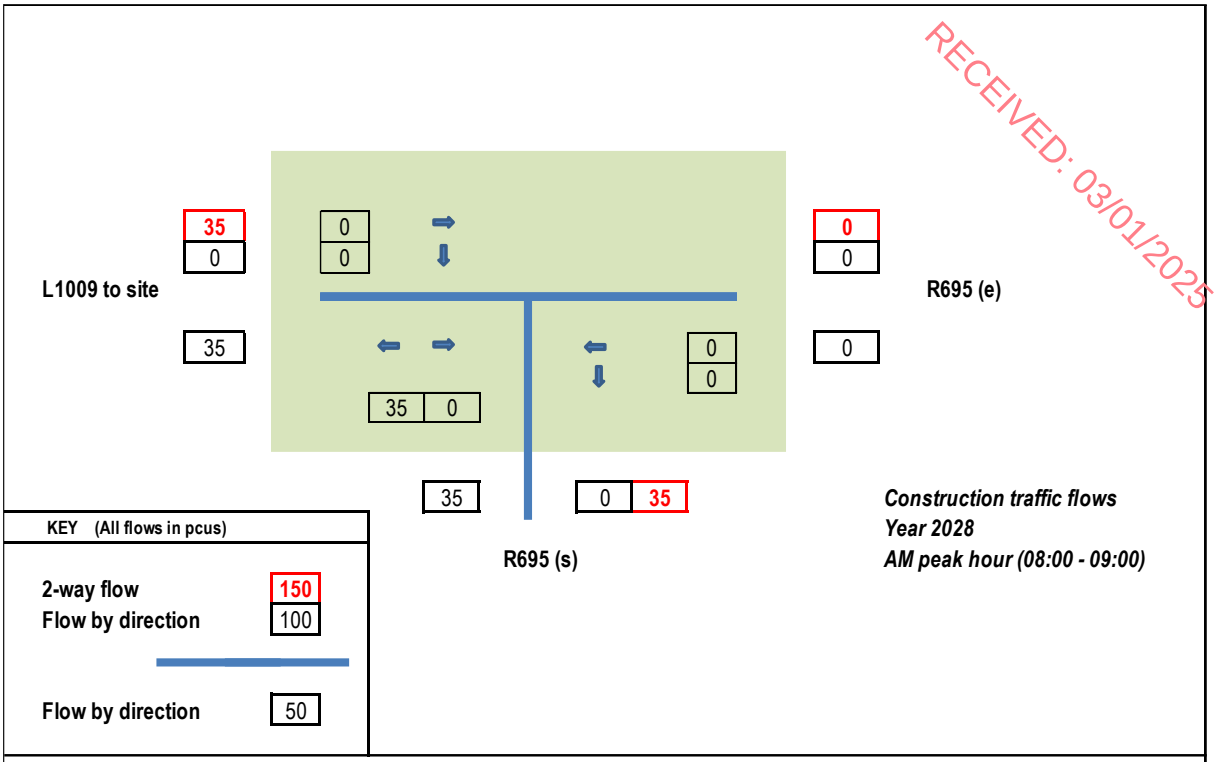
Figure 15-5b Background traffic flows, R695 / L1009 junction
AM and PM peak hours, year 2028, pcus



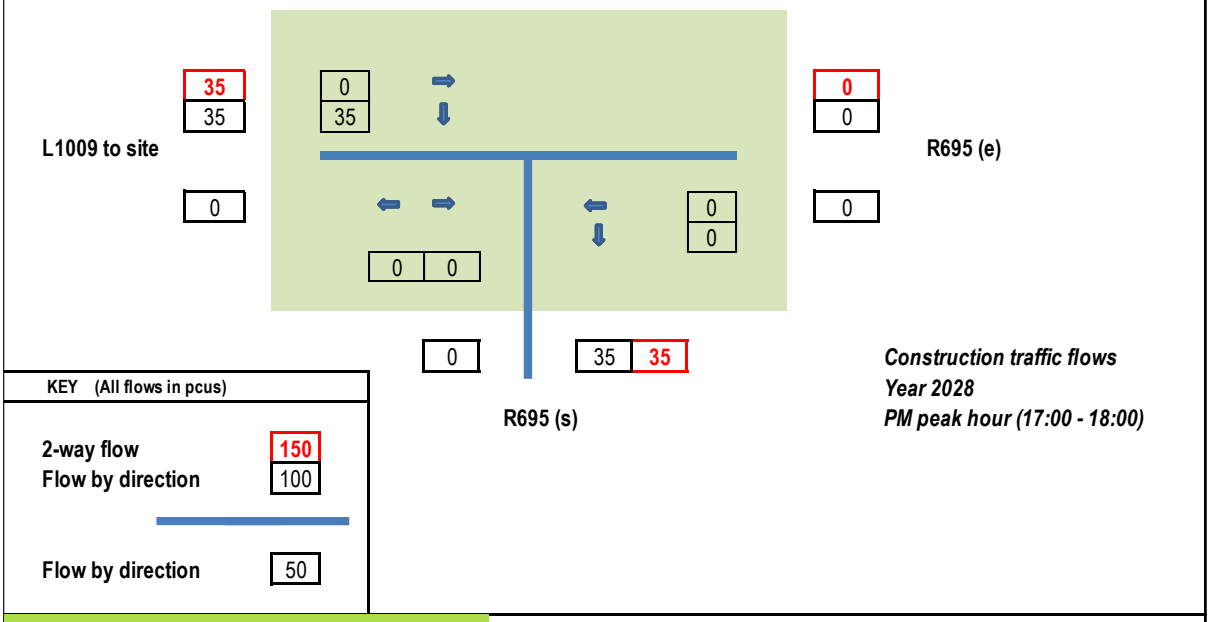


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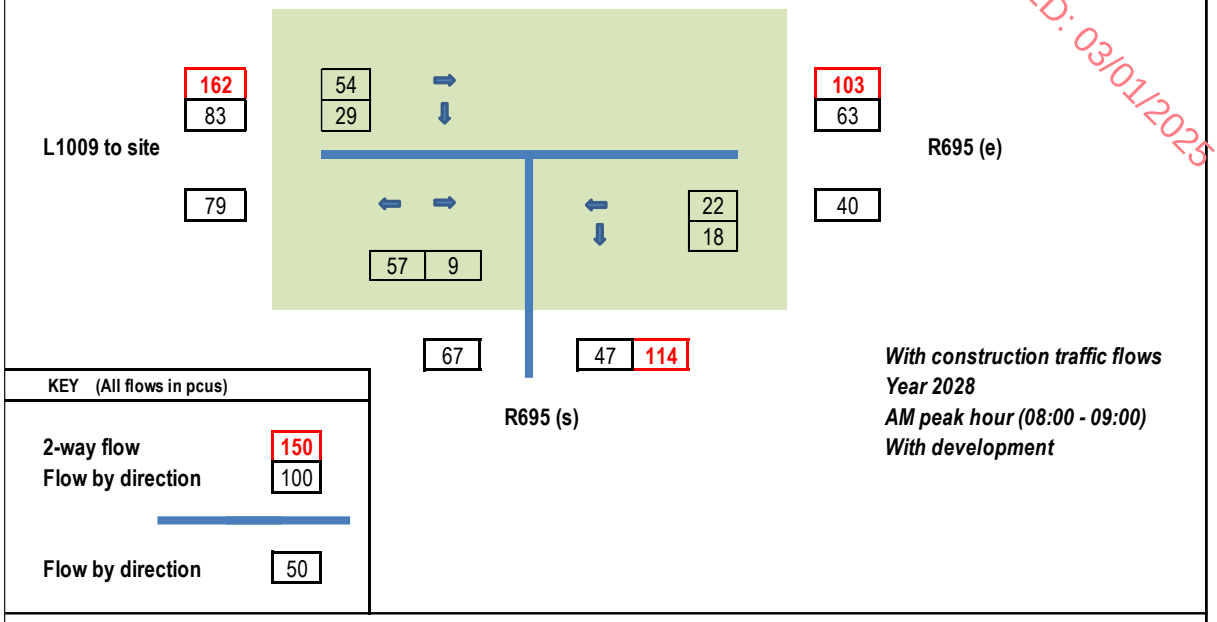
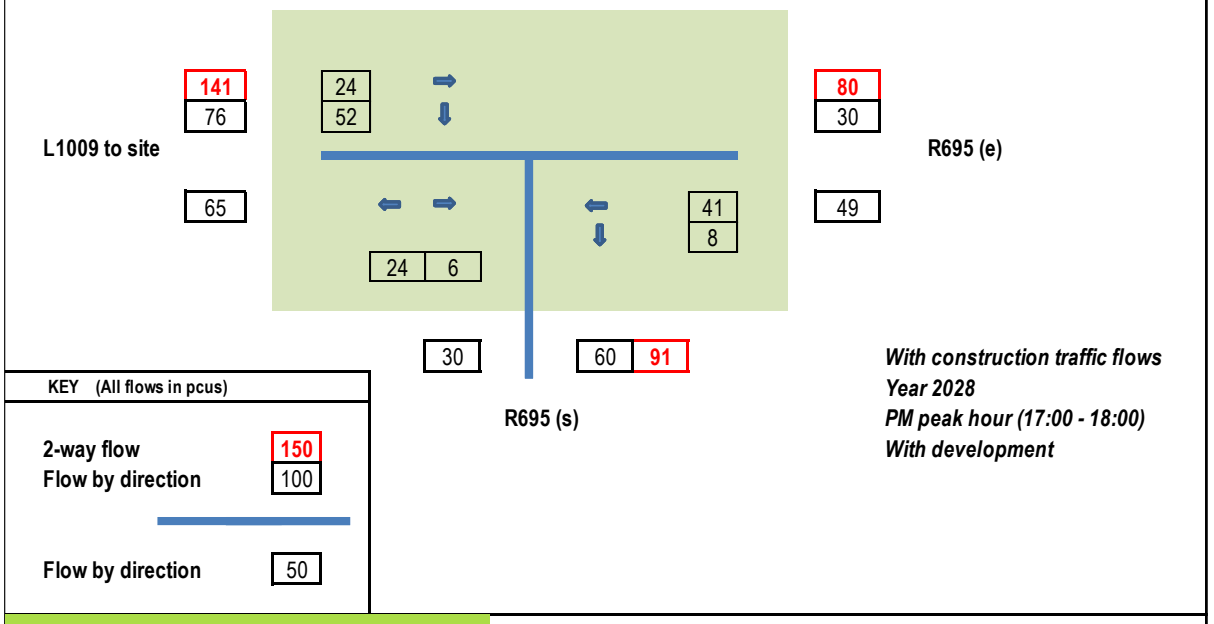
Figure 15-5c Development generated traffic flows, R695 / L1009 junction
AM and PM peak hours, pcus



KEY (All flows in pcus)

2-way flow 150
Flow by direction 100

Flow by direction 50



KEY (All flows in pcus)

2-way flow 150
Flow by direction 100

Flow by direction 50

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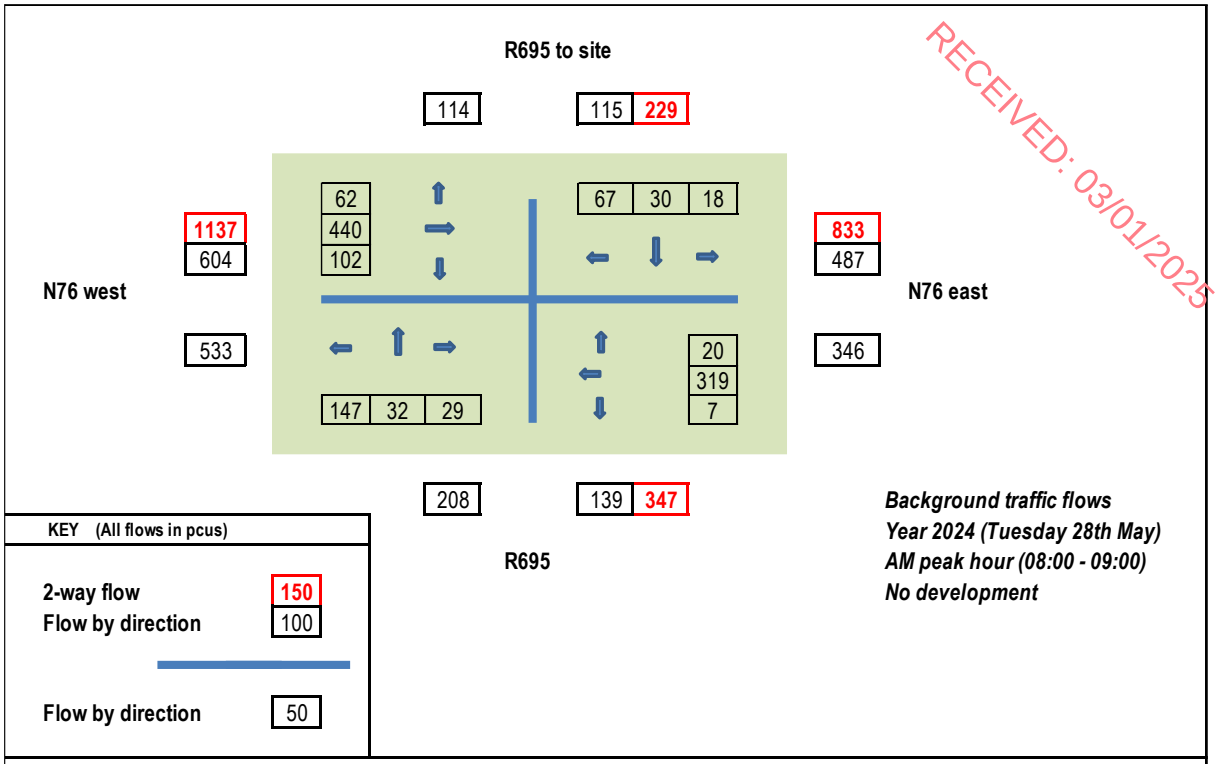
Figure 15-5d With construction traffic flows, R695 / L1009 junction
AM and PM peak hours, year 2028, pcus



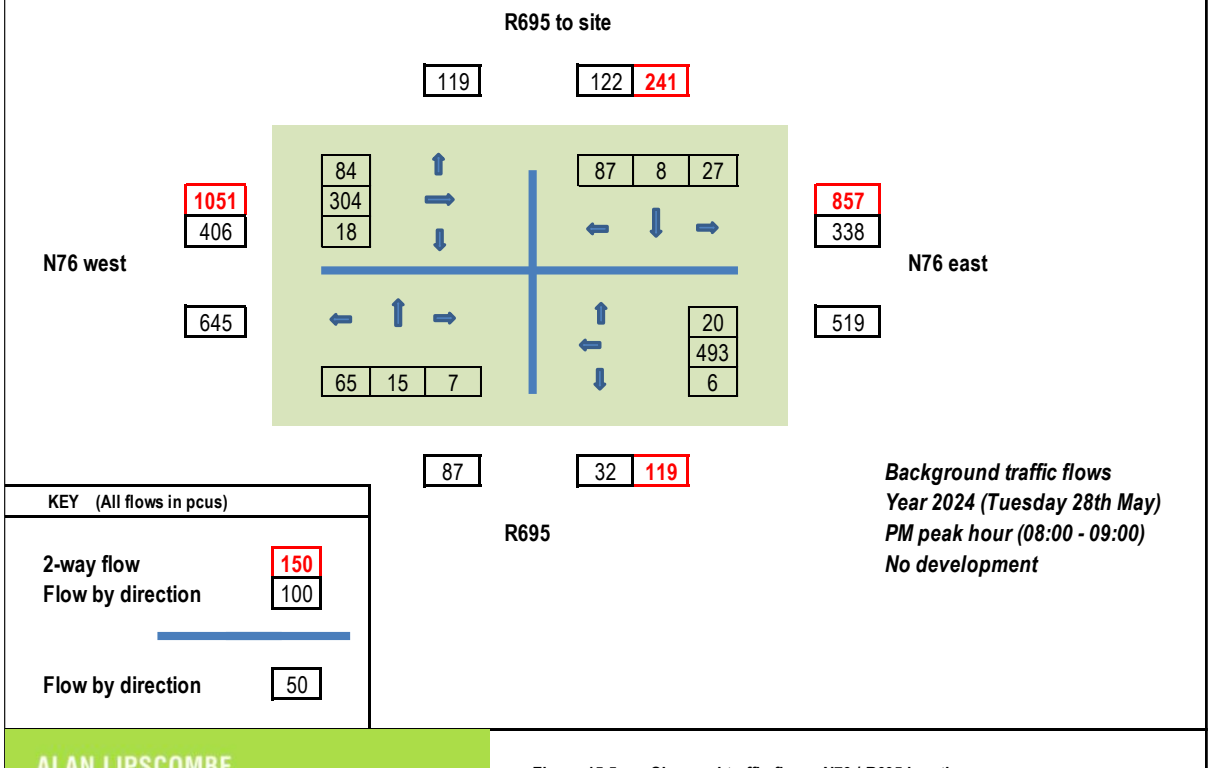


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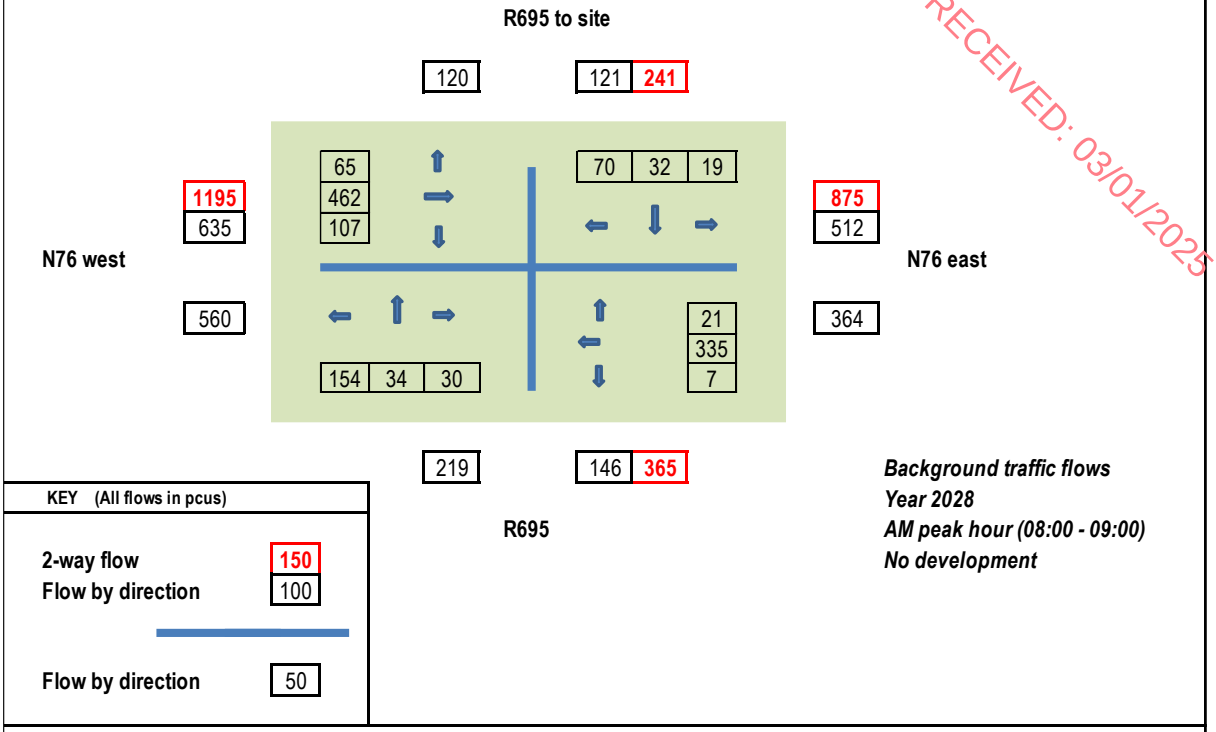
Figure 15-5e Observed traffic flows, N76 / R695 junction
AM and PM peak hours, year 2024, pcus



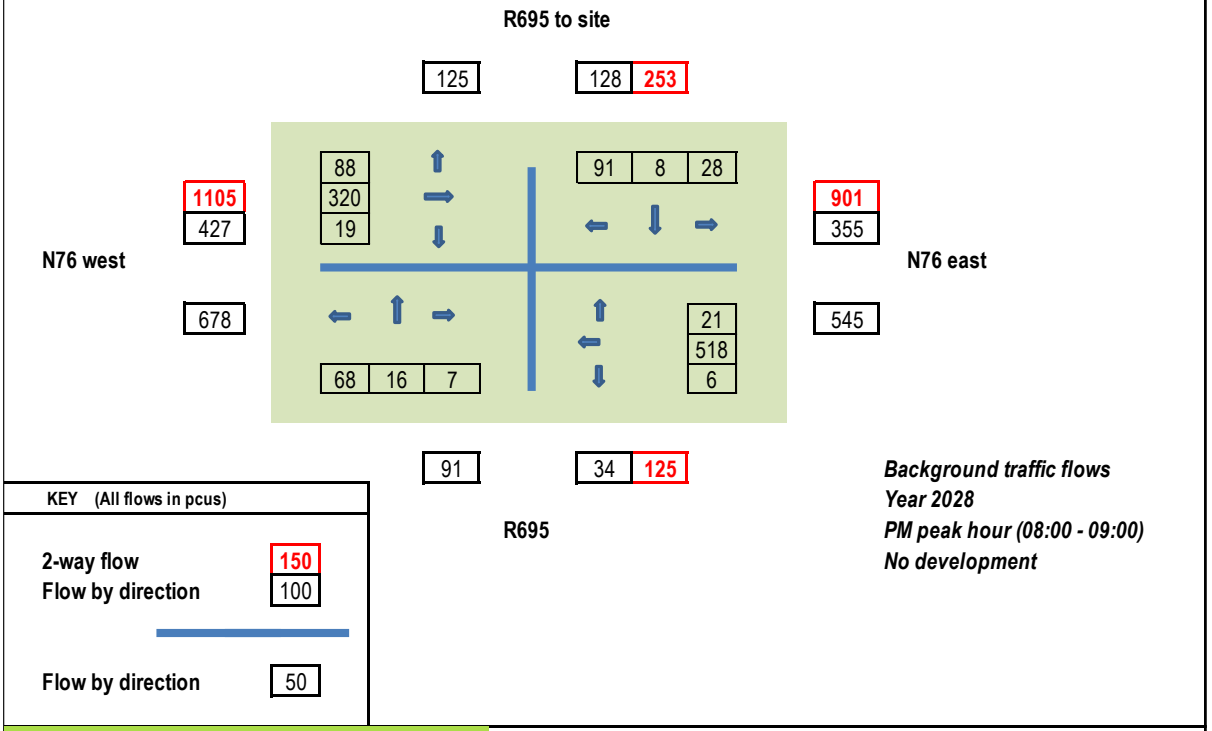


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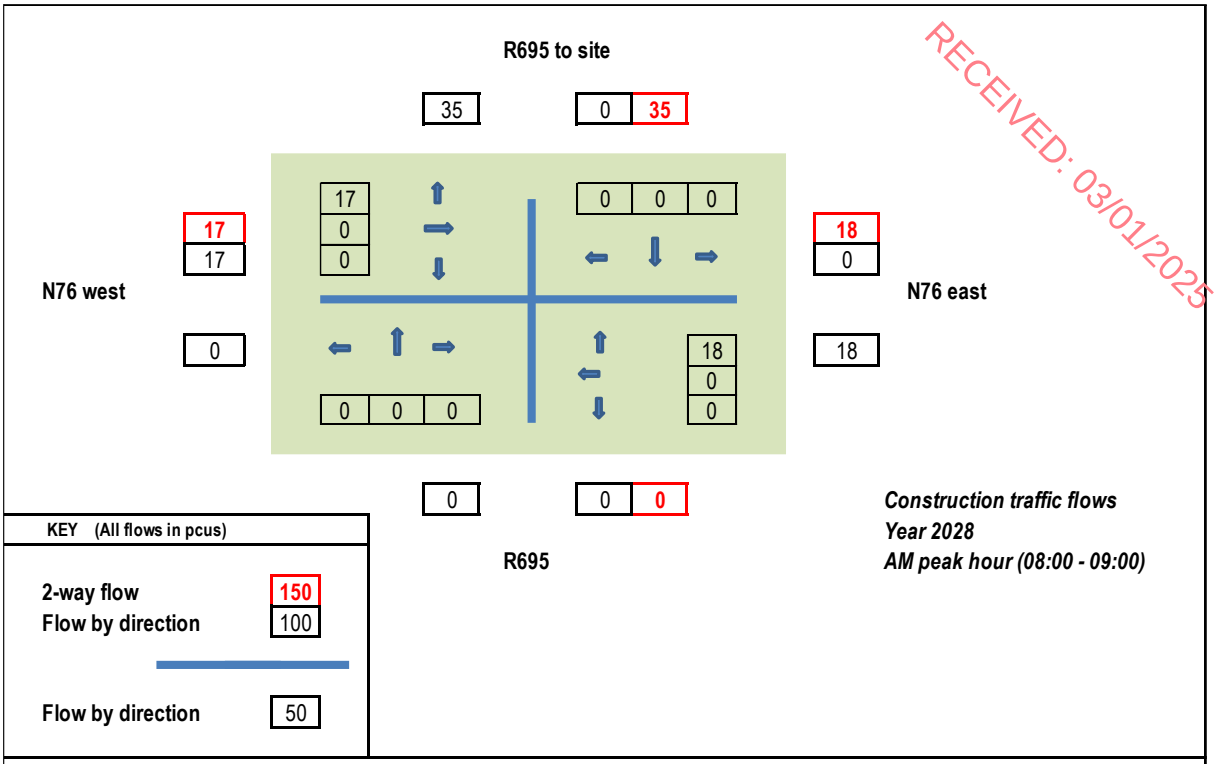
Figure 15-5f Background traffic flows, N76 / R695 junction
AM and PM peak hours, year 2028, pcus



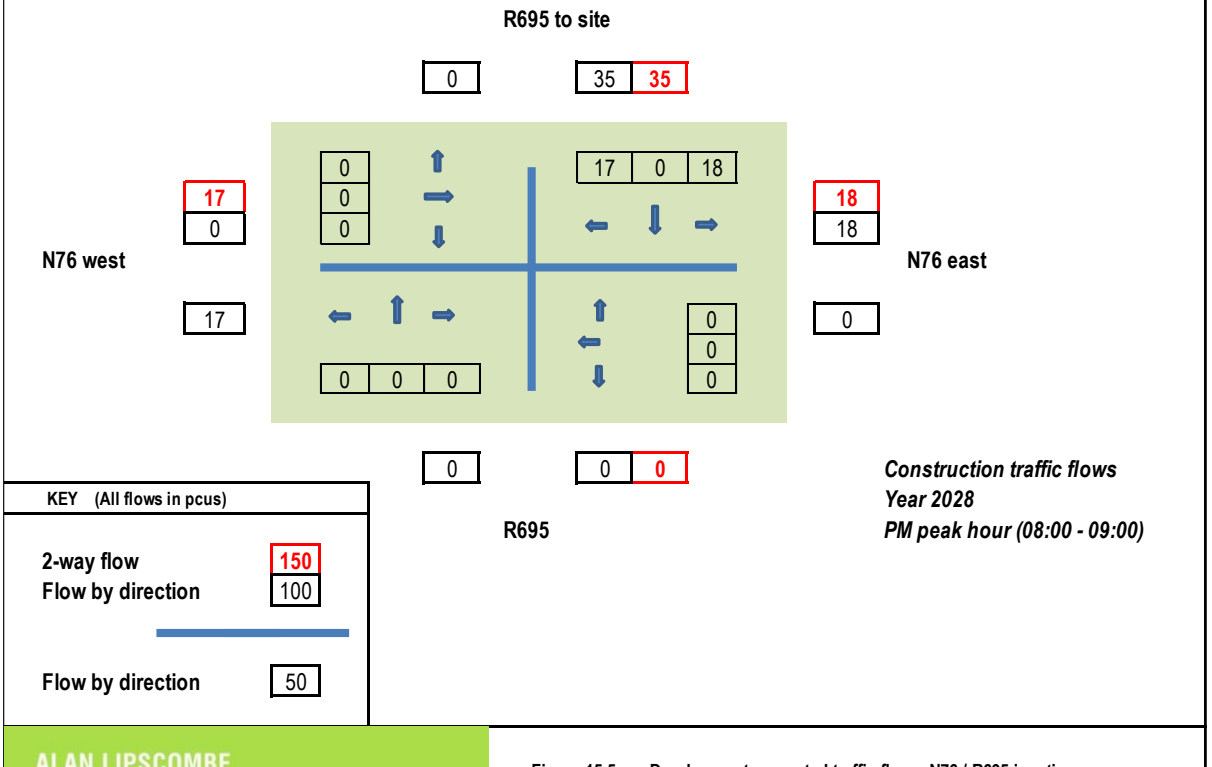


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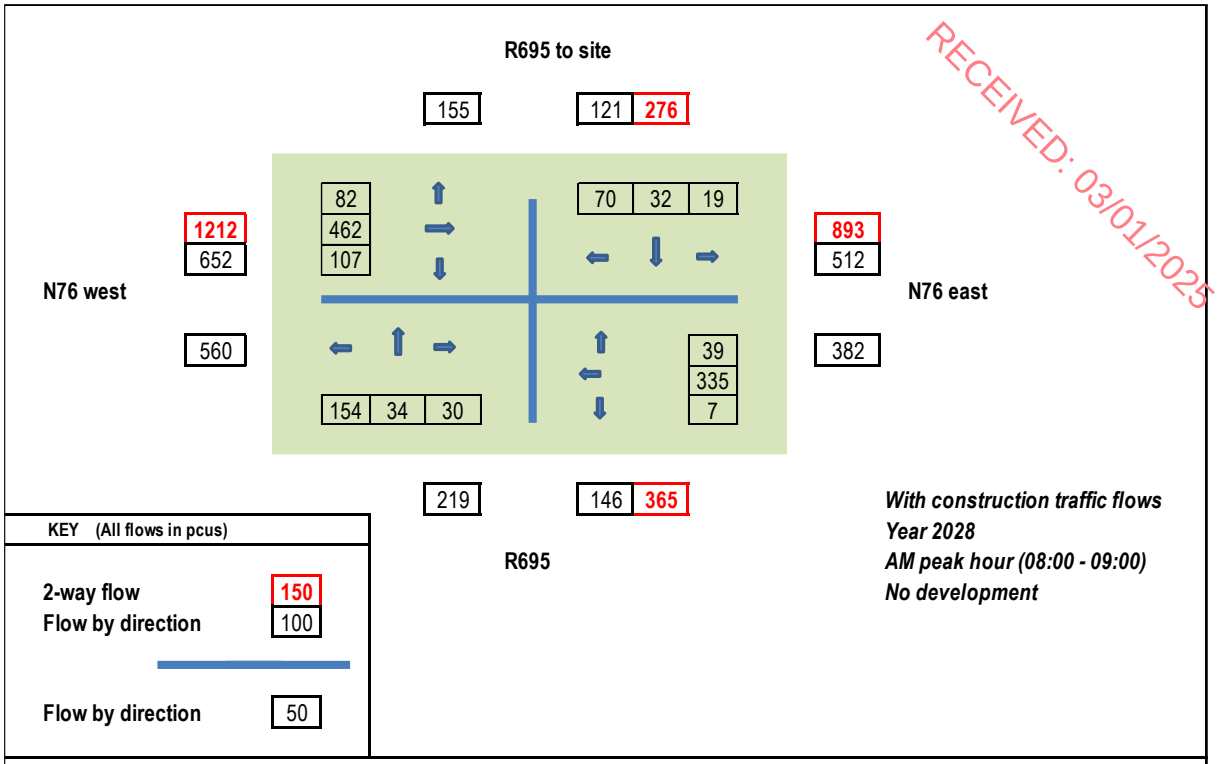
Figure 15-5g Development generated traffic flows, N76 / R695 junction
AM and PM peak hours, year 2024, pcus



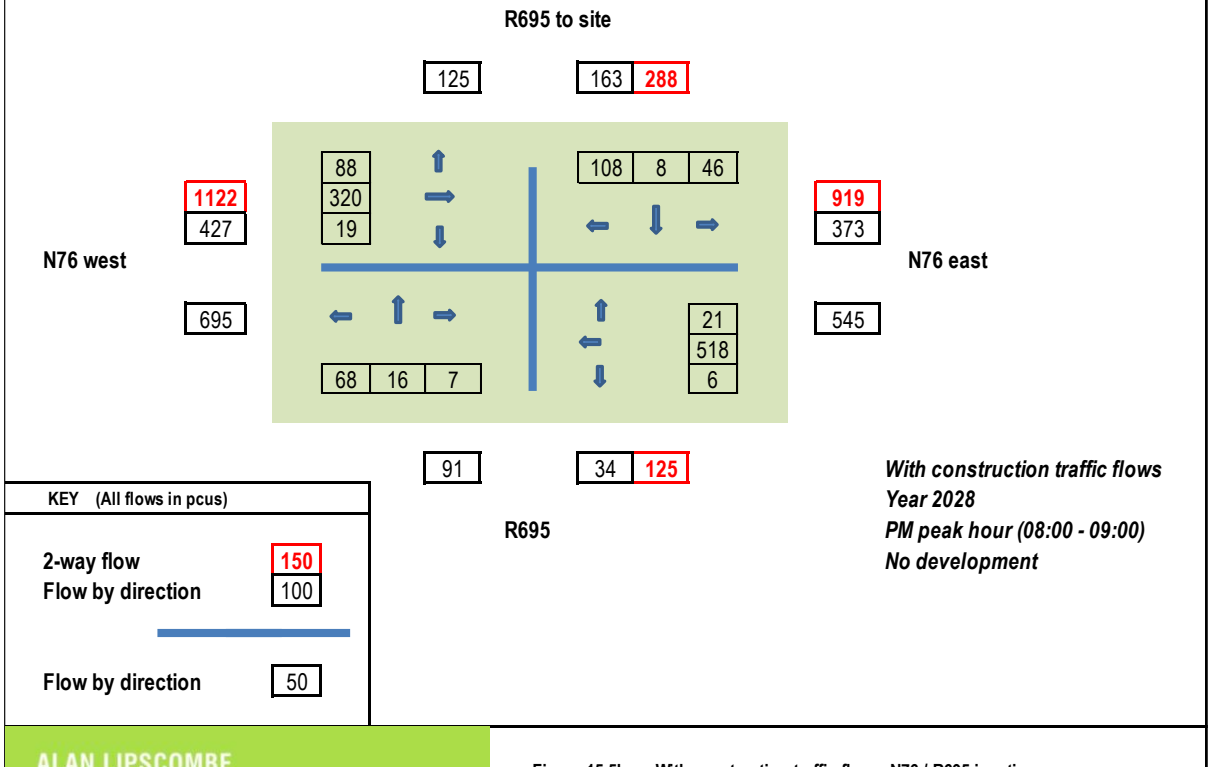


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Figure 15-5h With construction traffic flows, N76 / R695 junction
AM and PM peak hours, year 2028, pcus

Period	Location	Without construction traffic			With construction traffic		
	From L1009 (w) – right turn	3.6%	0.04	0.11	10.9%	0.13	0.12

15.1.6.4.4 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.

15.1.7 Effect on Network of Proposed Grid Connection Underground Cabling Route

A detailed description of the Proposed Grid Connection is provided in Chapter 4 of this EIAR. It is proposed that the 38kV onsite substation is connected by 38kV underground cabling to the existing 110kV Ballyragget Substation. The underground cabling route measures approximately 23km of which approximately 22.1km is located within the public road corridor.

The 38kV onsite substation and temporary construction compound have been considered in Section 15.1.6 above. The volumes of stone that will be delivered to the Site for the purpose of the Proposed Grid Connection underground cabling route is also considered in Section 15.1.6. All traffic for the Proposed Grid Connection and the onsite 38kV substation will be delivered via the delivery route as shown in Figure 15.1.

For the extent of the underground cabling route that will impact on the public road network, this is considered in the following 8 sections, as indicated in Figure 15-4a and summarised in Table 15-28.

The potential diversion routes identified during the construction of the Proposed Grid Connection underground cabling route are examples of routes that may be used, and are identified for the purpose of assessing the potential impacts to local traffic. Prior to the construction of the Proposed Grid Connection, the final diversion routes that will be used during the construction of the various sections of the cabling route will be agreed with Kilkenny County Council.

It should also be noted that the length of the diversion routes shown for the various sections of the Proposed Grid Connection are the longest that may be incurred by a driver, and that in practice some drivers undertaking longer trips will divert onto other parallel routes further afield to avoid the closure, incurring shorter actual diversions.

Table 15-29 Proposed Grid Connection underground cabling route link summary, link length (km), construction duration (days) and diversion during construction

Underground Cabling Route Section	Traffic management	Length (kms)	Construction duration (days)	Diversion length (kms)	Additional trip length (kms)
Off road at Proposed Wind Farm site	Off-road	0.3	3	N/A	N/A
Section 1 – L-5023	Closure	1.0	10	6.8	5.8
Section 2 – L-5023 / L-1008	Closure	4.8	48	6.3	1.5

Underground Cabling Route Section	Traffic management	Length (kms)	Construction duration (days)	Diversion length (kms)	Additional trip length (kms)
Section 3 – L-1003 / L-1002	Closure	6.2	62	13.1	6.9
Section 4 – L-1001 / R693 / R694	Stop & go	0.6	6	NA	NA
Section 5 – R694	Closure	2.6	26	5.9	3.3
Section 6 – R694	Closure	5.5	55	7.6	2.1
Section 7 – N77	Stop & go / 2-way flow	1.1	11	N/A	0.0
Off road section and River Nore crossing	Off-road	0.7	7	N/A	N/A
Section 8 – R432	Stop & go	0.1	1	N/A	N/A
Off road section at Ballyragget Substation site	Off road	0.1	1	NA	NA
Total		**23.0**	**230**		

Off road at Proposed Wind Farm site – (length 0.26 kms) – The underground cabling route commences at the proposed onsite 38kV substation located within the Proposed Wind Farm site and continues northwest for approximately 0.26kms to link into the L-5023. It is estimated that the construction of this section will take approximately 3 days. As this section is within the Proposed Wind Farm site no delays will be incurred by local traffic.

Section 1 – (length 1.0 km) – The underground cabling route then continues north along the L-5023 for approximately 1.0 km. During the 10 days required to construct this section of the underground cabling route, traffic will be required to divert onto the route shown in Figure 15-4b which will result in a diversion of 5.8km. The location of the construction will be transient with the extent of the section of road closed kept to a minimum.

Section 2 – (length 4.8 km) – The route then continues north on the L-5023 and the L-1008 for approximately 4.8 km. During the 48 days construction period for this section, traffic will require to divert onto the route shown in Figure 15-4c which will result in a diversion of 1.5km.

Section 3 – (length 6.2 km) – From this point the route continues north for approximately 6.2 km on the local road network on the L-1003 and L-1002 to the Chapel Road at the southern end of Freshford. During the estimated 62 days construction period for this section traffic will require to divert onto the route shown in Figure 15-4d which will result in an increase in trip length for local traffic of 6.9km.

Section 4 – (length 0.6 km) – From this point the route continues north through the village of Freshford on the L-1003 / R693 and R694 from the Chapel Road in the south to the junction with the Ard Lachtain residential estate on the east side of the R694. This section is approximately 0.6km and will take an estimated 6 days to construct.. It is estimated that a Stop & Go arrangement will be possible for this section of the route.

Section 5 – (length 2.6 km) – From the junction with the Ard Lachtain residential estate the route continues north on the R694 for approximately 2.6 km. During the 26 day construction period for this section, traffic will require to divert onto the route shown in Figure 15-4e which will result in a diversion of 3.3km.

Section 6 – (length 5.5 km) – The route continues northeast on the R694 for approximately 5.5 km to the point where the route links into the N77 national secondary road. During the 55 days construction period for this section, traffic will require to divert onto the route shown in Figure 15-4f which will result in a diversion of 2.1km.

Section 7 – (length 1.1kms) – From this point the route continues north on the N77 on the west side of the River Nore for approximately 1.1kms to a point where the route heads east off road. This section of the carriageway has sufficient width for the construction of the underground cabling to take place while operating a "stop-go" arrangement in order to retain 2-way traffic flow on the National Secondary Road. This section of the grid connection will take approximately 11 days to construct.

River Nore crossing and off road section – (length 0.7kms) – This section of the Proposed Grid Connection underground cabling route turns right off the N77 before crossing the River Nore via directional drilling. On the eastern side of the River Nore the cable route passes through agricultural fields and a private access track before linking into the R432. It is proposed that all construction plant, materials and construction staff will access this off road section via the R432 and not via the N77. Appropriate traffic management will be put in place at the junction with the local access road onto the R432 during this period, including temporary signs and a flagman. While minimal disruption to local traffic on the R432 will be incurred during the delivery of plant and materials via the R432, as this section is off road there will be no delays incurred by local traffic during the 7 days required to construct this section.

Section 8 – (length 0.1km) – From the access onto the R432 the route continues south for approximately 135 m to the existing site access to the 110kV Ballyragget Substation. During the 1 day construction period for this section, traffic will be managed using a Stop & Go type arrangement.

Off-road at Ballyragget Substation – (length 0.1kms) – The final short section of the Proposed Grid Connection underground cabling route turns off the R432 into the site of the existing 110kV Ballyragget substation. No delays will be incurred by local traffic during the 1 day required to construct this section.

In summary, the route will take a total of approximately 230 days to construct during which a road closure will be required at one point on the network on approximately 201 of these days. The diversions incurred will be a maximum of 6.9kms. It is noted that the diversions will be incurred by relatively few trips on the sections of the route on the local road network (approximately 12km of 23km route) as it is relatively lightly trafficked. For a further 11 days a stop & go facility will require to be operated on the N77.

The additional traffic that will be generated on the network during the construction of the underground cable route is included in Section 15.1.4.2 of this EIAR with the traffic impacts included in the assessment presented in Section 15.1.6. It is proposed that a further trip will be made by a minibus to transport construction staff, to and from the point of construction along the underground cable route, or alternatively, staff will travel to the site by car pooling encouraged as part of a staff travel plan . By its nature the impacts of these additional trips on the network will be transient and will therefore be temporary and slight.

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

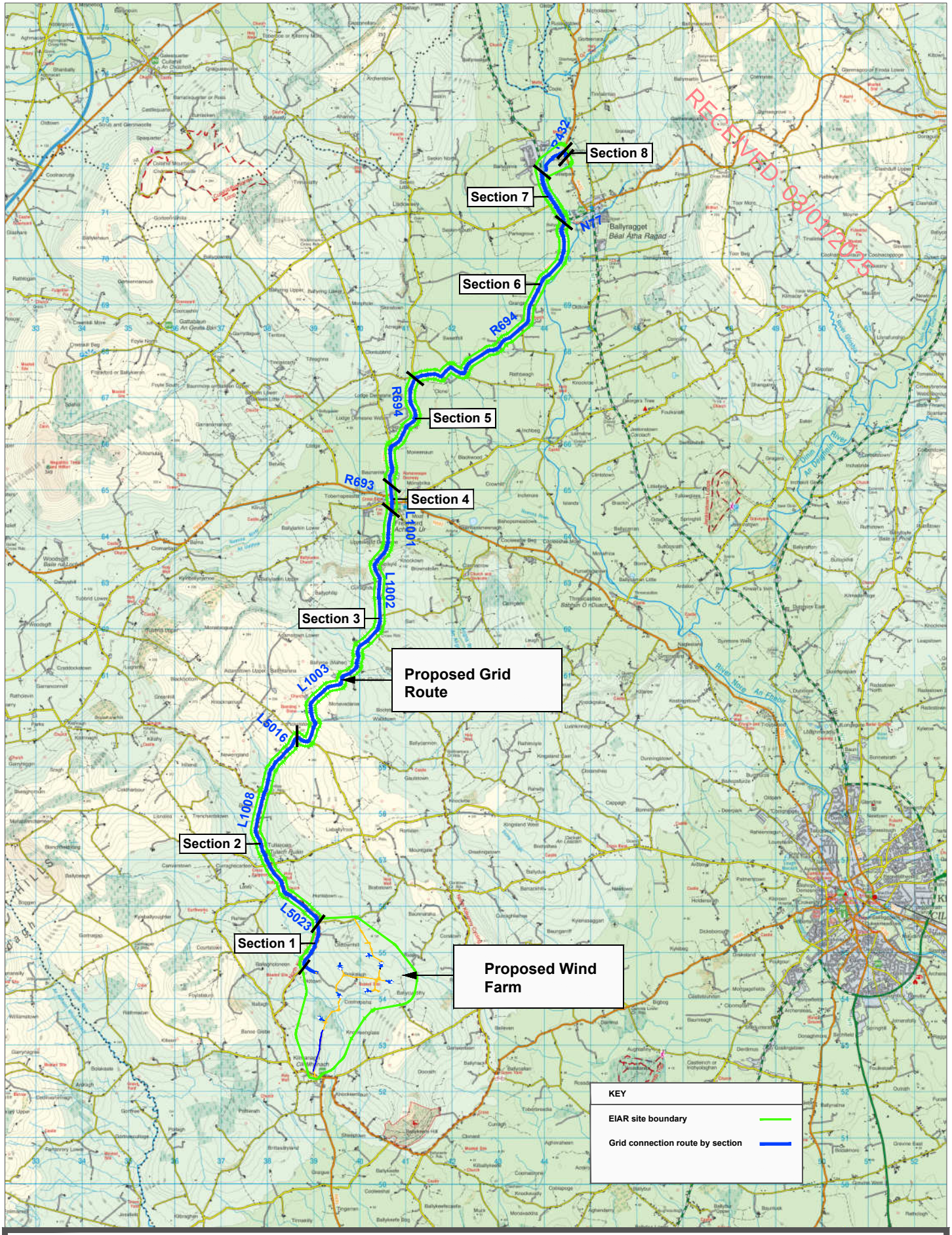

Figure 15-4a Proposed grid connection route

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 20.09.24	DRAWN BY:	AL

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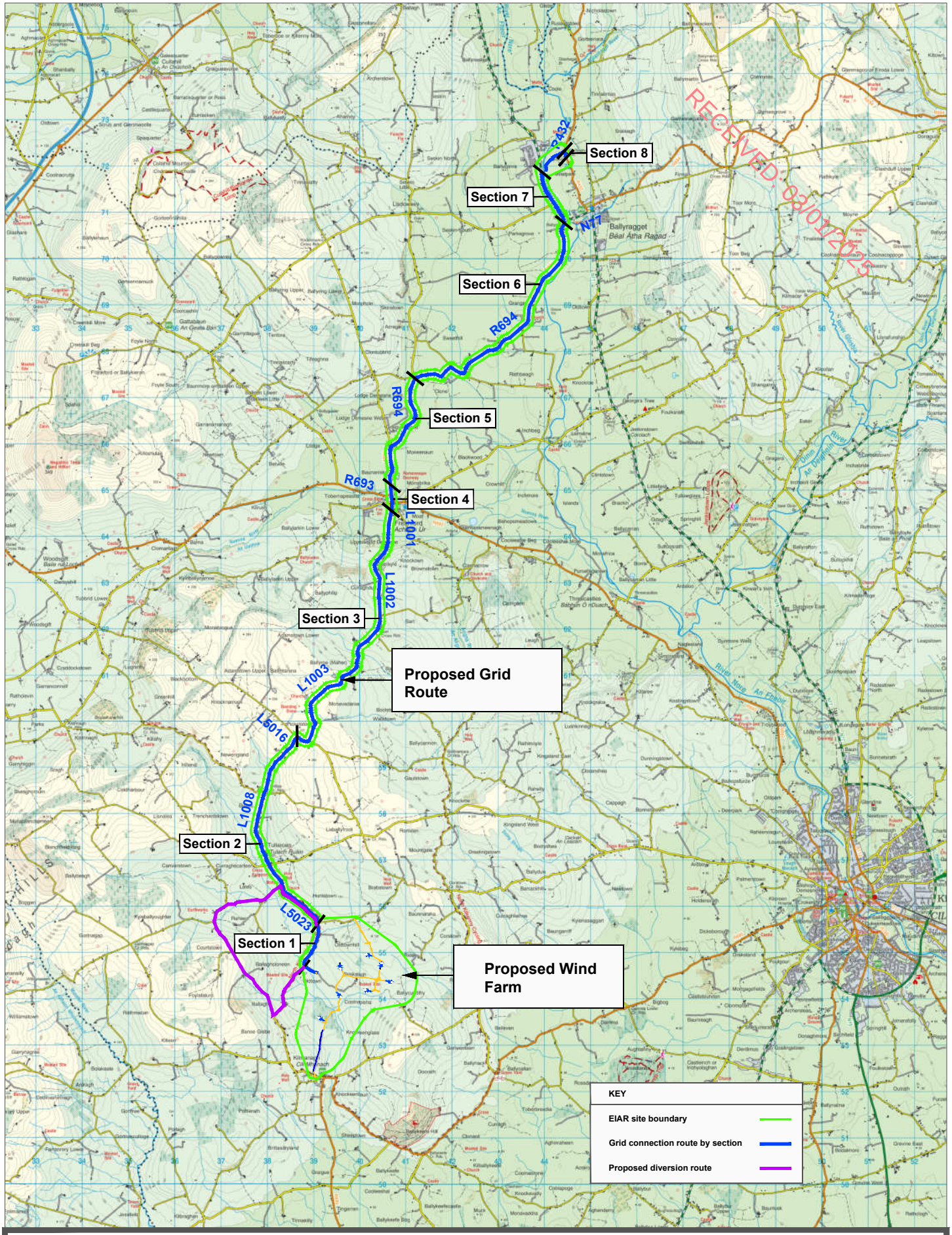

Figure 15-4b Proposed grid connection route - Diversion route for Section 1

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 20.09.24	DRAWN BY:	AL

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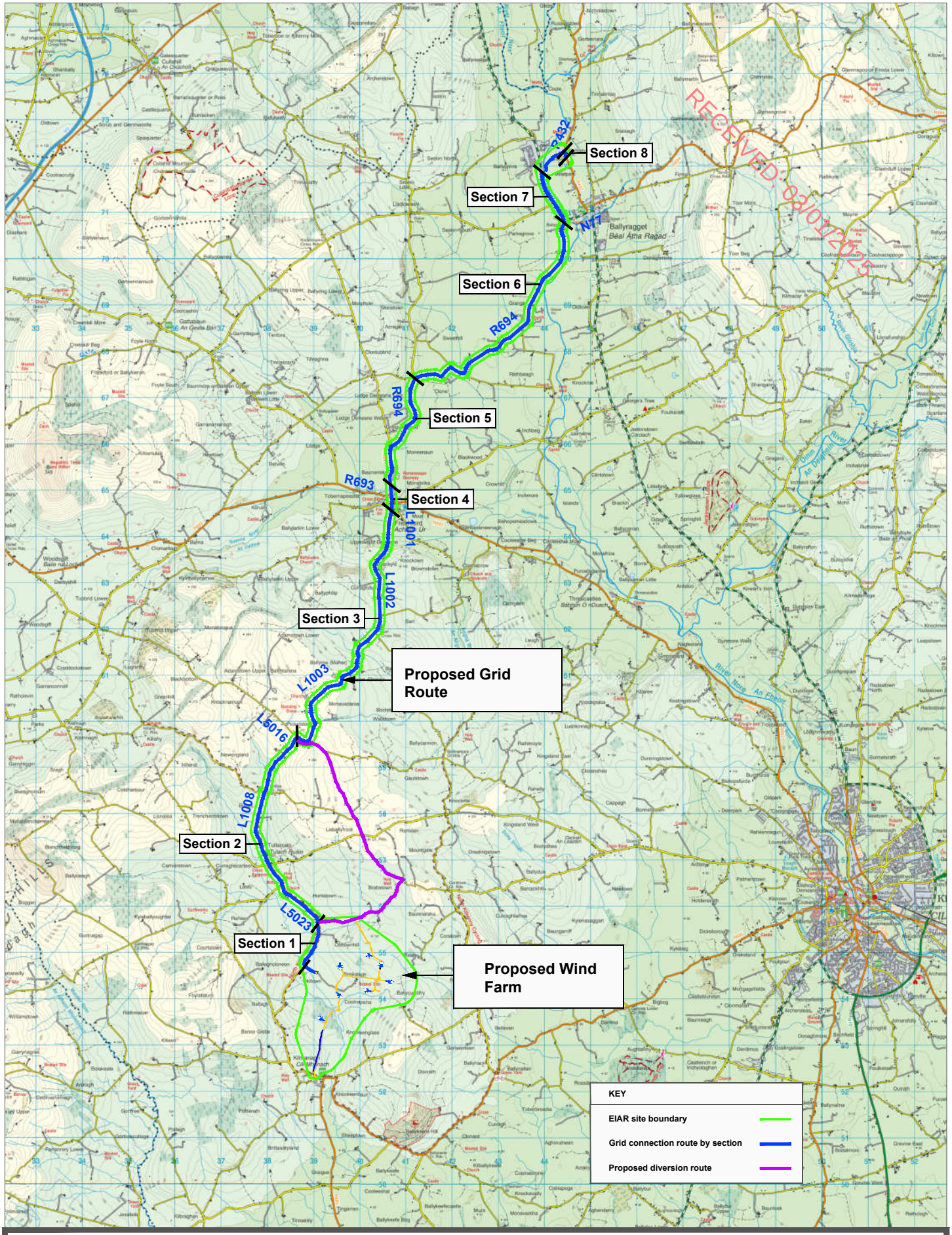

Figure 15-4c Proposed grid connection route - Diversion route for Section 2

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 20.09.24	DRAWN BY:	AL

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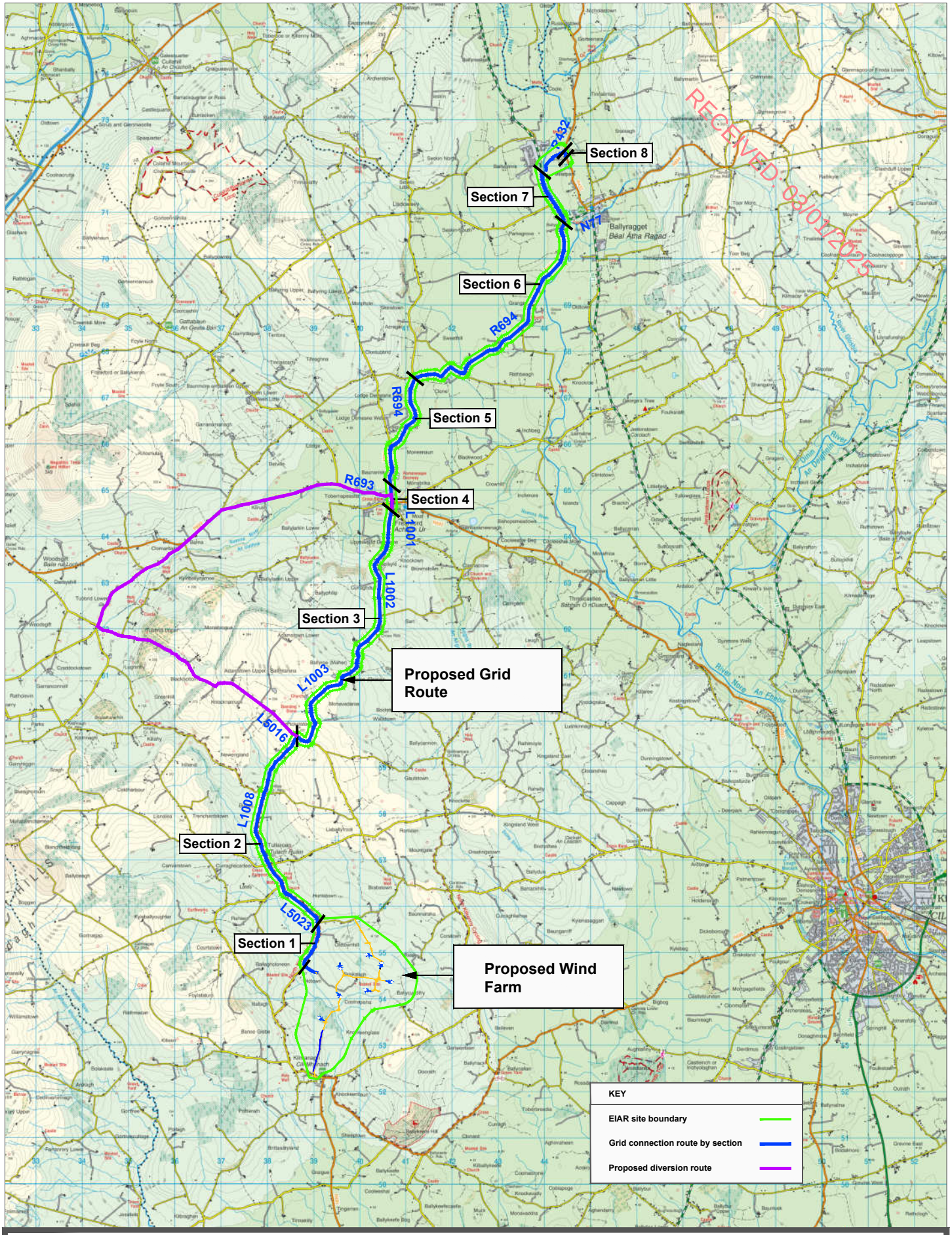

Figure 15-4d Proposed grid connection route - Diversion route for Section 3

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 20.09.24	DRAWN BY:	AL

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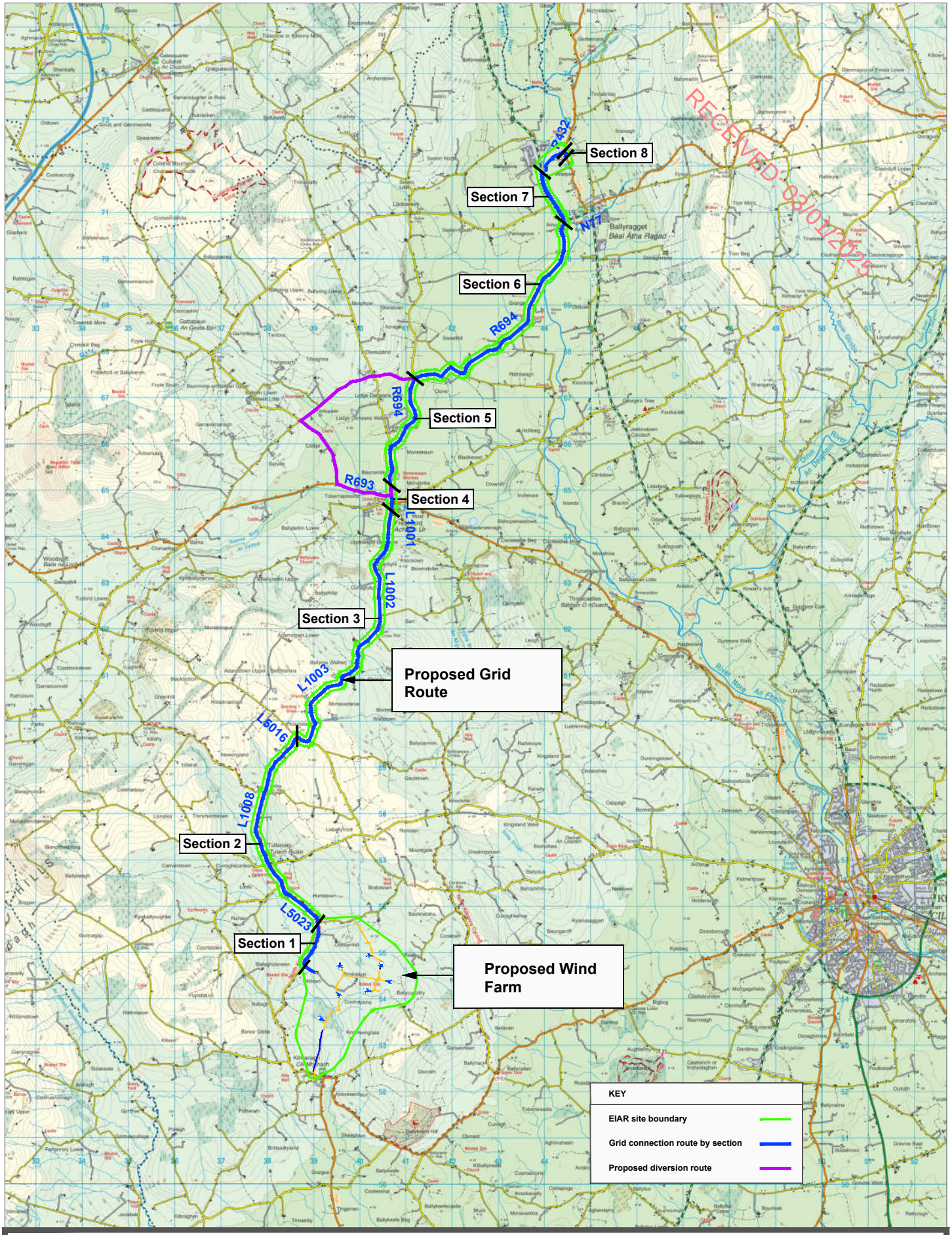

Figure 15-4e Proposed grid connection route - Diversion route for Section 5

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 20.09.24	DRAWN BY:	AL

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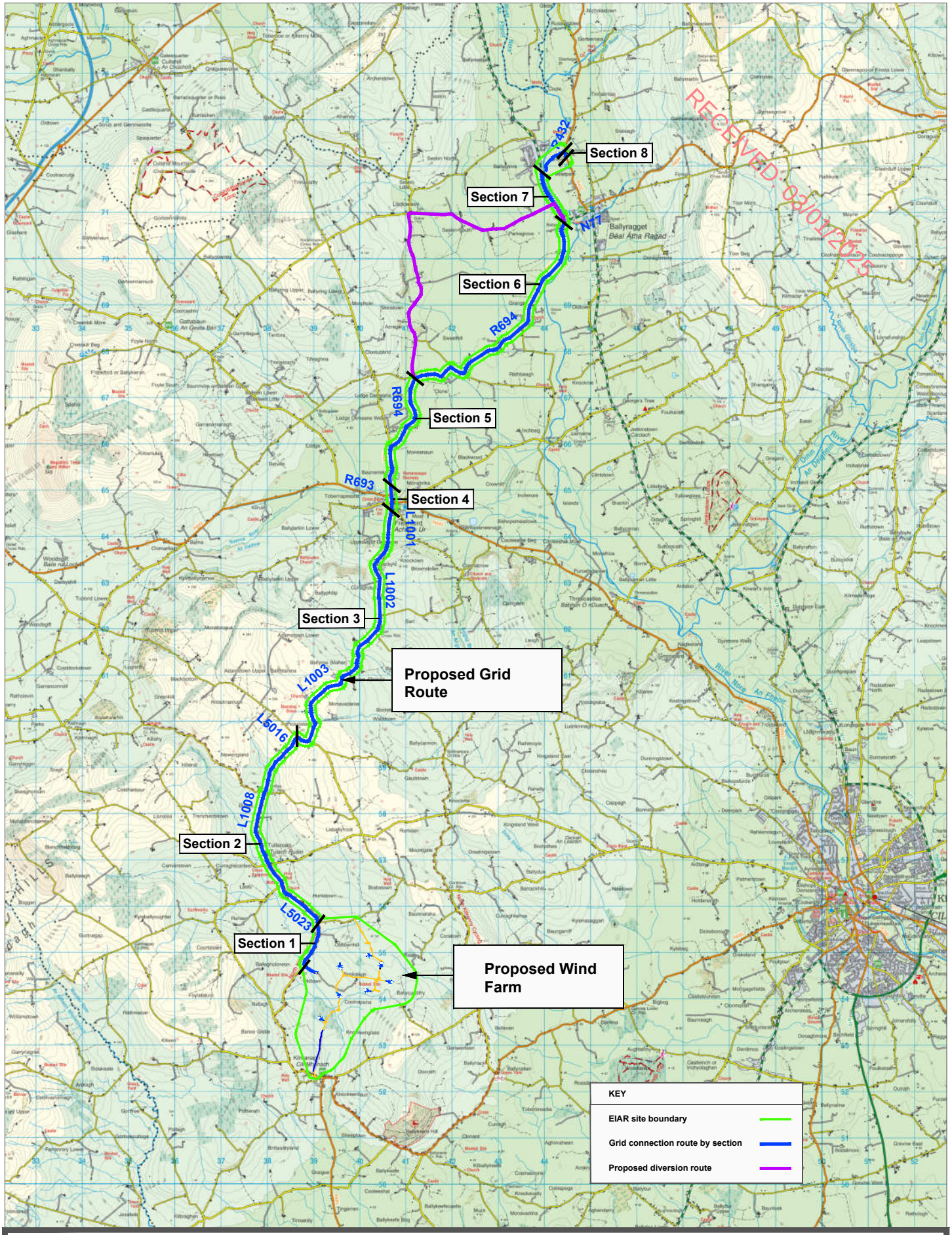

Figure 15-4f Proposed grid connection route - Diversion route for Section 6

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	NTS
PROJECT NO: 11060	DATE: 20.09.24	DRAWN BY:	AL

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A **Traffic Management Plan (TMP)**, incorporating all the mitigation measures is included as Appendix 15-2 of this EIAR, and will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the road's authority and An Garda Síochána prior to construction works commencing on Site.

15.1.8 Traffic Management of Large Deliveries

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 turbine delivery route such as hedge or tree cutting, temporary relocation of powerlines/poles, lampposts, signage and local road widening. Any upgrades to the public road network will be carried out in advance of turbine deliveries and following consultation and agreement with the relevant authorities. It is not anticipated that any sections of the local road network will be closed during the delivery of the abnormally sized loads.

Refer also to Appendix 15-2 of this EIAR, for the Traffic Management Plan.

15.1.9 Abnormal Load Route Assessment

Belview Port in Waterford City 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.

A route assessment was undertaken covering the entire delivery route between the port and the Proposed Wind Farm site. An autotrack assessment from Belview Port to Kilkenny Southern Ring Road (N10) is included as Appendix 15-3, which indicates that the abnormal loads will be accommodated on that section of the route with minor temporary alterations within the curtilage of the existing road network.

For the section of the TDR approaching the site from the N76 which travels southwest from the Kilkenny Southern Ring Road a swept path assessment was undertaken at the locations shown in Figure 15-2a. The analysis was undertaken in order to establish the locations where the wind turbine transporter vehicles will be accommodated, and the locations where some form of remedial measure may be required.

Location 1 – N76 / R695 junction

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-6 and 15-7 respectively. The swept path analysis undertaken for this location shows that both vehicles will be accommodated with overhang of the body of the blade required at the junction of the N76 and the R695 and the 2 bends on the R696. Over-sail of the blade tip will also occur on the southeastern side of the N76 and on both sides of the R695.

Location 2 – Bend on the R695 near the L-1017

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-8 and 15-9 respectively. The assessment shows that the body of the blade will require to overhang the inside of the corner and the blade tip will over-sail the southern edge of the R695 in order to negotiate this bend.

Location 3 – Bend on the R695 near the L-10174 and L-10176

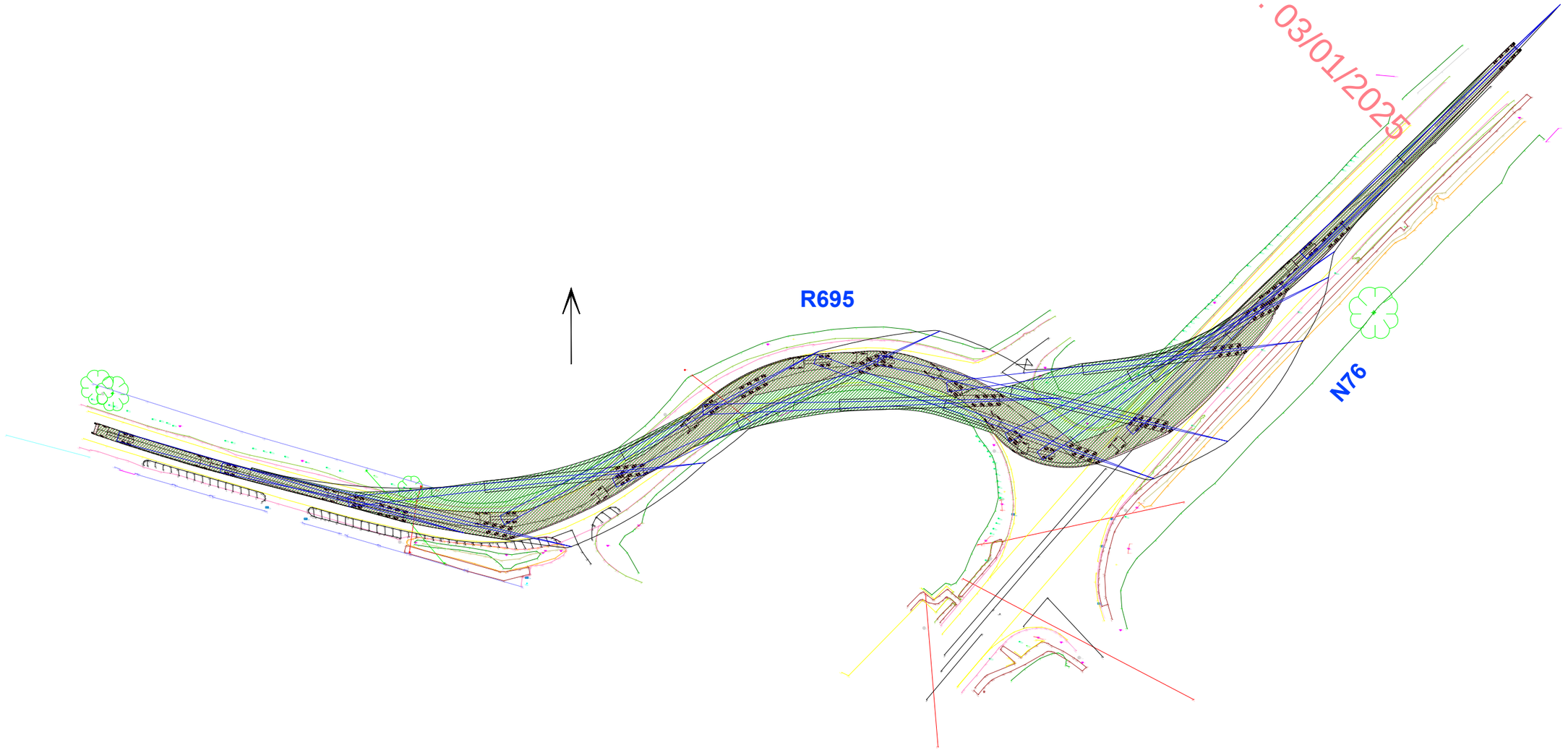
The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-10 and 15-11 respectively. The assessment shows that the body of the blade will require to overhang the inside of the corner and the blade tip will over-sail the southern edge of the R695 in order to negotiate this S-Bend.

Location 4 – Bend on the R695

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-12 and 15-13. The assessment shows that there will be slight overhang of the blade body and over-sail of the blade tip at this location.

Location 5 – Bend on the R695 at St Molua's Church and the L-5032

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-14 and 15-15 and shows that there will be minor overhang of the blade body and over-sail of the blade tip at this location.



NOTES:

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Figure 15-6 Location 1 - N76 / R695, autotrack, blade extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd		SCALE: 1:1000
PROJECT NO: 11060	DATE: 18.06.24		DRAWN BY: AL

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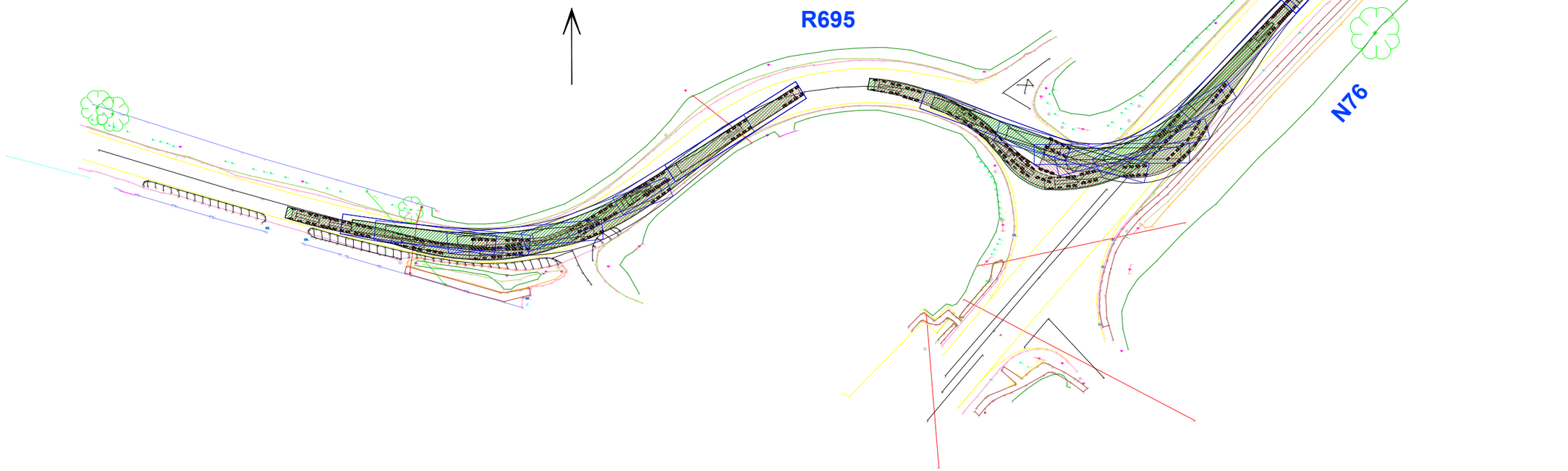

NOTES:

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Figure 15-7 Location 1 - N76 / R695, autotrack, tower extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd		SCALE: 1:1000
PROJECT NO: 11060	DATE: 19.09.24		DRAWN BY: AL

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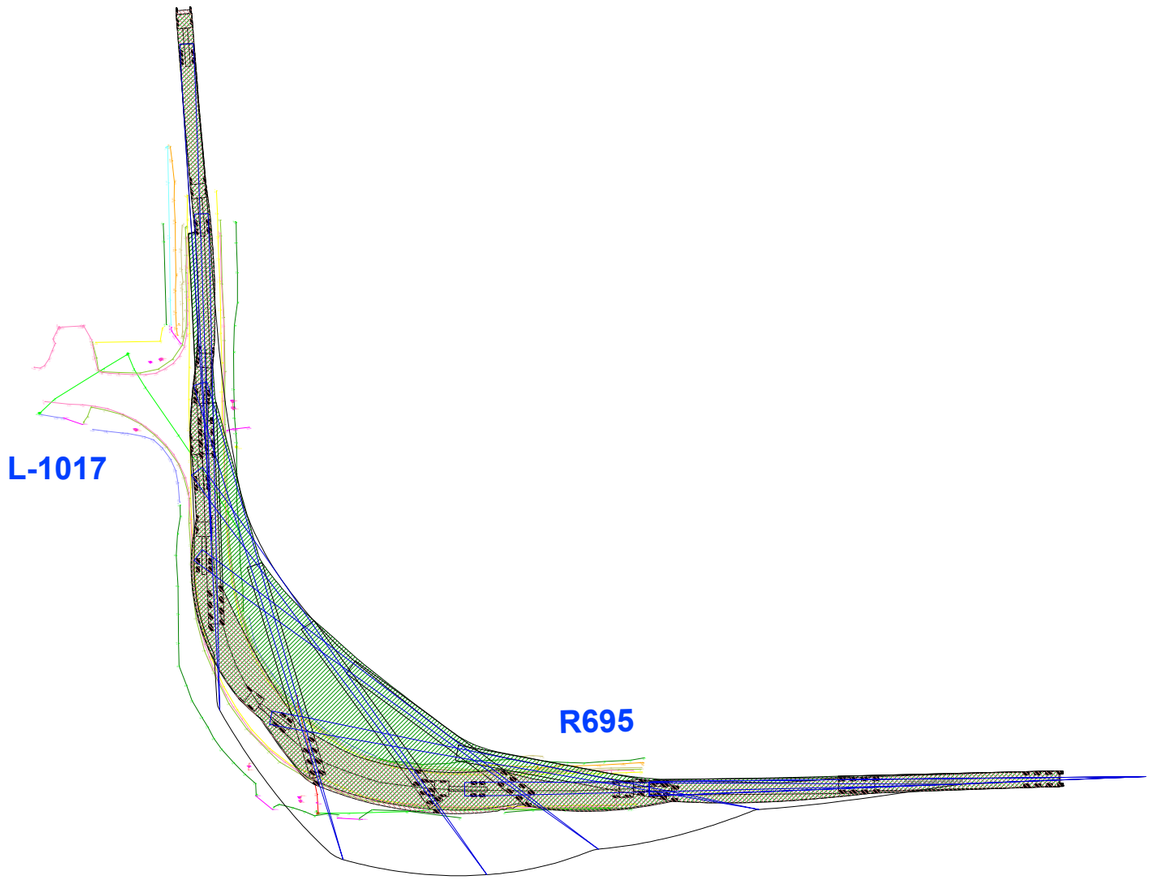

NOTES:

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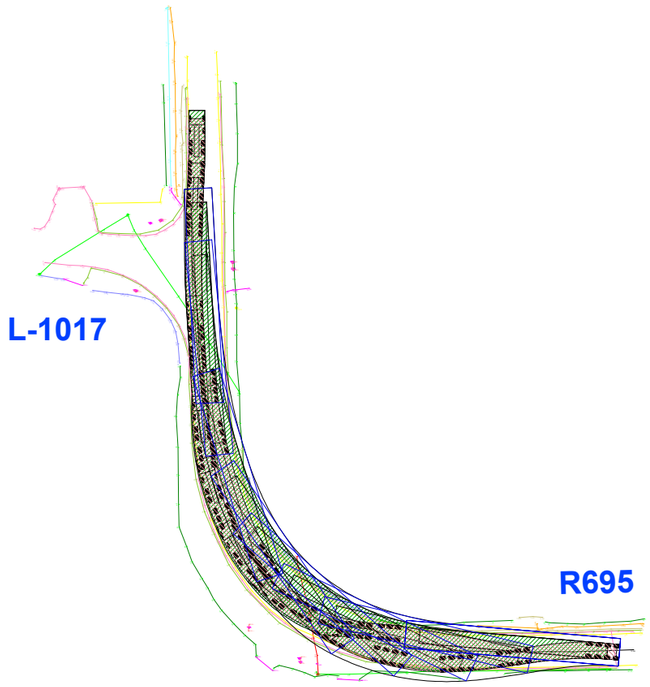
Figure 15-8 Location 2 - Bend on R695 near L-1017, autotrack, blade extended artic

PROJECT: Briskalagh Renewable Energy Development			ALAN LIPSCOMBE TRAFFIC & TRANSPORT CONSULTANTS
CLIENT: Briskalagh Ltd		SCALE: 1:1000	
PROJECT NO: 11060	DATE: 18.06.24	DRAWN BY: AL	



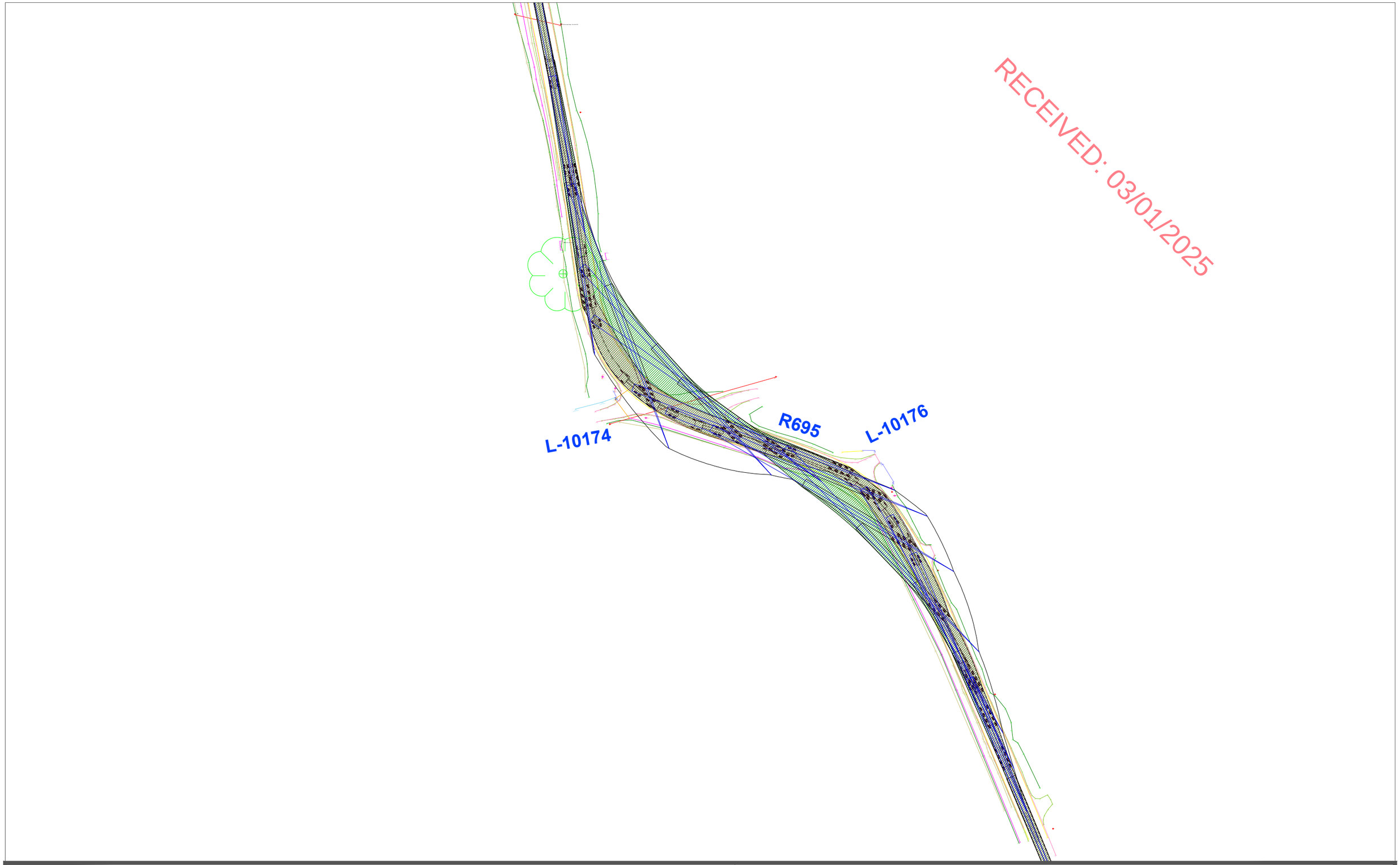
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-9 Location 2 - Bend on R695 near L-1017, autotrack, tower extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd		SCALE: 1:1000
PROJECT NO: 11060	DATE: 19.09.24		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

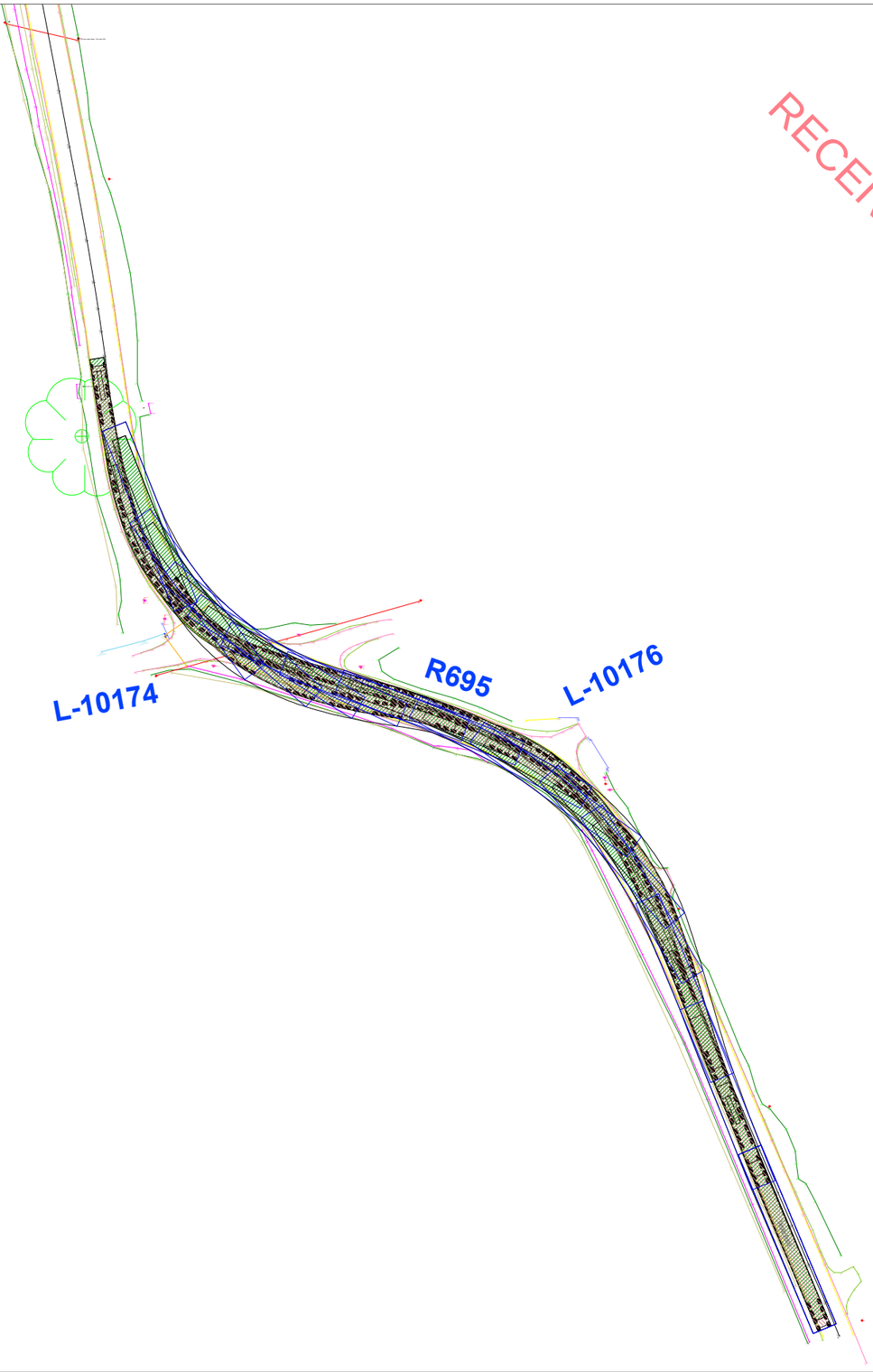


NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-10 Location 3 - Bend on R695 near L-10174 and L-10176, autotrack, blade extended artic

PROJECT: Briskalagh Renewable Energy Development			ALAN LIPSCOMBE TRAFFIC & TRANSPORT CONSULTANTS
CLIENT: Briskalagh Ltd		SCALE: 1:1000	
PROJECT NO: 11060	DATE: 18.06.24	DRAWN BY: AL	



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-11 Location 3 - Bend on R695 near L-10174 and L-10176, autotrack, tower extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	1:1000
PROJECT NO: 11060	DATE: 19.09.24	DRAWN BY:	AL

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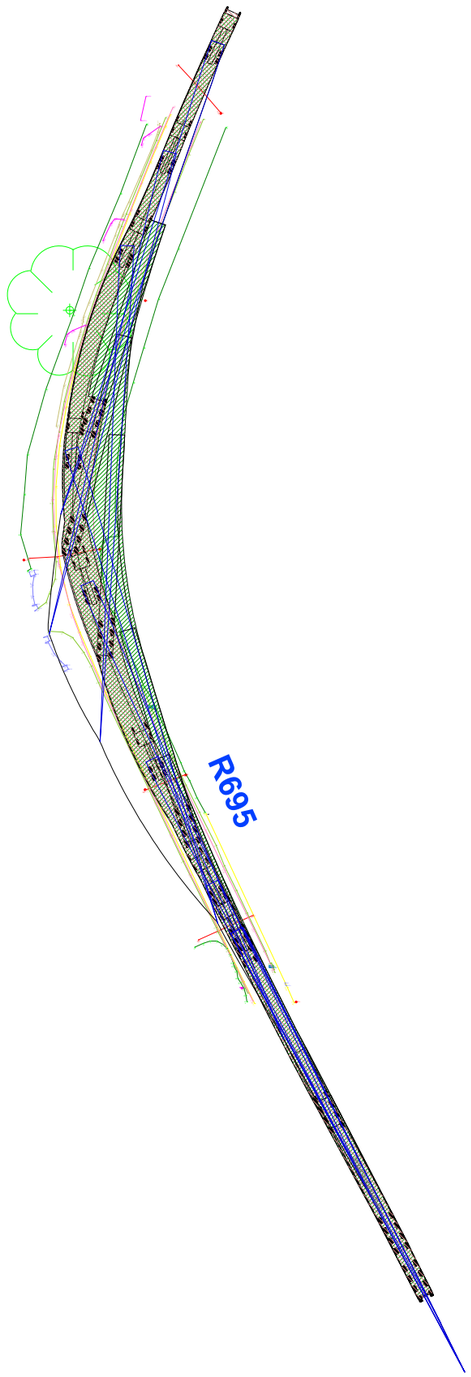
TRAFFIC & TRANSPORT CONSULTANTS



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-12 Location 4 - Bend on R695, autotrack, blade extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd		SCALE: 1:1000
PROJECT NO: 11060	DATE: 18.06.24		DRAWN BY: AL

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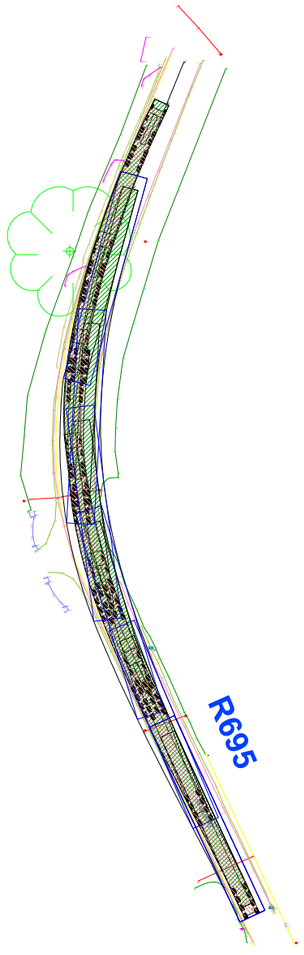


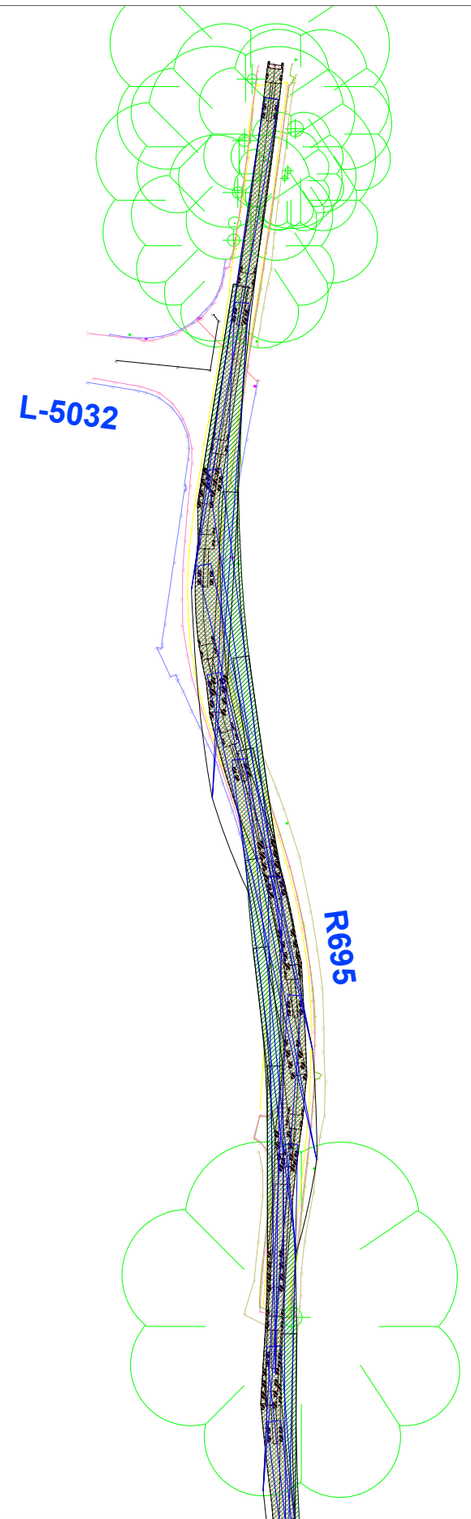
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-13 Location 4 - Bend on R695, autotrack, tower extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	1:1000
PROJECT NO: 11060	DATE: 19.09.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



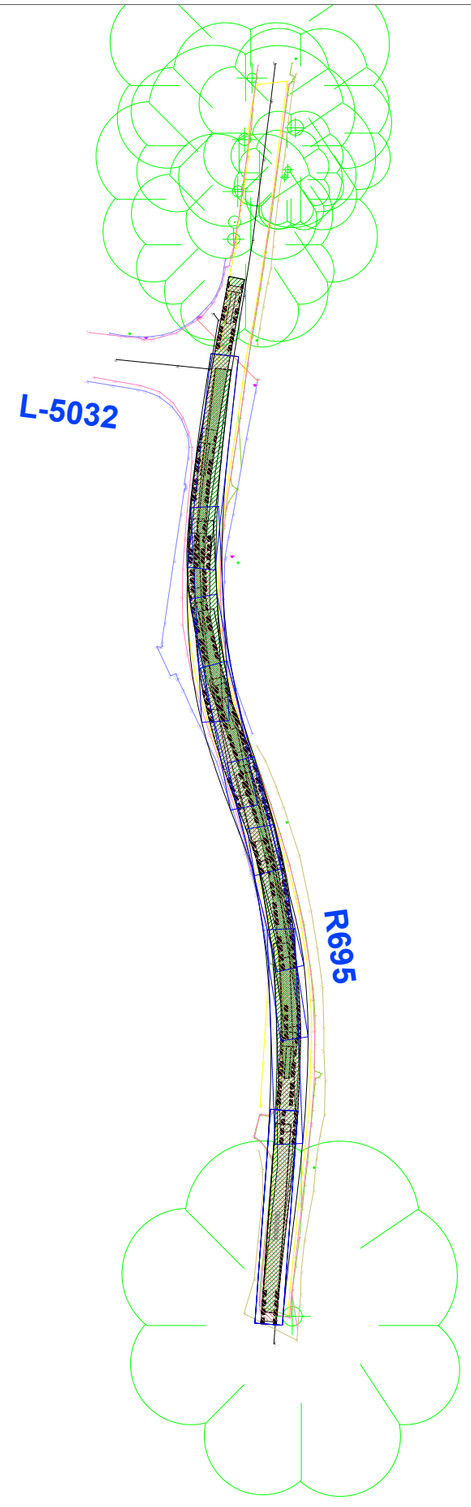
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-14 Location 5 - Bend on R695 at St Molua's Church and L-5032, autotrack, blade extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	1:1000
PROJECT NO: 11060	DATE: 18.06.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-15 Location 5 - Bend on R695 at St Molua's Church and L-5032, autotrack, tower extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	1:1000
PROJECT NO: 11060	DATE: 19.09.24	DRAWN BY:	AL

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Location 6 – S-Bend on the R695

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-16 and 15-17 respectively. The assessment shows that the body of the blade will require to overhang the inside of the 2 corners and the blade tip will over-sail the western and eastern edges of the R695 when negotiating this S-Bend.

Location 7 – Bend on the R695 north of L-5031

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-18 and 15-19 and shows that there will be minor overhang of the blade body and over-sail of the blade tip at this location.

15.1.10 Wind Farm Site Access Junctions

Locations 8 and 9 – R695 / L1009 junction and the temporary access on the L-1009

The swept path analysis undertaken for these junctions are shown for the blade and tower transporters in Figures 15-20 and 15-21. At the R695 / L-1009 junction Figure 15-20 shows that the blade transporter will require to utilise the existing carpark on the east side of the L-1009.

The figures also show the swept path of the abnormally sized loads accessing the site off the L-1009, with the area at the access requiring to be surfaced to accommodate the abnormally sized vehicles shown in Figure 15-22.

The temporary access for the abnormally sized loads will be opened temporarily only on;

- The 19 nights that the abnormally sized vehicle convoys deliver to the Proposed Wind Farm site escorted by An Garda Siochana and staff provided by the haulage company, and,
- On the 7 days when 107 concrete loads will be delivered to the site on each of these days for the construction of the turbine foundations. On these days temporary traffic management measures will be put in place, including signage and the presence of a flagman, in order to provide a safe access and egress to and from the site.

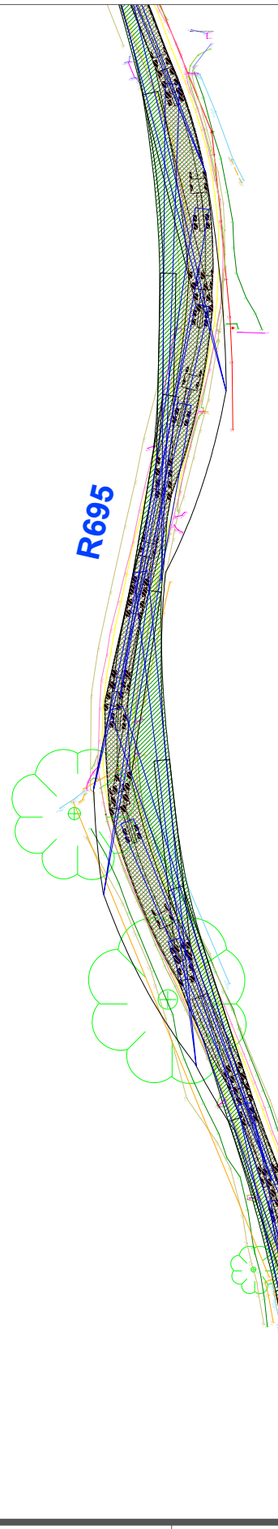
On the completion of the construction phase this location will be fenced off and re-instated to its original state and will be opened only for the purpose of replacing large turbine component parts.

Location 10 – Proposed construction access on the L-5024

It is proposed that access for general construction traffic will be provided to and from the Proposed Wind Farm site via an improved access junction off the L-5024, as shown in Figure 15-23. The proposed junction has a radii of 13m to provide for standard HGVs turning right into the site and right out of the site, in accordance with TII guidelines Geometric Design of Junctions (DN-GEO-03060). Visibility splays that will be kept clear during the construction and operational stages of the Proposed Project are shown in Figure 15-24. Splays of 90m at a setback of 2.4m will be provided as requested by Kilkenny County Council in the scoping response set out in Section 15.1.1.4 of this EIAR.

The autotrack assessment shown in Figures 15-25 demonstrates that the proposed junction off the L-5024 will accommodate the turning requirements of a large articulated HGV.

The proposed access off the L-5024 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 15-16 Location 6 - S-Bend on R695, autotrack, blade extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd		SCALE: 1:1000
PROJECT NO: 11060	DATE: 18.06.24		DRAWN BY: AL

ALAN LIPSCOMBE
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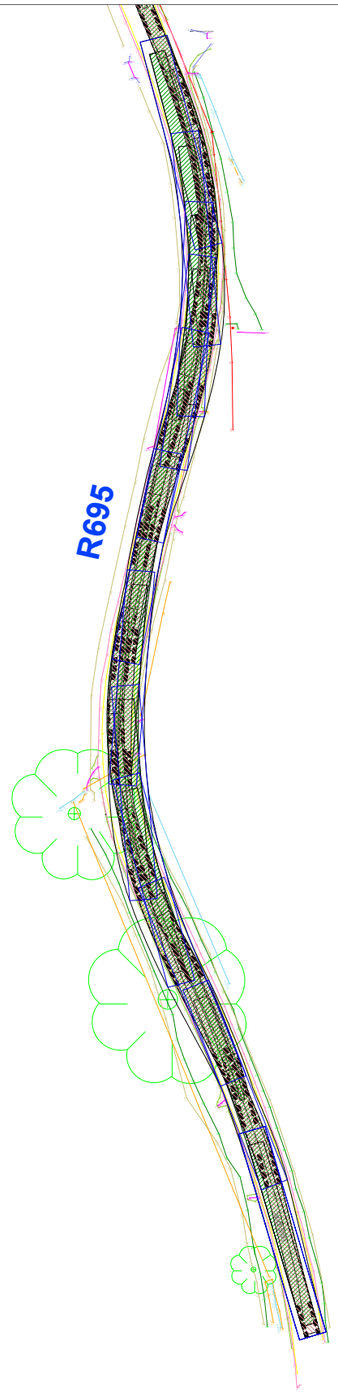

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-17 Location 6 - S-Bend on R695, autotrack, tower extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	1:1000
PROJECT NO: 11060	DATE: 19.09.24	DRAWN BY:	AL

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NOTES:

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Figure 15-18 Location 7 - Bend on R695 north of L-5031, autotrack, blade extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd		SCALE: 1:1000
PROJECT NO: 11060	DATE: 18.06.24		DRAWN BY: AL

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TRAFFIC & TRANSPORT CONSULTANTS

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-19 Location 7 - Bend on R695 north of L-5031, autotrack, tower extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	1:1000
PROJECT NO: 11060	DATE: 19.09.24	DRAWN BY:	AL

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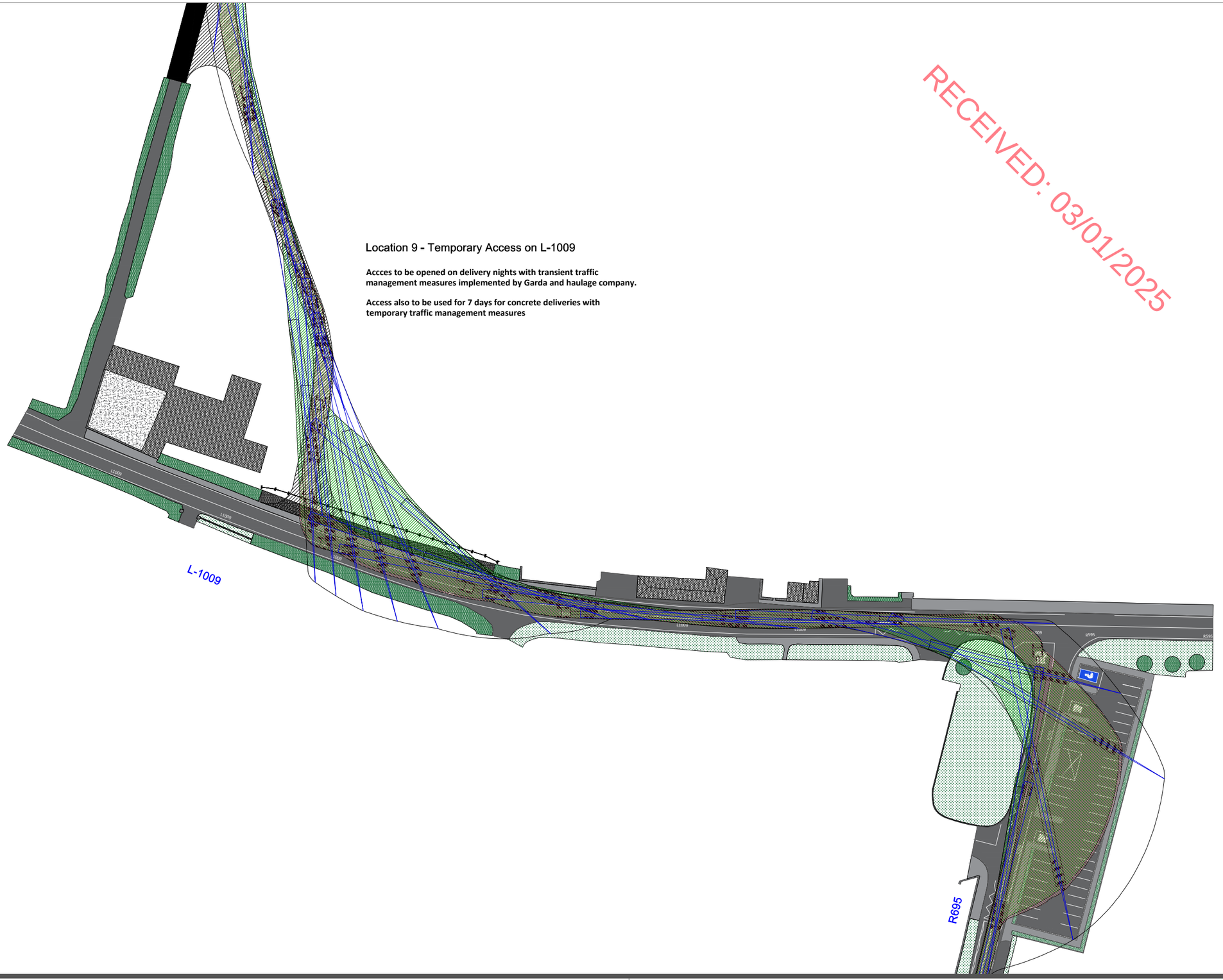


Location 9 - Temporary Access on L-1009

Accces to be opened on delivery nights with transient traffic management measures implemented by Garda and haulage company.

Access also to be used for 7 days for concrete deliveries with temporary traffic management measures

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-20 Locations 8 and 9 - R695 / L-1009 junction and temporary access on L-1009 autotrack assessment, blade extended artic

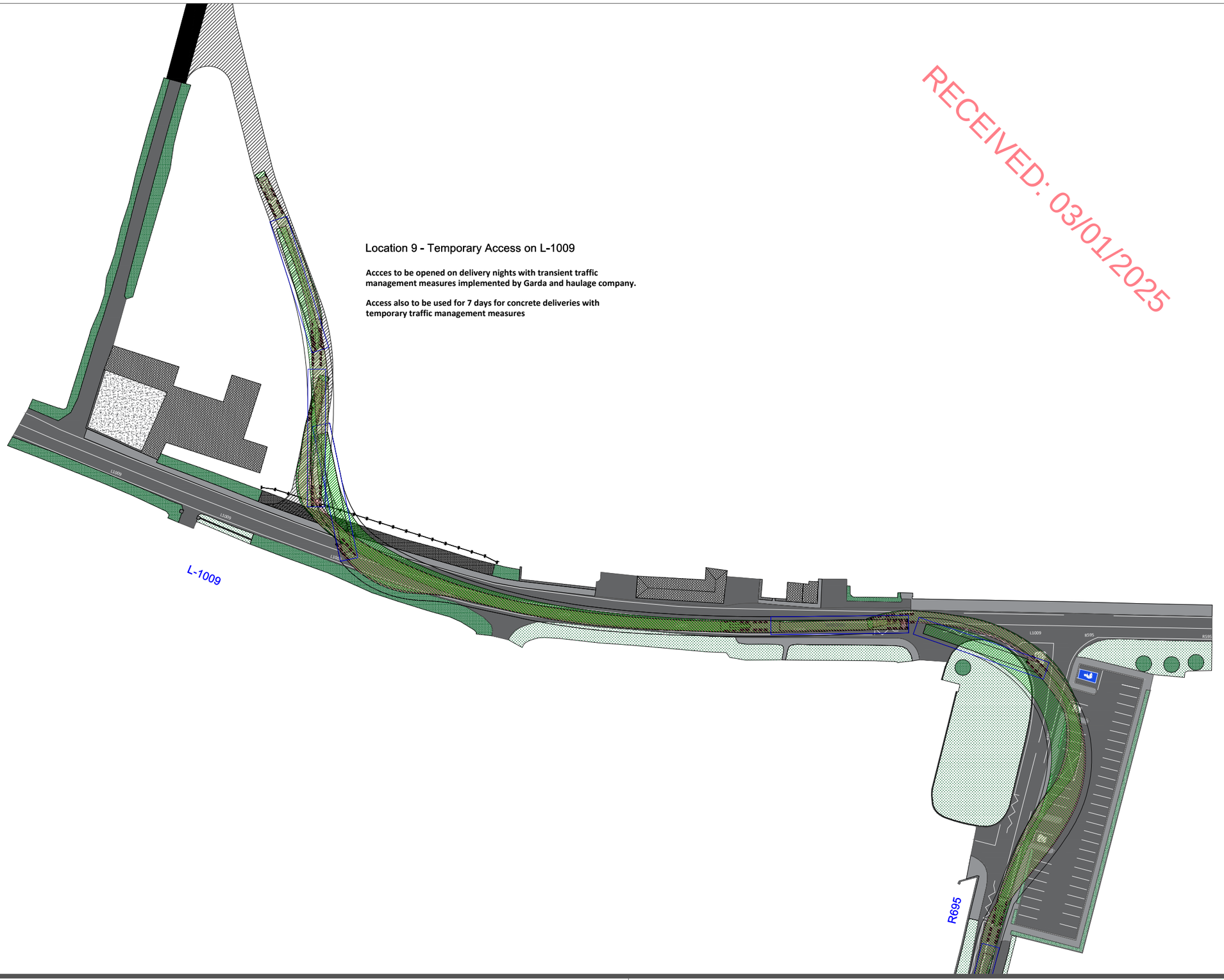
PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	1:1000
PROJECT NO: 11060	DATE: 26.09.24	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Location 9 - Temporary Access on L-1009

Accces to be opened on delivery nights with transient traffic management measures implemented by Garda and haulage company.

Access also to be used for 7 days for concrete deliveries with temporary traffic management measures



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-21 Locations 8 and 9 - R695 / L-1009 junction and temporary access on L-1009 autotrack assessment, tower extended artic

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	1:1000
PROJECT NO: 11060	DATE: 26.09.24	DRAWN BY:	AL

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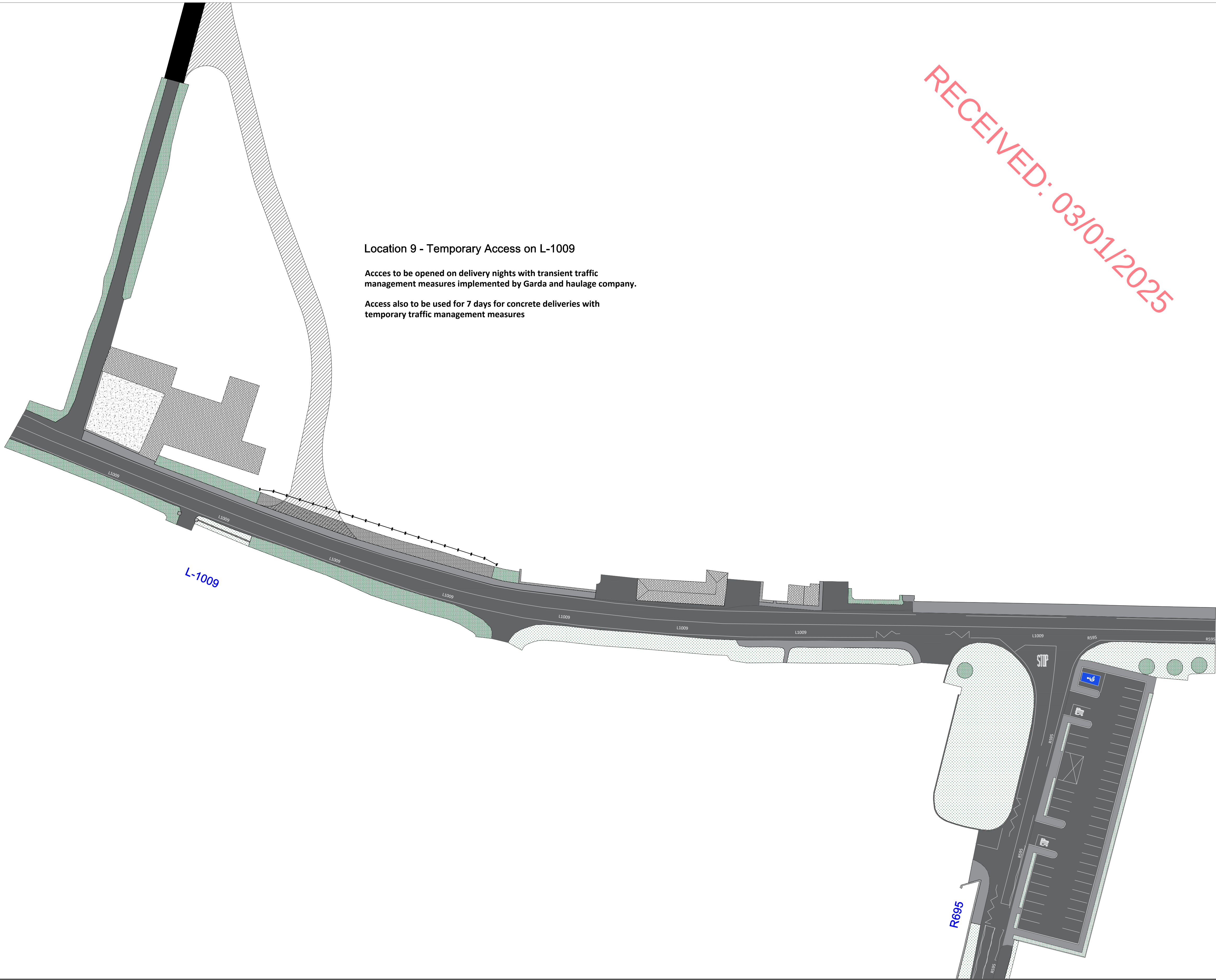

Location 9 - Temporary Access on L-1009

Accces to be opened on delivery nights with transient traffic management measures implemented by Garda and haulage company.

Access also to be used for 7 days for concrete deliveries with temporary traffic management measures

NOTES:

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Figure 15-22 Location 9 - Temporary access on L-1009

PROJECT: Briskalagh Renewable Energy Development			
CLIENT: Briskalagh Ltd		SCALE: 1:1000	
PROJECT NO: 11060	DATE: 26.09.24	DRAWN BY: AL	

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Location 10 - Construction Access Junction

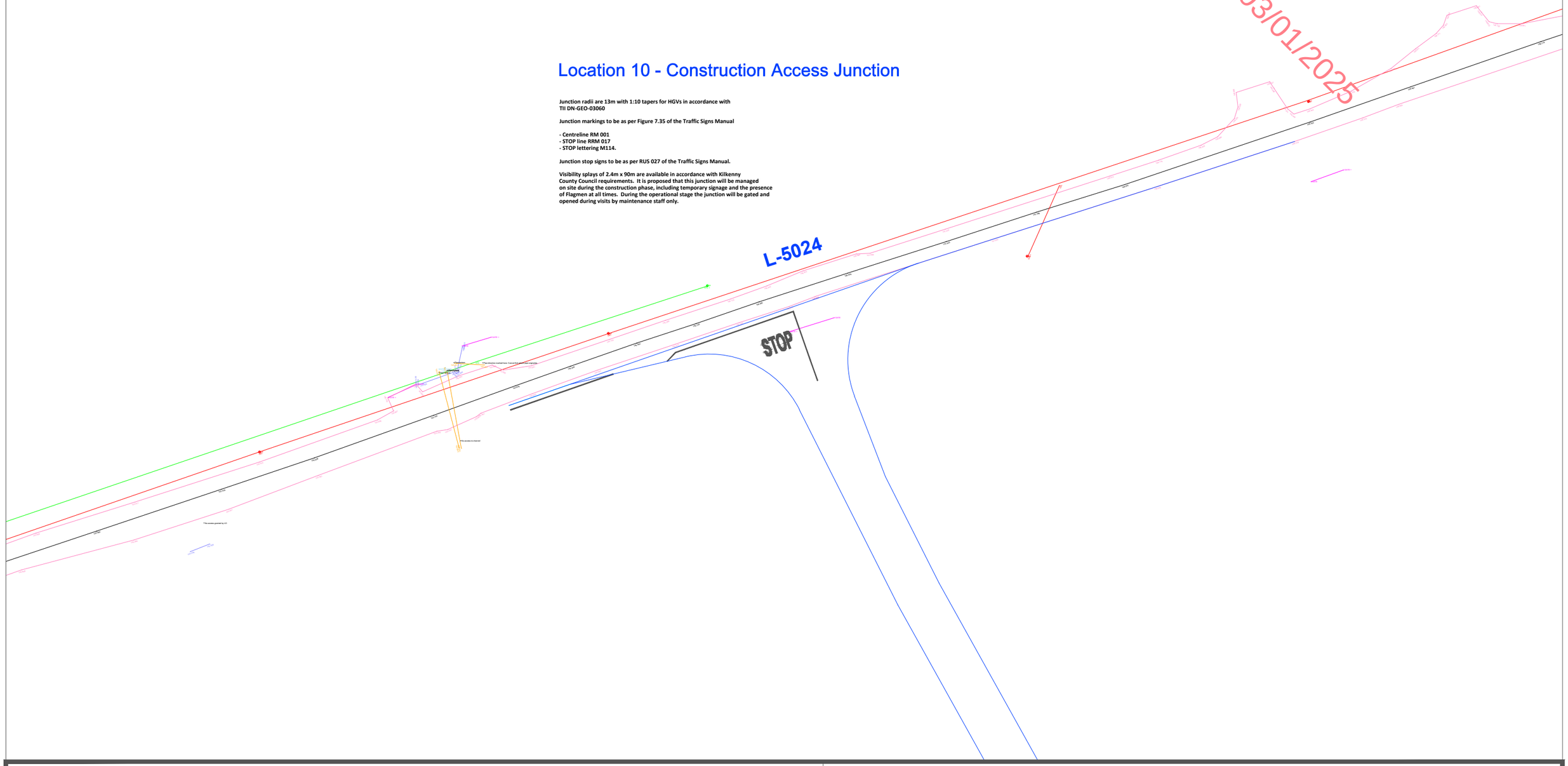
Junction radii are 13m with 1:10 tapers for HGVs in accordance with TII DN-GEO-03060

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.

Visibility splays of 2.4m x 90m are available in accordance with Kilkenny County Council requirements. It is proposed that this junction will be managed on site during the construction phase, including temporary signage and the presence of Flagmen at all times. During the operational stage the junction will be gated and opened during visits by maintenance staff only.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-23 Location 10 - Construction access on L-5024, junction layout

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd		SCALE: 1:500
PROJECT NO: 11060	DATE: 27.09.24		DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Location 10 - Construction Access Junction

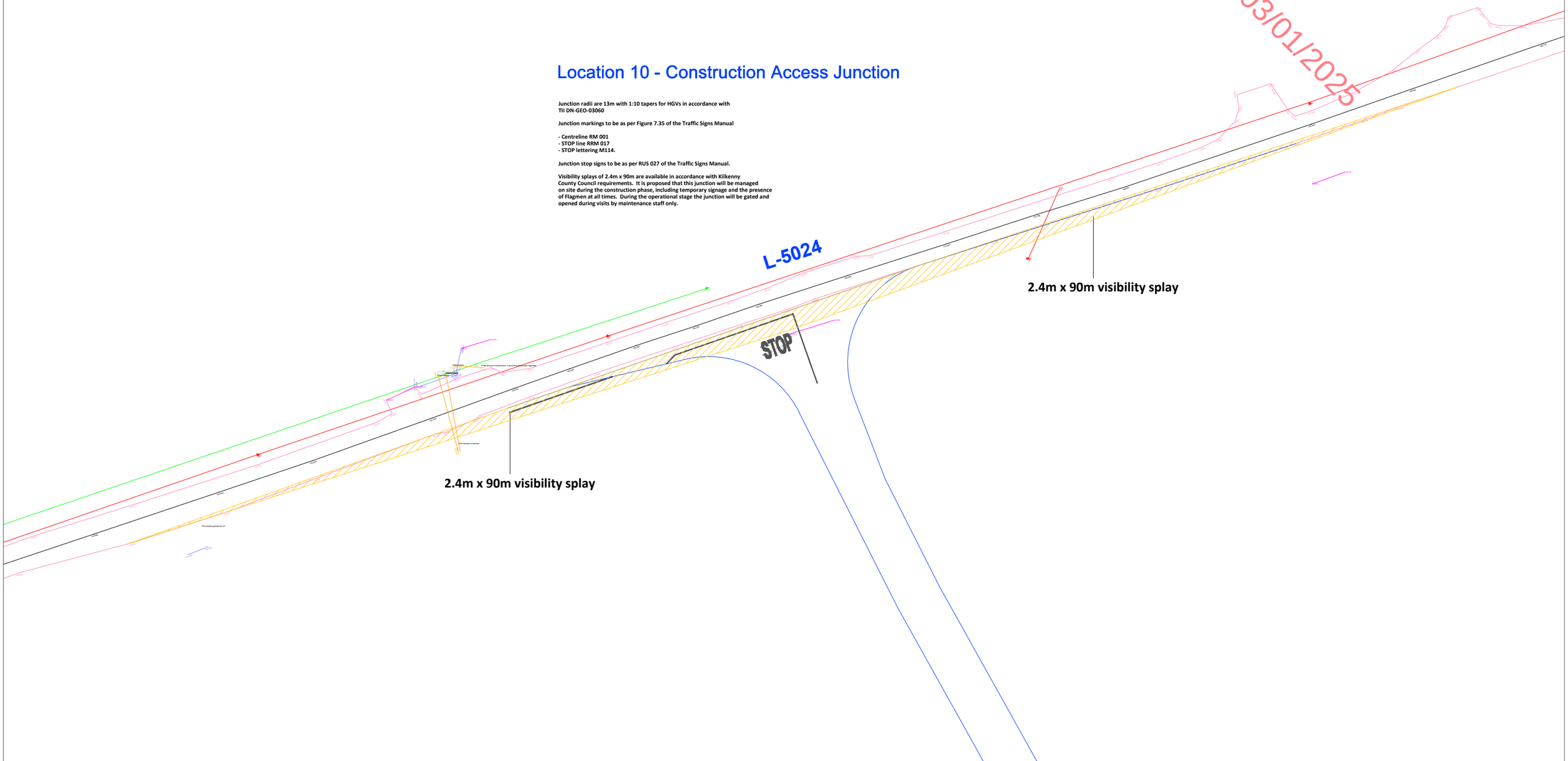
Junction radii are 13m with 1:10 tapers for HGVs in accordance with TII DN-GEO-03060

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.

Visibility splays of 2.4m x 90m are available in accordance with Kilkenny County Council requirements. It is proposed that this junction will be managed on site during the construction phase, including temporary signage and the presence of Flagmen at all times. During the operational stage the junction will be gated and opened during visits by maintenance staff only.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-24 Location 10 - Construction access on L-5024, visibility splays

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd		SCALE: 1:500
PROJECT NO: 11060	DATE: 19.09.24		DRAWN BY: AL

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Location 10 - Construction Access Junction

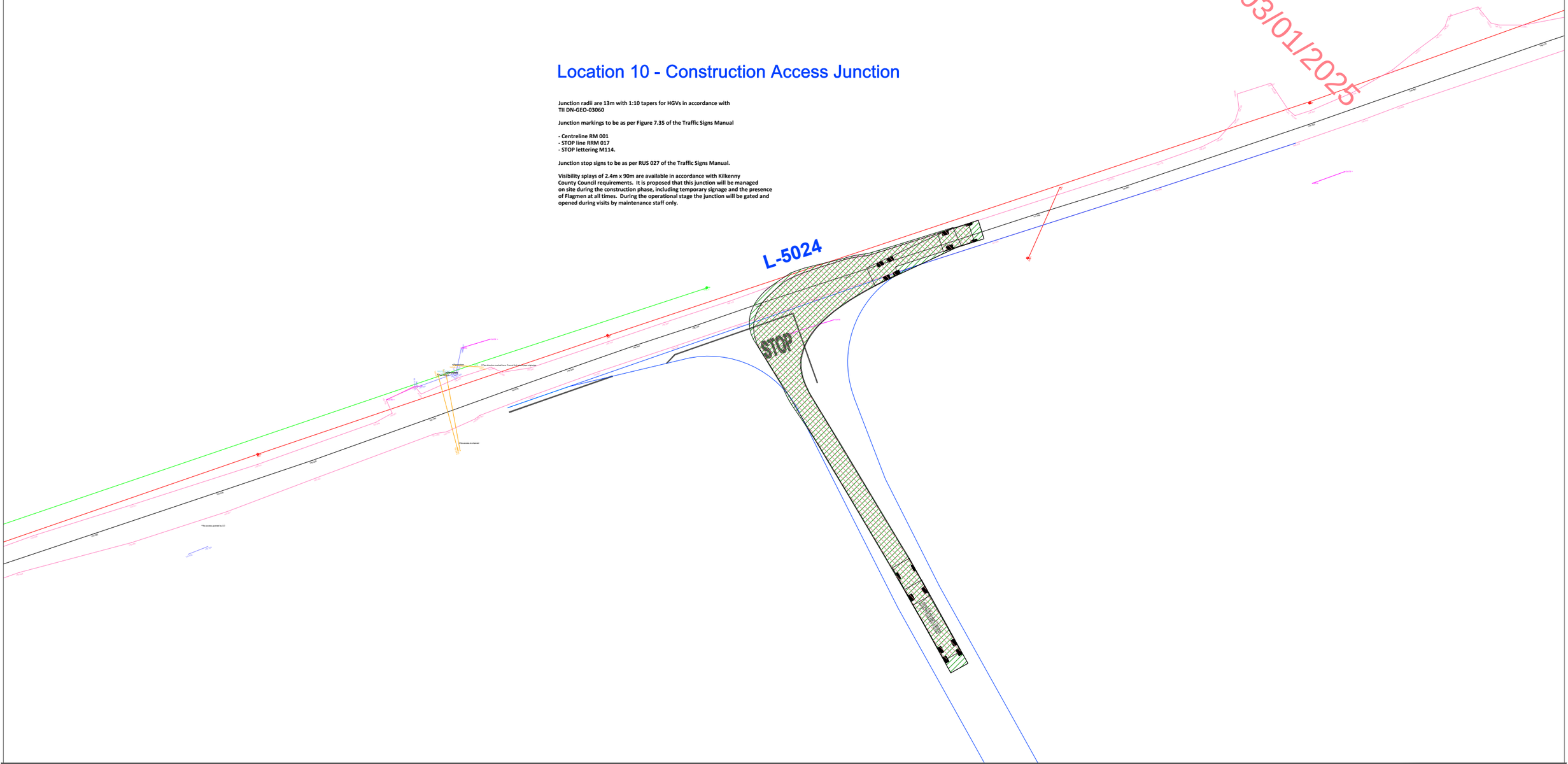
Junction radii are 13m with 1:10 tapers for HGVs in accordance with TII DN-GEO-03060

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.

Visibility splays of 2.4m x 90m are available in accordance with Kilkenny County Council requirements. It is proposed that this junction will be managed on site during the construction phase, including temporary signage and the presence of Flagmen at all times. During the operational stage the junction will be gated and opened during visits by maintenance staff only.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 15-25 Location 10 - Construction access on L-5024, autotrack, large standard articulated HGV layout

PROJECT:	Briskalagh Renewable Energy Development		
CLIENT:	Briskalagh Ltd	SCALE:	1:500
PROJECT NO: 11060	DATE: 19.09.24	DRAWN BY:	AL

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TRAFFIC & TRANSPORT CONSULTANTS

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

15.1.11 Provision for Sustainable Modes of Travel

15.1.11.1 Walking and Cycling

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

15.1.11.2 Public Transport

A review of the TFI website indicates that there are no bus services that pass through Kilmanagh or the local road network in the proximity of the Proposed Wind Farm Site. Public transport is therefore not an option for construction staff to access the Proposed Wind Farm site. The provision of minibuses will be considered for transporting staff to and from the site in order to minimise traffic generation and parking demand.

As the Proposed Grid Connection underground cabling route is located along the public road network there are a number of public transport services that service this aspect of the Site. However, due to the transient nature of construction works along the underground cabling route, use of these public transport services would be limited to short durations.

15.1.12 Likely and Significant Effects and Associated Mitigation Measures

15.1.12.1 'Do-Nothing' Scenario

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

If the Proposed Project were not to proceed, the opportunity to capture part of Kilkenny'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.

15.1.12.2 Construction Phase: Traffic and Transport

15.1.12.2.1 *Proposed Wind Farm*

For 222 days, when general construction works will take place at the same time as the construction of the grid connection route, an additional 123 PCUs will travel to/from the Proposed Wind Farm site. On these days Proposed Project generated traffic will travel on routes other than the TDR through the settlement of Kilmanagh, with potential routes via Kilkenny identified in Section 15.1.2.3 of this EIAR. During these days it is forecast that the increase in traffic volumes will range from +1.3% on the N10 between the M9 and Kilkenny (Link 1), to +1.2% on the N76 just to the east of Callan (Link 2) and +3.5% on the R695 just to the north of Callan (Link 3). Travelling north toward the site background traffic volumes decrease resulting in a 13.6% increase on the R695 approaching Kilmanagh (Link 4), a 9.3% increase on the L-1009 just west of Kilmanagh. It is forecast that this will have a temporary slight negative effect for existing traffic on the delivery routes and on the route of the proposed grid connection and at the proposed access junction on the L5024.

For 7 days when the delivery of smaller turbine components are made to the site by standard HGVs at the same time as the remaining 7 days required for the construction of the grid connection, it is forecast that an additional 85 PCUs will travel to/from the Proposed Wind Farm site. On these days it is forecast that the increase in traffic volumes will range from +0.9% on the N10 between the M9 and Kilkenny (Link 1), to +0.8% on the N76 just to the east of Callan (Link 2) and +2.4% on the R695 just to the north of Callan (Link 3). Travelling north toward the site it is forecast that there will be a 9.4% increase on the R695 approaching Kilmanagh (Link 4), a 6.4%% increase on the L-1009 just west of Kilmanagh (Link 5). It is forecast that this will have a temporary slight negative effect for existing traffic on the delivery routes and on the route of the proposed grid connection and at the proposed access junction on the L5024.

For 7 days when concrete is delivered to the site for the construction of the turbine foundations via the TDR and the temporary junction on the L1009 west of Kilmanagh, an additional 584 PCUs will travel to/from the site. On these days it is forecast that the increase in traffic volumes will range from +6.0% on the N10 between the M9 and Kilkenny (Link 1), to +5.6% on the N76 just to the east of Callan (Link 2) and +16.5% on the R695 just to the north of Callan (Link 3). Travelling north toward the site it is forecast that there will be a 64.5% increase on the R695 approaching Kilmanagh (Link 4) and a 44.2% increase on the L-1009 just west of Kilmanagh (Link 5). It is forecast that this will have a temporary moderate negative effect for existing traffic on the delivery route and at the temporary access junction on the L-1009.

On the 19 nights that the abnormal loads carrying the large turbine components travel to the Proposed Wind Farm, an additional 105 PCUs will travel to/from the site. On these days the volumes of traffic will remain at similar level in terms of pcus when it is forecast that the increase in traffic volumes will range from +1.1% on the N10 between the M9 and Kilkenny (Link 1), to +1.0% on the N76 just to the east of Callan (Link 2) and +3.0% on the R695 just to the north of Callan (Link 3). Travelling north toward the site it is forecast that there will be a 11.6% increase on the R695 approaching Kilmanagh (Link 4) and an 8.0% increase on the L-1009 just west of Kilmanagh (Link 5). It is forecast that this will have a temporary moderate negative effect for existing traffic on the delivery route and at the temporary access junction on the L-1009.

15.1.12.2.2 *Proposed Grid Connection*

With respect to the traffic volumes that will be generated during the construction of the Proposed Grid Connection underground cabling route, it is estimated that there will be approximately 14 daily return trips made by a truck transporting materials, and 8 return trips made by a car to transport construction staff, to and from the site. Short term diversions are required for local traffic, as discussed in Section 15.1.7 of this EIAR, although the traffic volumes that will be impacted on the local road network are low. Therefore, by its nature the effects of these additional trips and diversions on the network will be transient, will be temporary and will be slight.

15.1.12.3 Operational Phase: Traffic and Transport

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

15.1.12.4 Decommissioning Phase: Traffic and Transport

15.1.12.4.1 *Proposed Wind Farm*

The wind turbines proposed as part of the Proposed Project 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 Site may be decommissioned fully.

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

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

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

15.1.12.4.2 *Proposed Grid Connection*

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

The works required during the decommissioning phase are described in Chapter 4: Description of the Proposed Project and the accompanying Decommissioning Plan included as Appendix 4-5 of this EIAR.

15.1.12.5 Mitigation Measures

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

15.1.12.5.1 Mitigation by Design

Mitigation by design measures include the following:

- Selection of the most appropriate delivery route to transport the wind turbine components, requiring the minimum remedial works to accommodate the vehicles as set out in Section 15.1.2.2.
- Selection of the shortest underground grid connection route, minimising the impacts on the existing road network and traffic.

15.1.12.5.2 *Mitigation Measures During the Construction Stage*

The successful completion of the Proposed Project will require significant coordination and planning, and a comprehensive set of mitigation measures will be put in place before and during the construction stage of the Proposed Project, in order to minimise the effects of the additional traffic generated by the Proposed Project.

A **Traffic Management Plan (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.

Temporary Access Junction for Abnormally Sized Loads and Concrete Foundation Deliveries on L-1009

It is proposed that a temporary access junction will be constructed off the L1009 at a location approximately 0.2km west of the junction with the R695 in Kilmanagh, as set out in Sections 15.1.4.1 and 15.1.9 of this EIAR. this access will be open for the following period only;

- For 19 nights, convoys comprising of 3 abnormal loads will gain access and exit the site at this proposed temporary junction. Transient traffic management measures on these nights will comprise of transient traffic management measures provided by an escort provided by An Garda Síochána and the haulage company.
- For the 7 days when concrete loads will be delivered to the site during the construction of the turbine foundation. On these days circa 107 concrete loads will access and leave the site over a 12-hour period, resulting in 7 HGV trips accessing and exiting the site at this junction per hour. On these days it is proposed that temporary traffic management measures, including signs and the presence of flagmen will be in place during the hours of operation.
- At all other times during the construction phase this temporary access will be closes by means of security gates. On completion of the construction phase the temporary access will be permanently closed and existing boundary treatment reinstated, and opened only for the purpose of the replacing a large turbine component.

Construction and Operational Site Access off the L-5024

As set out in Section 15.1.9 this access is designed in accordance with TII Guidelines and will provide access for general construction deliveries and staff during the construction period and for all maintenance traffic once the Proposed Wind Farm is Operational. As set out in Section 15.1.2.3 and shown in Figure 15-1a of this EIAR, in order to separate traffic movements travelling to and from the site it is proposed that all traffic accessing the site will travel east along the L5024 and turn right into the site, with all traffic exiting the site turning right out onto the L5024. It is proposed that temporary traffic management measures will be introduced at this location during the construction phase, including signs and the presence of a Flagman on days with high volumes of construction material deliveries.

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

- Introduction of signage on westbound and eastbound approaches to the proposed temporary access on the L1009 and the access on the L5024 warning of approaching construction site (TMS Traffic Signs WK001).
- Signage on the L1009 eastbound indicating the temporary construction access approaching on the left (TMS traffic Sign WK052) and similar on westbound lane indicating the temporary link approaching on the right (TMS Traffic Signs WK053). Similar signs to be included on the L5024 during the construction phase.
- It is proposed that the temporary speed limit of 50 km/h is indicated on the section of the L5024 in the proximity of the access junction.
- The introduction of signage on the approaches to both access junctions 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 Kilkenny County Council and other relevant authorities in advance of deliveries of turbine components to the Proposed Wind Farm site. For general construction traffic, routes to and from the site avoiding the settlement of Kilmanagh will be agreed with Kilkenny County Council and strictly adhered to by all suppliers.
- **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 Site–** A travel plan for construction staff, which will include the identification of a routes to / from the Site and identification of parking areas will be implemented by the main contractor.
- **Temporary traffic signs** – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including the proposed access junctions on the L1009 and L5024.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 Underground Cabling 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.

15.1.12.5.3 Mitigation Measures During Operational Stage

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

15.1.12.5.4 Mitigation Measures During Decommissioning Stage

In the event that the Proposed Project is decommissioned after the 35 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Chapter 4 and Appendix 4-5 Decommissioning Plan. This plan will include a material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning, in accordance with Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013).

15.1.12.6 Residual Effects

15.1.12.6.1 Construction Stage

During the 12 -18 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 underground cabling route will have a slight to moderate, short-term 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.

15.1.12.6.2 Operational Stage

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

15.1.12.6.3 Decommissioning Stage

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

For this scenario the Proposed Grid Connection onsite 38kV substation and underground cabling route will remain in-situ and continue to operate as part of the national electricity grid network.

15.1.12.7 Cumulative Effects

A detailed list of all developments at varying stages in the development process (from pre-planning to operational), is set out in Appendix 2-3 of this EIAR. The potential cumulative traffic effects with the Proposed Project are assessed based on the following criteria;

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

15.1.12.7.1 Other Wind Farms

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

As set out in Table 15-29 there are 4 permitted wind farm developments and a further 2 at the pre-application stage located within 10km of the Proposed Project, yet to be constructed, that have the potential to cause cumulative effects in relation to traffic and transport.

Of these 6 Wind Farms, the permitted Farranrory Wind Farm (9 turbines) shares part of the TDR with the Proposed Project, including the southern section of the R695 and could potentially have concrete delivery and general construction delivery routes that share common parts of the road network.

A similar assessment is made for the Kyleballyoughter Wind Farm (2 turbines), although less traffic will be generated by this development as it is smaller in scale.

It is therefore proposed that the construction phase of the Proposed Project will be scheduled, where possible, to avoid the construction phases of the permitted Farranrory Wind Farm and the Kyleballyoughter Wind Farm. 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 cumulative traffic effects
1 – Farranrory Wind Farm (9 Turbines) – Tipperary County Council, Planning Reference 20/972 (including grid connection application under Planning Ref. 2360248)	Permitted	High	Medium	High
2 – Knockroe Wind Farm (7 Turbines) – Tipperary County Council, Planning Reference 21/1502, ABP.315176	Permitted	Medium	Medium	Medium
3 – White Hill Wind Farm (7 Turbines) – Carlow & Kilkenny County Councils, ABP.315365	Permitted	Low	Medium	Low
4 – Kyleballyoughter Wind Farm (2 Turbines) – Kilkenny County Council, Planning Reference 16/666 & 24/33	Permitted	High	Low	High
5 – Freneystown Wind Farm (8 Turbines) – Kilkenny County Council, Pre-Application ABP Reference .317589.	Pre- application stage	Low	Medium	Low
6 – Littleton Wind Farm (14 Turbines) – Tipperary County Council, Pre-Application ABP Reference .314186.	Pre- application stage	Low	Medium	Low

Other development applications in the planning system

A detailed cumulative assessment has been carried out for all planning applications (granted and awaiting decisions) within the cumulative assessment area for the Proposed Wind Farm site and the Proposed Grid Connection described above.

The planning applications identified within the study area for new dwellings or renovations of existing dwellings, associated wastewater treatment systems as well as for the erection of farm buildings. The planning applications have been reviewed based on their type, scale and proximity to the Proposed Wind Farm site. Based on the scale of the works, their proximity to the Proposed Wind Farm site and

the temporal period of likely works, no cumulative effects will occur as a result of the Proposed Project (construction, operation and decommissioning phases).

A desk study of planning applications within 200m of the Proposed Grid Connection was undertaken. The majority of these applications relate to the construction or renovation/extension of domestic dwellings, which will not generate potential cumulative effects due to their scale. However, in the vicinity of Ballyragget substation there is a permitted application for the construction of a battery energy storage system. This chapter details the mitigation measures for the management of traffic through all phases of the Proposed Project. Therefore, once implemented, there is no potential for significant cumulative effects on traffic and transport.

The works along the Proposed Grid Connection are minor and transient, similar to roadworks being completed across the country and have no potential for significant cumulative effects on traffic and transport.

15.2 Telecommunications and Aviation

15.2.1 Introduction

This section of the EIAR assessed the likely significant effects of the Proposed Project on telecommunications and aviation assets.

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 Jack Smith and reviewed by Eoin McCarthy, of MKO. Jack is a Project Environmental Scientist with MKO with over 2 years' experience in the consultancy sector. Jack holds a MSc. in Environmental Leadership from NUIG and is a Practitioner member of the Institute for Environmental Management and Assessment. Jack's key strengths and areas of expertise are in project management, environmental impact assessment, GIS mapping and modelling, and feasibility assessment. Since joining MKO, Jack has experience in report writing including feasibility studies and EIA screening reports and EIAR chapters including Material Assets chapters for large-scale renewable energy developments. Eoin McCarthy holds a BSc. (Env.) in Environmental Science and is a Senior Environmental Scientist with over 13 years' experience in the consultancy sector. Eoin has completed numerous Material Assets (Other Material Assets) sections of EIARs for wind farm developments. This chapter was also reviewed by Michael Watson. Michael Watson is Director of Environment at MKO with over 20 years' experience in the environmental sector.

15.2.2 Methodology and Guidance

The methodology for the assessment included in this section focuses particularly on the scoping and consultation exercise conducted with telecoms operators and aviation authorities. Scoping was carried out in line with the EPA Guidelines (EPA, 2022), and the 'Best Practice Guidelines for the Irish Wind Energy Industry' (Irish Wind Energy Association, 2012) which provides a list of telecommunications operators for consultation.

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

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.

15.2.2.1 Legislation, Policy and Guidance

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

- Kilkenny County Development Plan 2021-2027
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022)
- Draft Air Corps Wind Farm/Tall Structures Position Paper (August 2014)
- Department of Environment, Heritage and Local Government (2006) Wind Energy Development Guidelines for Planning Authorities "the Guidelines"

- Department of the Environment, Heritage and Local Government (2019) Draft Revised Wind Energy Development Guidelines for Planning Authorities 'the draft Guidelines'
- Irish Wind Energy Association (2012) Best Practice Guidelines for the Irish Wind Energy Industry
- ESB Networks (2019) Code of Practice for Avoiding Danger from Overhead Electricity Lines.
- ESB (2017) EMF & You: Information about Electric & Magnetic Fields and the electricity network in Ireland
- Irish Rail (2018) CCE Department Technical Guidance Document CCE-TMS-310 Guidance on Third Party Works
- Irish Rail (2009) CCE Departmental and Multidisciplinary Standard I-DEP-0121 Third Party Works: Additional Details of Railway Safety Requirements.

15.2.3 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, effecting, 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 published Corine Land Cover Maps (www.epa.ie) identify that the closest airport to the Proposed Project is the Kilkenny Airport, located at Holdensrath, Co. Kilkenny. This airport is located approximately 6.6km east of the Proposed Wind Farm. The closest large international airport to the Proposed Project is Cork Airport, which is located approximately 114km southwest of the Proposed Project. Both airports listed above are outside the range at which such issues would be expected, and as detailed in Table 15-26 below, the Irish Aviation

Authority noted no issues with the Proposed Project however they issued observations as discussed in Section 15.2.5.3.2.

15.2.4 Preventing Electromagnetic Interference

15.2.4.1 National Guidelines

Both the Guidelines and the draft Guidelines state that interference with broadcast communications can be overcome by the installation of deflectors or repeaters where required.

Developers are advised to contact individual local and national broadcasters and mobile phone operators to inform them of proposals to develop wind farms. This consultation has been carried out by MKO as part of the assessment of the Proposed Project as summarised below in Table 15-31; full details are provided in Section 2.7 in Chapter 2 of this EIAR.

15.2.4.2 Scoping and Consultation with Telecommunications and Aviation Operators

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

The responses received from the telecommunications and aviation consultees are summarised below in Table 15-31.

Table 15-31 Telecommunications and aviation Scoping Responses

Consultee	Initial Scoping Response	Potential for Interference Following Consultation Exercise	Action Required
Broadcasting Authority of Ireland	Received 02.08.2023	No	No
Cellnex	Received 01.08.2023	No	No
Dense Air	No Response	N/A	No
Eircom Ltd/Eir	Received 21.12.2023	No	No
ESB	No Response	N/A	No
Enet	Received 10.08.2023	No	No
EOBO	No Response	N/A	No
Fastcom	No Response	N/A	No
Hibernian Towers	No Response	N/A	No
Imagine Networks	Received 01.08.2023	No	N/A

Consultee	Initial Scoping Response	Potential for Interference Following Consultation Exercise	Action Required
JFK Communications	Received 02.08.2023	No	No
Whizzy Internet Limited	No Response	N/A	No
Lackabeha Services	Received 02.08.2023	No	No
TETRA Ireland	No Response	N/A	No
Three Ireland Ltd	Received 02.08.2023	No	No
Viatel	N/A	No	N/A
Virgin Media Ltd	Received 01.08.2023	No	N/A
Vodafone Ireland Ltd	No Response	N/A	No
Western Broadband Network	No Response	N/A	No
RTE Transmission Network (2rn)	Received 10.08.2023	Yes	2rn asked that a protocol be signed between the developer and 2rn should the site go ahead. See Section 15.2.4.2.1 below for details

15.2.4.2.1 *Telecom Operators with Potential for Impacts*

The full scoping responses received from all operators are provided in Appendix 2-2. As listed in the table above, no operators have links within the Proposed Wind Farm site. Only one operator (Three Ireland Ltd) has links in proximity to the area of the Proposed Wind Farm site, however, these links are directed away from the Proposed Wind Farm and do not cross the Proposed Wind Farm site. Further correspondence with this operator confirmed that there is no potential for impacts on their links. Details of the correspondence can be found below and in Appendix 2-2.

Three

Three replied on the 2nd of August 2023 to a scoping request from MKO, noting that there are three links within 5km of the Proposed Wind Farm site, but all are directed away from the site. Further correspondence dated 27th November 2023 from Three confirmed that the Proposed Wind Farm will have no impact on the Three Ireland transmission network.

RTE/2rn

2rn replied on the 10th of August 2023 to a scoping request from MKO, noting that 2rn have no fixed links in a 5km radius of the Proposed Wind Farm site. The operator stated that *'There is however a risk of interference to broadcast coverage to viewers in the area. We would therefore ask that a protocol be signed between the developer and 2rn should the site go ahead.* A signed protocol is in place between 2rn and the Developer for the Proposed Project. Please see Appendix 15-2.

15.2.4.2.2 *Aviation*

Department of Defence

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

The Department of Defence was contacted by MKO on the 24th November 2023 and a response was received on the 4th December 2023 stating *"The Department of Defence wishes to acknowledge receipt of your e-mail below re: the proposed renewable energy project at Briskalagh Co. Kilkenny. We will consult with our Air Corps colleagues at Casement Aerodrome and will revert in due course."*

MKO followed up on the 15th July 2024 with the Department of Defence, however, no further response has been received to date.

Irish Aviation Authority

A scoping request was issued to the Irish Aviation Authority (IAA) on the 24th November 2023 regarding potential for impacts from the Proposed Project on aviation assets. A follow up request was made on the 15th January 2024, and an email response was received on the same day stating the below requirements.

IAA response:

> *"the following general observations would be proffered by the Authority during a formal planning process: In the event of planning consent being granted, the applicant should be conditioned to contact the Irish Aviation Authority to:*
>
> *(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 blade tip height elevations at each wind turbine location and*
>
> *(3) notify the Authority of intention to commence crane operations with at least 30 days prior notification of their erection.*

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

Electric and Magnetic Fields occur both naturally and from man-made sources. All electricity, both natural and man-made, produces two types of fields: electric fields and magnetic fields which are referred to as EMF. Two types of technology can be used to transmit electricity, alternating current (AC) and direct current (DC). Both AC and DC power lines produce electric and magnetic fields. AC lines produce AC electric and magnetic fields and DC lines produce static electric and magnetic fields.

ESB Networks transmission and distribution networks are AC systems. Please see Figure 15-26 reproduced from the 2017 ESB information booklet which demonstrates the alternating magnetic field of AC overhead lines and underground cables. As can be seen in Figure 15-26 below, EMF from 110kV overhead lines and underground cables diminishes quickly with distance from the potential impacted receptor, with EMF from underground 110kV cables such as those proposed for the Grid Connection, diminishing from 4µT to 0.5µT at 10m away from the cable, reducing to almost 0µT at 20m.

Figure 15-26 illustrates the magnetic field from overhead AC lines operating in Ireland

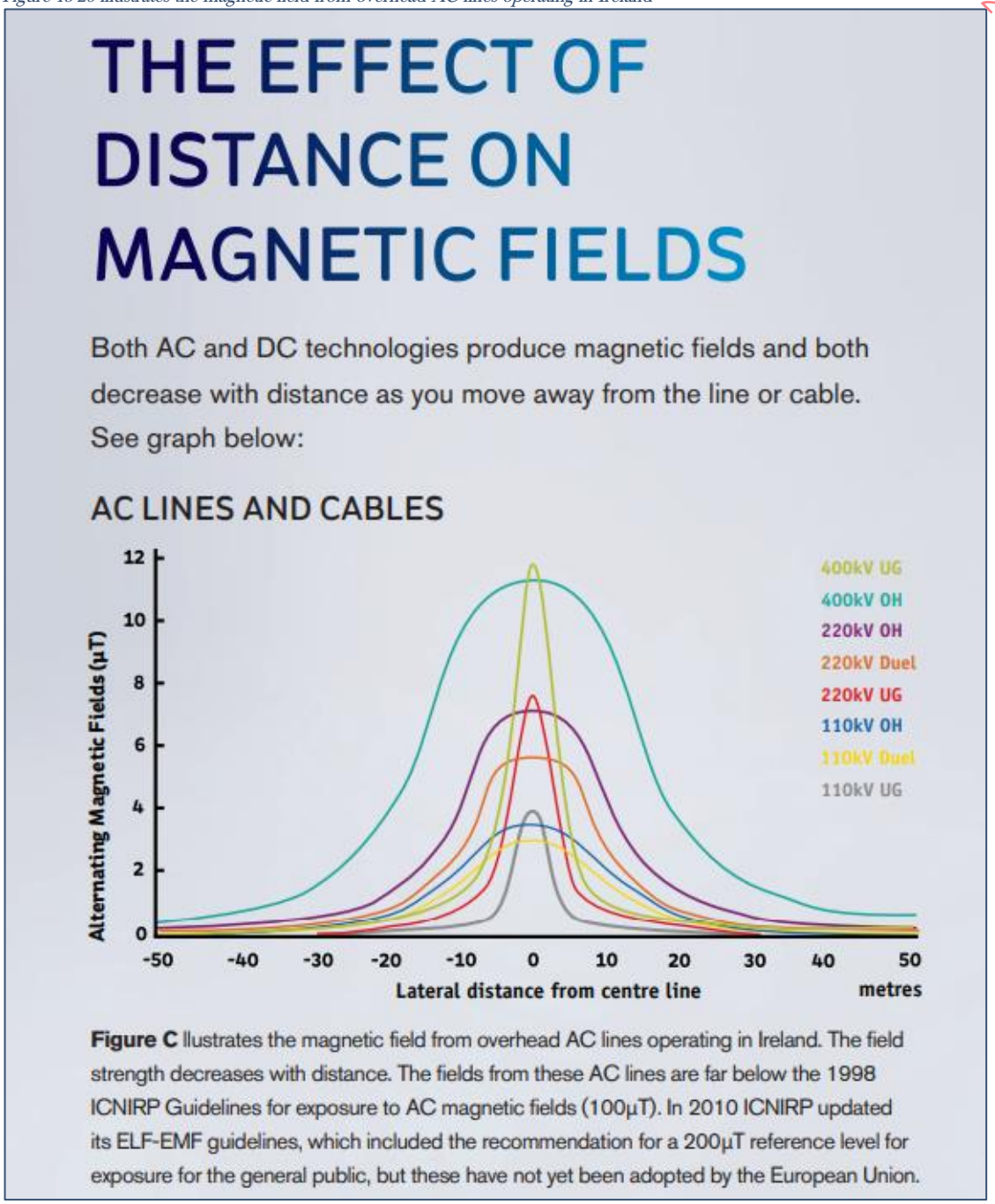

Figure C Illustrates the magnetic field from overhead AC lines operating in Ireland. The field strength decreases with distance. The fields from these AC lines are far below the 1998 ICNIRP Guidelines for exposure to AC magnetic fields (100µT). In 2010 ICNIRP updated its ELF-EMF guidelines, which included the recommendation for a 200µT reference level for exposure for the general public, but these have not yet been adopted by the European Union.

15.2.5 Likely Significant Effects and Associated Mitigation Measures

15.2.5.1 '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.

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

15.2.5.2 Construction Phase

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

15.2.5.3 Operational Phase

15.2.5.3.1 *Telecommunications*

Pre-Mitigation Effect

Proposed Wind Farm

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

Proposed Grid Connection

None identified.

Mitigation Measures

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

A signed protocol agreement between 2rn and the applicant can be found in Appendix 15-4. The protocol document ensures that in the event of any interference occurring to television or radio reception due to operation of the wind farm, the required measures, as set out in the document, will be carried out by the applicant to rectify this. The protocol document ensures that the appropriate mitigation is carried out in the event of unanticipated broadcast interference arising to television or radio reception as a result of the Proposed Wind Farm.

Residual Effect

The Proposed Project will have an imperceptible impact on the telecommunications signals of any operator, due to distance from or absence of any links in the area. In addition, a protocol agreement, ensuring no impacts on broadcast signals, has been signed between 2rn and the applicant, please see Appendix 15-4.

Significance of Effect

There will be no significant effect on telecommunications as a result of the Proposed Project.

15.2.5.3.2 *Aviation*

Pre-Mitigation Effect

Proposed Wind Farm

There are no IAA assets within the Proposed Wind Farm site or surrounds that may be impacted by the proposed turbines.

Proposed Grid Connection

None identified.

Mitigation Measures

None Proposed.

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

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

Residual Impact

The Proposed Project will have an imperceptible residual impact on aviation as all lighting requirements will be met by the applicant.

Significance of Effects

There will be no significant effects on aviation operations as a result the Proposed Project.

15.2.5.4 Decommissioning Phase

As stated in Section 15.2.5.2 above, the potential for electromagnetic interference from wind turbines occurs only during the operational phase of the Proposed Project. There are no electromagnetic interference impacts associated with the construction or decommissioning phases of the Proposed Project, and therefore no mitigation required.

15.2.5.5 Cumulative Effects

Chapter 2, Section 2.8 of this EIAR describes the methodology used in compiling the list of permitted or proposed projects and plans in the area, (wind energy or otherwise) considered in the assessment of cumulative effects, and provides a description of each project, including current status, and is set out in Section 2.8 in Chapter 2 of this EIAR. During the development of any large project that holds the potential to effect telecoms or aviation, the developer is responsible for engaging with all relevant telecom operators and the relevant aviation authorities to ensure that the proposal will not interfere with television or radio signals by acting as a physical barrier. In the event of any potential impact, the developer for each individual project is responsible for ensuring that the necessary mitigatory measures are in place. Therefore, as each project is designed and built to avoid impacts arising, a cumulative impact cannot arise.

As outlined above in Section 15.2.5.3.2, the Proposed Project will have no residual impact on aviation as all lighting requirements will be met by the applicant.

Therefore, there will 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.

15.3.1 Scoping and Consultation

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, Uisce Eireann, and numerous sections of Kilkenny County Council, including the Roads Department and Environment Department. Please refer to Section 2.6 of Chapter 2 of this EIAR for details in relation to the EIA scoping exercise.

A scoping response was received from Irish Rail to say that no impact was anticipated on any of their infrastructure or services due to the Proposed Project. No scoping response was received from the Water department of the local authority. A scoping and consultation exercise was conducted with utilities operators, as outlined below in Section 15.3.1.1. A full description of the scoping and consultation exercise is provided in Chapter 2 of this EIAR.

15.3.1.1 Utilities

Uisce Eireann

A scoping request was sent to Uisce Eireann the 24th of November 2023. A response was received the 12th of December 2023 stating that they do not have the capacity to comment on individual projects, but general aspects of Water Services should be considered in the EIA where relevant. Some of the items to considered are listed below. Please see Chapter, Section 2.7 for a full list of Uisce Eireann comments. It should be noted that the Proposed Project does not intend to connect into Uisce Eireann assets. The scoping response did not provide details in relation to specific water services within the Site.

"Where the development proposal has the potential to impact an Uisce Éireann Drinking Water Source(s), the applicant shall provide details of measures to be taken to ensure that there will be no negative impact to Uisce Éireann's Drinking Water Source(s) during the construction and operational

phases of the development. Hydrological / hydrogeological pathways between the applicant's site and receiving waters should be identified as part of the report.

1. *Mitigations should be proposed for any potential negative impacts on any water source(s) which may be in proximity and included in the environmental management plan and incident response.*
2. *Any and all potential impacts on the nearby reservoir as public water supply water source(s) are assessed, including any impact on hydrogeology and any groundwater/ surface water interactions.*
3. *Impacts of the development on the capacity of water services (i.e. do existing water services have the capacity to cater for the new development). This is confirmed by Uisce Éireann in the form of a Confirmation of Feasibility (COF). If a development requires a connection to either a public water supply or sewage collection system, the developer is advised to submit a Pre-Connection Enquiry (PCE) enquiry to Uisce Éireann to determine the feasibility of connection to the Uisce Éireann network.*
4. *The applicant shall identify any upgrading of water services infrastructure that would be required to accommodate the proposed development.*
5. *In relation to a development that would discharge trade effluent – any upstream treatment or attenuation of discharges required prior to discharging to an Uisce Éireann collection network.*
6. *Any physical impact on Uisce Éireann assets – reservoir, drinking water source, treatment works, pipes, pumping stations, discharges outfalls etc. including any relocation of assets.*
7. *Any potential impact on the contributing catchment of water sources either in terms of water abstraction for the development (and resultant potential impact on the capacity of the source) or the potential of the development to influence / present a risk to the quality of the water abstracted by Uisce Éireann for public supply should be identified within the report.*
8. *Where a development proposes to connect to an Uisce Éireann network and that network either abstracts water from or discharges wastewater to a "protected"/ sensitive area, consideration as to whether the integrity of the site / conservation objectives of the site would be compromised should be identified within the report.*
9. *Mitigation measures in relation to any of the above ensuring a zero risk to any Uisce Éireann drinking water sources (Surface and Ground water).*

A data request was sent to Uisce Eireann on the 9th April 2024, the response to which (dated 16th April 2024) included data detailing the extent and type of Uisce Eireann infrastructure present on the Site.

Waterways Ireland

A scoping request was sent to Waterways Ireland on the 24th of November 2023 and a response was received on the 24th of November 2023 stating that the Proposed Project is not located within a zone of influence of any waterways and therefore they have no comment to make on the proposal.

Department of the Environment, Climate and Communications

A scoping request was sent to the Department of the Environment, Climate and Communications the 24th of November 2023. No response has been received to date.

ESB

A scoping request was sent to the ESB on the 24th of November 2023. A further scoping request was sent to the ESB on 5th January 2024 and data was provided by the ESB on the same date detailing the extent and type of ESB infrastructure present on the Site.

EirGrid

A scoping request was sent to EirGrid on the 24th of November 2023 and again on the 4th of January 2024. A response was received from EirGrid on the 10th of January 2024 stating that it is EirGrid's position not to comment on individual projects.

Gas Networks Ireland (GNI)

GNI supply MKO their latest infrastructure data quarterly. The latest data share illustrating all GNI infrastructure was provided to MKO in July 2024. The data indicates that there is no GNI infrastructure is located within or adjacent to the Site with the nearest infrastructure being approximately 9km to the east of the Proposed Project footprint.

15.3.2 Baseline Environment

15.3.2.1 Existing and Built Services and Utilities

15.3.2.1.1 *Electricity*

Grid Infrastructure

There are no 110kV or 38kV overhead electricity lines within or adjacent to the Proposed Wind Farm. The Proposed Grid Connection underground cabling route passes under 38kV and 110kV overhead electricity lines in the townland of Moatpark, Co. Kilkenny. There are no 38kV or higher known existing underground electricity cables present on the Proposed Wind Farm site or along the Proposed Grid Connection underground cabling route.

15.3.2.1.2 *Gas*

A data request was sent to Gas Networks Ireland in 2024. The data returned in July 2024 concluded there are no gas pipelines within or near the Site.

15.3.2.1.3 *Water*

As noted previously, a water main runs along the L1009 located within the southern extent of the EIAR Site Boundary, adjacent to the temporary access road. An additional water main runs from the L1011 east of the Site and enters the EIAR Site Boundary passing through agricultural fields. An approximately 200m length of this water main is located within the EIAR Site Boundary although there is no proposed infrastructure that overlaps with the water main or which is located within 300m. The Proposed Grid Connection underground cabling route also crosses a number of water mains within Tullaroan and Freshford..

15.3.2.2 Waste Management Services

There are no EPA-licensed or local authority-authorised waste facilities or activities located within the Site. The closest, authorised municipal waste facility is located approximately 10km northeast of the Site in Dunmore, Co. Kilkenny.

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

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

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

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

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

It is not anticipated that any significant volume of waste will be generated within the Site during the operational phase of the Proposed Project as only a small number of operational and maintenance personnel will be present on within the Proposed Wind Farm site certain times. Any waste generated due to the operation and maintenance of the Proposed Project will be disposed of in a covered skip, located within the on-site substation compound. The waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licenced waste contractor where the waste will be sorted into individual waste stream for recycling, recovery or disposal.

15.3.3 Likely Significant Effects and Associated Mitigation Measures

15.3.3.1 'Do-Nothing' Scenario

If the Proposed Project were not to proceed, the potential to impact on other material assets would not arise.

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

15.3.3.2 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 Project infrastructure has been designed to avoid existing underground electricity cables and other services and can be described as mitigation by design, therefore there is no potential to give rise to effects on electrical and other services.

Proposed Mitigation Measures

Notwithstanding the above, specific measures are incorporated into the CEMP, included as Appendix 4-2 of this EIAR, to ensure that the construction of the Proposed 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.

Residual Impacts

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

Significance of Effects

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

15.3.3.3 Operational Phase

It is not anticipated that any significant volume of waste will be generated within the Site during the operational phase of the Proposed Project as only a small number of operational and maintenance personnel will be present on within the Proposed Wind Farm site certain times. Any waste generated due to the operation and maintenance of the Proposed Project will be disposed of in a covered skip, located within the on-site substation compound. The waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licenced waste contractor where the waste will be sorted into individual waste stream for recycling, recovery or disposal.

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

15.3.3.4 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 will be decommissioned fully as described in Chapter 4 and the accompanying decommissioning plan in Appendix 4-5.

The works required during the decommissioning phase are described in Section 4.11 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. Based on the assessment outlined above in Section 15.3.3.2, there will be no significant effects on existing and built services, or waste management as part of the decommissioning phase.

15.3.3.5 Cumulative Effects

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

Included within proposed projects, the potential for cumulative impacts with other wind farms is considered. There are 10 no. operational wind farms (Foyle, Ballybay, An Cnoc, Garteen Lower, Ballincurry, Lisdowney, Lisheen I, II, III, and Bruckana) within 25 kilometres of the proposed turbines, as well as the permitted Foyle wind turbine, permitted Ballybay wind turbine and the permitted Farranrory, Knockroe, and White Hill wind farms. There will be a Significant Positive cumulative effect on electrical supply with the commissioning of the Proposed Project along with the existing operational and permitted wind farms within the area.

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

- Permitted Farranrory Wind Farm
  - Permitted grid connection underground cabling route overlaps for a c.325m stretch of the N77 national road with the Proposed Grid Connection underground cabling route.
- Permitted Ballyragget and Parksgrove Solar Farms
  - Permitted grid connection underground cabling route crosses the Proposed Grid Connection underground cabling route along the N77, as the Ballyragget and Parksgrove Solar Farms underground cabling route crosses the River Nore.
- Proposed Energy Storage System
  - Located adjacent to the Ballyragget Substation to the south and west, with a permitted site entrance on the R432 regional road. The connection from this Energy Storage System to the national grid is not included as part of the planning permission, however, the planning and environmental report accompanying the planning application states that it is likely that the connection method will be via an 'under the fence' method, although confirmation of the point and method of connection remains outstanding. The Proposed Grid Connection underground cabling route passes along a farm track adjacent to the north of this proposed development.
- Proposed Battery Energy Storage System
  - Located within an agricultural field to the north of the field and farm track through which the Proposed Grid Connection underground cable route passes. The site access for the Battery Energy Storage System is located along the same farm track that the Proposed Grid Connection underground cabling route passes.
- Proposed (SID Pre-Application) Ballynalacken Wind Farm
  - Proposed wind energy development comprising 12 no. wind turbines that is intending to connect into the Ballyragget substation. The proposed Ballynalcken Wind Farm site is located approximately 6km north of the Proposed Grid Connection underground cabling route.

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 underground cabling route in conjunction with these other permitted projects. The construction of the Proposed Grid Connection 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.

There were no other potential cumulative effects identified as part of this assessment.

On the basis of the assessment above, the Proposed Project will have no impact on built services and waste management. It is on this basis that it can be concluded that during the construction, operational

and decommissioning phases, there would be a short-term imperceptible cumulative effect 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 2.8 in Chapter 2 of this EIAR.