

Chapter 10: Transport and Access

Creag Riabhach Wind Farm Extension

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Document Control

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10.1 Introduction

This Chapter examines the transport and access issues associated with the proposed development and considers the likely significant effects on transport and access associated with the construction, operation, and decommissioning. The specific objectives of the chapter are to:

- describe the existing access network and transport baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect, and cumulative effects;
- describe the mitigation measures proposed to address likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

The assessment has been undertaken by Pell Frischmann Consultants Limited and led by Stephen Cochrane. Stephen is an Associate Director within the Traffic and Transport team and has over 21 years' experience in the traffic and transportation industry and over 16 years' experience in the production of EIA transport chapters (and associated studies) for onshore wind farms and other energy generation and distribution projects in Scotland. Stephen is a Chartered Member of the Chartered Institute of Logistics and Transport (CIMLT) and a Member of the Chartered Institution of Highways and Transportation (MCIHT).

This chapter is supported by **Technical Appendix 10.1: Transport Assessment**, which is referenced in the text where relevant.

10.2 Scope of Assessment

10.2.1 *Effects Assessed in Full*

The following effects were identified at the scoping stage for consideration in this assessment:

- direct effects during construction on traffic flows in the surrounding Study Area;
- direct effects upon local road users;
- direct effects on local residents as a result of increased traffic; and
- a cumulative sensitivity review on direct effects during construction on traffic flows in the surrounding Study Area.

10.2.2 *Effects Scoped Out*

On the basis of the desk and field survey work undertaken, the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, and feedback received from consultees, the following topic areas have been 'scoped out' of detailed assessment:

- Operational Phase: The traffic effects during the operational phase of the proposed development are likely to be insignificant as expected traffic flows will be less than ten vehicle movements per week,

far below the recognised thresholds for triggering a formal transport assessment. As such, the effects during the operational phase are scoped out of the assessment.

- Decommissioning Phase: The traffic effects during the decommissioning phase can only be fully assessed closer to that period, 40 years on from the completion of the proposed development. As elements of the proposed development are likely to remain in-situ (such as cable trenches, access tracks, etc), the traffic flows associated with the decommissioning works will be lower than those associated with the construction phase. The construction phase therefore represents a worst case assessment and as such, no further assessment of the decommissioning phase has been considered at this point in time and it has been scoped out of the assessment.

10.3 Legislation, Policy and Guidelines

A review of relevant legislation, policy and guidelines has been undertaken to inform the assessment within the Chapter and are highlighted below.

10.3.1 Legislation

This assessment is carried out in accordance with the principles contained within the following legislation:

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

10.3.2 Policy / Guidelines

This assessment has been carried out in accordance with the principles contained within the following documents:

- Transport Assessment Guidance (2012)¹;
- The Highland Council (THC) Guidelines on the Preparation of Transport Assessments (2014)²;
- The Highland Council Onshore Wind Energy Supplementary Guidance (2016)³;
- The Highland Council Roads and Transportation Guidelines for New Developments (2013)⁴;
- Institute of Environmental Assessment, The Guidelines for the Environmental Assessment of Road Traffic (1993)⁵;
- Institution of Environmental Management and Assessment (IEMA) 'Guidelines for Environmental Impact Assessment' (2005)⁶;
- LA104, Environmental assessment and monitoring, Design Manual for Roads and Bridges (DMRB) (Standards for Highways, 2020)⁷; and

¹ Transport Scotland (2012), Transport Assessment Guidance

² The Highland Council (2014), Guidelines on the Preparation of Transport Assessments

³ The Highland Council (2016), Onshore Wind Energy Supplementary Guidance

⁴ The Highland Council (2013), Roads and Transportation Guidelines for New Developments

⁵ Institute of Environmental Assessment (1993), The Guidelines for the Environmental Assessment of Road Traffic

⁶ Institute of Environmental Management and Assessment (2005), Guidelines for Environmental Impact Assessment

⁷ Highways England, Transport Scotland, Welsh Government & Department for Infrastructure (2020), LA104, Environmental assessment and monitoring, the Design Manual for Roads and Bridges (DMRB)

- **Table 2.2** of Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB) (2008)⁸.

10.4 Consultation

Table 0.1 summarises the consultation responses undertaken regarding transport and access matters and provides information on where and/or how they have been addressed in this assessment. The following regulatory bodies made comment on transport matters during scoping discussion held in 2022:

- THC Transport Department (as local roads agency); and
- Transport Scotland (as trunk roads agency).

Table 0.1: Consultation Summary

Consultee and Date	Issue Raised	Response / Action Taken
THC (June 2022) – Scoping Opinion	The key aspects for THC Roads is understanding the management of the traffic through construction and the associated impacts that will have on the road network, particularly the A836, which is sensitive to heavy traffic and volumes. Hence, it is likely details will need to be provided on: <ul style="list-style-type: none"> • Traffic routing, numbers and weights. • Timing in terms of existing leading onto extension. An understanding of the timing will be important in order to define cross-over between existing scheme and extension (e.g., the widening works on the A836). 	Noted and provided.
	THC Roads would not want to scope Traffic out of the application, but as per point above are generally happy to focus the scope of the traffic assessment to address their key issues. Likely THC Roads would look for: <ul style="list-style-type: none"> • A Transport Statement (i.e. providing details on the traffic routing, numbers, etc). • A preliminary TMP based around the existing updated with extension specific elements and mitigation. • Commitment to a Section 96 for repair of the road (A836) 	Transport Assessment has been provided, including reference to commitment to Section 96 agreement. With regards to the CTMP, information in this regard has been included, with the commitment to implement the previously agreed measures, signed off in relation to planning condition 15 of the existing CRWF.
	In the main the approach for the existing development has worked reasonably well. However, some wear and tear work to the public road above the initial mitigation has been required. A similar approach for the extension appears acceptable.	Comment noted and consideration given within the Chapter and supporting Transport Assessment.

⁸ Highways Agency (2008), **Table 2.2** of app 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB)

Consultee and Date	Issue Raised	Response / Action Taken
	<p>A Transport Assessment will be required, but it is accepted it may be tailored to make use of the supporting information and experience gained as part of the original permission. Some issues will require a refresh such as the review of mitigation agreed and confirmation with the structures team that the new proposals are acceptable</p>	<p>Noted and provided. This has taken cognisance of the previous works associated with the existing CRWF, together with those pertinent points highlighted with THC scoping response.</p>
	<p>A new Construction Traffic Management Plan and a section 96 agreement and a bond will be required for the new proposals.</p>	<p>Comment noted and consideration given within the Chapter and supporting Transport Assessment.</p>
	<p>Considerable advice has been given relating to 14/000004/S36 which will remain relevant for the extension.</p>	<p>Comment noted.</p>
<p>TS (June 2022) – Scoping Opinion</p>	<p>It should be noted that Transport Scotland will require to know whether there are likely to be any significant environmental effects associated with increased traffic on the trunk road network and any requirement for further trunk road assessment.</p>	<p>The effects of increased transport movements are detailed in this chapter.</p>
	<p>The Scoping Report also states that it is proposed that an Abnormal Load Assessment be scoped out of the EIA Report. While we acknowledge that the abnormal load route has been used during the construction of the operational CRWF, we note that the proposed turbines at 149.9m are considerably taller than the existing turbines at 125m.</p> <p>Transport Scotland will, therefore, require to be satisfied that the increased size of turbines proposed can negotiate the selected route and that their transportation will not have any detrimental effect on structures within the trunk road route path. An Abnormal Loads Assessment report should therefore be provided with the Environmental Impact Assessment (EIA) Report that identifies key pinch points on the trunk road network. Swept path analysis should be undertaken and details provided with regard to any required changes to street furniture or structures along the route.</p>	<p>Routing details for abnormal loads are provided in the Transport Assessment (Technical Appendix 10.1).</p> <p>Whilst the turbine tip height has increased, it is anticipated that the same turbine as that used on the existing CRWF would be used on the proposed development. As such, it is considered that the information previously submitted in the CRWF CTMP and supporting swept path assessment drawings sufficiently demonstrates that a proven route for abnormal loads is available to access the site.</p> <p>Notwithstanding the above, a review of the proposed access route would be undertaken prior to the movement of any loads to ensure there have been no changes to the road network. This would be shared with both THC</p>

Consultee and Date	Issue Raised	Response / Action Taken
		and TS, with any required mitigation works agreed with the relevant party.

10.5 Assessment Methodology and Significance Criteria

A high-level overview of the effects of the traffic movements has been considered in accordance with IEMA *Guidelines for the Environmental Assessment of Road Traffic*. The document is referred to as the *IEMA Guidelines* in this chapter.

The methodology adopted in this assessment involved the following key stages:

- determine baseline conditions;
- review the proposed development to identify potential effects including any cumulative effects;
- evaluate significance of effects on receptors;
- identify mitigation; and
- assess residual effects.

This chapter considers effects on the following:

- the existing baseline transport conditions of the Study Area surrounding the proposed development site;
- the likely infrastructure requirements necessary to enable the proposed development;
- the likely effects and changes associated with the imposition of construction traffic on the local road network;
- what measures would be required to mitigate against any potential significant effects of the temporary construction traffic;
- the likely traffic conditions during the operational phase of the proposed development; and
- the likely traffic conditions during the decommissioning phase of the proposed development.

The assessment of cumulative effects has been undertaken in a similar manner to that of the potential effects but takes into consideration other consented developments. Developments currently in the scoping stages of planning or without extant consent, have not been considered.

The use of Low National Road Traffic Forecast 97 (NRTF97) traffic growth assumptions have provided a robust future year assessment scenario to account for the level of trip generation that can occur as a result of the types of local development that may occur within the Study Area and the effects of tourist traffic on the network.

The assessment is based on the proposed development as described in **Chapter 3**.

10.5.1 Consultation

The scope of the assessment has been informed by consultation responses summarised in **Table 0.1** and the guidelines/policies highlighted in **Section 10.3** above.

10.5.2 Study Area

The Study Area includes local roads that are likely to experience increased traffic flows resulting from the proposed development during the construction phase. The geographic scope was determined through a review of Ordnance Survey (OS) plans and an assessment of the potential origin locations of construction staff and supply locations for construction materials.

The proposed development would take access directly from the existing CRWF site access junction located south of Vagastie Bridge. It is proposed that traffic associated with the proposed development would utilise the same routes as those used during the construction of the CRWF. There are no proposals for any new access points onto public roads.

Access for construction materials would be predominantly from the south via the A9, A836 and A839. On the A836, north of Lairg, the section between the Dalnessie Estate entrance and the existing forestry access just south of the Crask Bridge through Dalchork Forest would be used for all abnormal loads and Heavy Goods Vehicles (HGVs) traffic in accordance with the route used for CRWF.

Access from the south via the B9176 Struie Road is not considered suitable for bulk materials deliveries due to the twisting nature of the road and the natural constraints at the Allt Fearna Burn bridge, Strathroy River bridge and bends and at the River Avereon bridge. Bulk construction traffic would be prohibited from this route via the Balance of Plant (BoP) contract as the Applicant does not consider the road suitable for articulated HGV deliveries, where alternatives routes such as the A9 and A836 exist.

Abnormal loads associated with the wind turbines only have one route available to access the site and this is via the A9, A839 and A836, with loads passing through The Mound, Rogart and Lairg. There would be no abnormal load movements associated with the BESS components.

The Study Area for the assessment has, therefore, been assumed to be:

- The A9 (between Invergordon and The Mound);
- The A836 (from the Dornoch Bridge to the proposed northern site access junction); and
- The A839 (between the A9 at The Mound and Lairg).

This Study Area, illustrated in **Figure 4** in **Technical Appendix 10.1** includes areas of material supply, the site access junction, the trunk road network and the construction material and abnormal load delivery routes. It is also of sufficient size to include the main areas of workforce accommodation during the construction phase.

10.5.3 Site Visit

A number of site visits have been undertaken in relation to both the proposed development and neighbouring schemes. The most recent site visit was undertaken in January 2023 and included a review of the access route for abnormal loads and to review potential access constraints and opportunities.

10.5.4 Desk Study

A desk study has been undertaken to inform the assessment, which included reviews and identification of the following:

- relevant transport planning policy;
- accident data;
- sensitive locations;
- any other traffic sensitive receptors in the area (Core Paths, routes, communities, etc.);
- OS plans; and
- potential origin locations of construction staff and supply locations for construction materials to inform extent of local area road network to be included in the assessment.

10.5.5 Assessment of Potential Effect Significance

Criteria for Assessing the Sensitivity of Receptors

The IEMA '*Guidelines for Environmental Impact Assessment*' (2005) notes that the separate '*Guidelines for the Environmental Assessment of Road Traffic*' (1993) document should be used to characterise the environmental traffic and transport effects (off-site effects) and the assessment of significance of major new developments. The guidelines intend to complement professional judgement and the experience of trained assessors.

In terms of traffic and transport impacts, the receptors are the users of the roads within the Study Area and the locations through which those roads pass.

The IEMA Guidelines includes guidance on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement was used to develop a classification of sensitivity for users based on the characteristics of roads and locations. This is summarised in

Table 0.2.

Table 0.2: Classification of Receptor Sensitivity

Receptor	Sensitivity			
	High	Medium	Low	Negligible
Users of Roads	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs. Includes roads with traffic control signals, waiting and loading restrictions, traffic calming measures.	Where the road is a local A or B class road capable of regular use by HGV traffic. Includes roads where there is some traffic calming or traffic management measures.	Where the road is Trunk or A-class, constructed to accommodate significant HGV composition. Includes roads with little or no traffic calming or traffic management measures.	Where roads have no adjacent settlements. Includes new strategic trunk roads that would be little affected by additional traffic and suitable for Abnormal Loads and new strategic trunk road junctions capable of accommodating Abnormal Loads.
Users / Residents of Locations	Where a location is a large rural settlement containing a high number of community and public services and facilities.	Where a location is an intermediate sized rural settlement, containing some community or public facilities and services.	Where a location is a small rural settlement, few community or public facilities or services.	Where a location includes individual dwellings or scattered settlements with no facilities.

The classifications are based upon the activities that can be expected in different areas and different types of streetscape. Professional judgement is used to reflect these generalised descriptions to Study Areas, especially those in remote areas where settlement size, function and facilities are more important than the category descriptors suggest.

Where a road passes through a location, users are considered subject to the highest level of sensitivity defined by either the road or location characteristics.

Criteria for Assessing the Magnitude of Impact

The following rules, also taken from the IEMA Guidelines are used to determine which links within the Study Area should be considered for detailed assessment:

- Rule 1 – include highways links where traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles is predicted to increase by more than 30%); and
- Rule 2 – include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

Notwithstanding the above rules within the IEMA Guidelines, THC has requested that in addition to the environmental impacts assessed within the chapter, those impacts in terms of the structural effects of HGV traffic on the infrastructure should also be considered and the threshold value for significance in this respect

should be 10%. As such, to ensure a robust assessment has been undertaken in line with the requirements set out by THC, this has been applied to the assessment.

The IEMA Guidelines identify the key impacts that are most important when assessing the magnitude of traffic impacts from an individual development. The impacts and levels of magnitude are discussed below:

- Severance – the IEMA Guidance states that, “*severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery.*” Further, “*Changes in traffic of 30%, 60% and 90% are regarded as producing ‘slight’, ‘moderate’ and ‘substantial’ [or minor, moderate and major] changes in severance respectively*”. However, the Guidelines acknowledge that “*the measurement and prediction of severance is extremely difficult*”;
- Driver delay – the IEMA Guidelines note that these delays are only likely to be “*significant [or major] when the traffic on the network surrounding the development is already at, or close to, the capacity of the system.*”;
- Pedestrian delay – the delay to pedestrians, as with driver delay, is likely only to be major when the traffic on the network surrounding the development is already at, or close to, the capacity of the system. An increase in total traffic of approximately 30% can double the delay experienced by pedestrians attempting to cross the road and would be considered major;
- Pedestrian amenity – the IEMA Guidelines suggests that a tentative threshold for judging the significance of change in pedestrian amenity would be where the traffic flow (or its lorry component) is halved or doubled. Therefore, it is considered that a change in the traffic flow of -50% or +100% would produce a major change in pedestrian amenity;
- Fear and intimidation – there are no commonly agreed thresholds for estimating levels of fear and intimidation, from known traffic and physical conditions. However, as the impact is considered to be sensitive to traffic flow, changes in traffic flow of 30%, 60% and 90% are regarded as producing minor, moderate, and major changes respectively; and
- Accidents and safety – professional judgement would be used to assess the implication of local circumstances, or factors which may elevate or lessen risks of accidents.

While not specifically identified as more vulnerable road users, cyclists are considered in similar terms to pedestrians.

Criteria for Assessing Cumulative Effects

The assessment of cumulative effects has been undertaken in a similar manner to that of the potential effects but takes into consideration other consented developments. Developments currently in the scoping stages, of planning or without consent, have not been considered.

Criteria for Assessing Significance

To determine the overall significance of effects, the results from the receptor sensitivity and magnitude of change assessments are correlated and classified using a scale set out in **Table 2.4** of *Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges* (DMRB) and summarised in **Table 0.3**.

Table 0.3: Significance of Effects

Sensitivity	Magnitude of Change			
	Major	Moderate	Minor	Negligible
High	major	major/moderate	moderate/minor	minor
Medium	major/moderate	moderate	minor	minor/negligible
Low	moderate/minor	minor	minor	minor/negligible
Negligible	minor	minor	minor/negligible	negligible

In terms of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, effects would be considered to be significant where they are assessed to be major or moderate. Where an effect could be one of major/moderate or moderate/minor, professional judgement would be used to determine which option should be applicable and whether the effect is significant or not.

The terminology used in this chapter can differ slightly from that used within the other chapters of the EIA Report and, as previously advised, has been based on the scale set out within the DMRB. The effects of traffic whether temporary or permanent on any sensitive receptors on the local road network tends to be neutral at best, with most being of an adverse nature ranging from major to minor. As such, when undertaking the assessment within this chapter no reference has been made to 'beneficial' when describing the significance of any effects relating to the traffic generated by the construction of the proposed development.

The assessment is based upon average traffic flows in a one-month period (the busiest predicted month). During the month, activities at the site may fluctuate between one day and another and it is not possible to fully develop a day-by-day traffic flow estimate as no BoP contractor has been appointed and external factors can impact upon activities on a day-by-day basis (weather conditions, availability of materials, time of year, etc.).

10.5.6 Difficulties and Uncertainties

The assessment is based upon an assumed construction programme for the proposed development. Alterations in this programme, may increase or decrease traffic flows per month.

This assessment is based upon average traffic flows. There may be localised peaks with construction days where flows can be higher for a specific hour, such as a shift change on site.

Assumptions on the origin points for materials have been made to provide a worst-case assessment scenario. Should these origin points change, the effects on surrounding areas may alter to those presented in the assessment.

10.6 Baseline Conditions

10.6.1 Baseline Traffic Surveys

Access to the proposed development site would be taken directly from the A836 via the existing CRWF site access junction located south of Vagastie Bridge. The access junction is surfaced and constructed to adoptable standards. The access tracks within the site are private.

The A836 is a district distributor road that provides connections between Tain and Thurso by way of Lairg and Tongue. The road is of a good standard and varies between 6 metres (m) and 7m in width, up to the Dalchork substation, to the north of Lairg. Beyond this point, the road narrows in width, becoming a single track road with passing places. Within villages and settlements, the speed limit is generally 30 miles per hour (mph), while in more rural locations the national speed limit is in place (60mph).

The A839 connects The Mound and A9 through to Lairg and beyond to Invercassley. The road is generally a modern two-lane road with a speed limit of 60mph, with 30mph restrictions within settlements.

The A836 and A839 are all maintained and operated by THC.

The A9 is the main trunk road in the area and connects Polmont to Scrabster. The road is operated on behalf of TS by BEAR Scotland. Within the Study Area, the road is subject to a 60mph speed limit for the majority of its length.

The A9 and A836 within the Study Area form part of the North Coast 500 (NC500) tourist route. This 830km (516 mile) route is now a popular tourist sightseeing route around the north-west Highlands and Sutherland and has been responsible for an increase in traffic visiting the Study Area.

A number of the roads within the Study Area form part of the agreed route network used for the extraction of timber and are therefore, regularly used by HGV traffic, similar to the type used in the construction of the proposed development. The Agreed Timber Route Map has been developed by The Timber Transport Forum who are a partnership of the forestry and timber industries, local government, national government agencies, timber hauliers and road and freight associations. One of the key aims of the forum is to minimise the impact of timber transport on the public road network, on local communities and the environment and a way of achieving this is to categorise the roads leading to forest areas in terms of their capacity to sustain the likely level of timber haulage vehicles i.e., HGVs. The routes are categorised into four groups, namely; 'Agreed Routes', 'Consultation Routes', 'Severely Restricted Routes' and 'Excluded Routes'.

'Agreed Routes' are categorised as routes used for timber haulage without restriction as regulated by the Road Traffic Act 1988. A-roads are classified as 'Agreed Routes' by default unless covered by one of the other road classifications. Those links classed as 'Consultation Routes' are categorised as a route which is key to timber extraction, but which are not up to 'Agreed Route' standard. Consultation with the local authority is required, and it may be necessary to agree limits of timing, allowable tonnage etc. before the route can be

used. B-roads are classified as ‘Consultation Routes’ by default unless covered by one of the other classifications. ‘Severely Restricted Routes’ are not normally to be used for timber transport in their present condition. These routes are close to being Excluded Routes. Consultation with the local authority is required prior to use. Finally, ‘Excluded Routes’ should not be used for timber transport in their present condition. These routes are either formally restricted, or are close to being formally restricted, to protect the network from damaging loads.

In order to assess the impact of development traffic on the Study Area, Annual Average Daily Traffic (AADT) flows were obtained from the UK Department for Transport (DfT) traffic database. Available 2019 flow information was obtained for all locations, as these flows would be unaffected by Covid-related travel restrictions. The traffic counts sites used were as follows:

1. A836 to the south of Crask Inn;
2. A836 within the centre of the village of Lairg;
3. A839 to the west of Pittentrail;
4. A836 to the west of Bonar Bridge;
5. A836 within the village of Ardgay;
6. A9 to the south of The Mound; and
7. A9 at Glenmorangie.

Effects associated with traffic generated by the proposed development would be most pronounced in close proximity to the site access junction and on the final approaches to the site. As vehicles travel away from the proposed development, they would disperse across the wider road network, thus diluting any potential effects. It is, therefore, expected that the effects relating to construction traffic are unlikely to be significant beyond the Study Area identified above.

The locations of the traffic count sites used in this assessment are illustrated in **Figure 5** in **Technical Appendix 10.1**. The DfT traffic data allow the traffic flows to be split in vehicle classes. The data was summarised into Cars/Light Goods Vehicles (LGVs) and HGVs (all goods vehicles >3.5tonnes gross maximum weight). **Table 0.4** summarises the AADT traffic data collected and used in this assessment.

Table 0.4: Existing Two-Way (2019) AADT Traffic Flows

Survey Location	Cars & LGV	HGV	Total	% HGV
A836 Site Access (30936)	289	29	318	9.12%
A836 Lairg (40936)	1,825	140	1,965	7.12%
A839 Lairg (20935)*	830	27	857	3.15%
A839 Rogart (20935)	830	27	857	3.15%
A836 Bonar Bridge (50937)	1,683	106	1,789	5.93%
A836 Ardgay (80005)	1,472	123	1,595	7.71%
A9 south of The Mound (30722)	3,988	310	4,298	7.21%
A9 at Glenmorangie (8001)	7,383	494	7,877	6.27%

*Assumed Count Point based on traffic flow from DfT Count Point 20935

10.6.2 Baseline Road Safety Review

Personal Injury Accident (PIA) data for the five-year period covering 2017 to 2021 was obtained from the online resource www.crashmap.co.uk which uses data collected by the police about road traffic crashes occurring on British roads, where someone is injured.

The statistics are categorised into three categories, namely “Slight”, “Serious” and “Fatal” for accidents that result in a death. The review included the A836 and A839 from the A9 towards the site. **Table 0.5** provides a summary of the recorded accidents at the aforementioned locations, while **Figure 6** in **Technical Appendix 10.1** shows the locations of the accidents on the road network.

Table 0.5: Recorded PIAs

Location	Severity		
	Slight	Serious	Fatal
A836 between the Site Access and Lairg	-	-	1
A836 between Lairg and the A9	5	1	2
A839 between Lairg	1	2	-
Total	6	3	3

Looking at each location in detail, a more comprehensive review of each accident has been provided, to determine any trends in the accident types, for example types of vehicles, vulnerable road users, age of casualties etc. **Table 0.6** provides a summary of each PIA recorded.

Table 0.6: PIA Data Summary

Location	OS Grid Ref.	Date/Time	Severity	Type	Conditions	Summary	Probable Cause
A836 between the Site Access and Lairg	257284 907329	4/7/2019 12:09	Fatal	Car and motorcycle	Fine with high winds, road surface dry Daylight	Vehicle 1 (motorcycle) travelling normally on carriageway, on right hand bend, collided with vehicle 2 (car) on left hand bend Casualty – fatality, vehicle 1 (36-45)	Driver error
A836 between Lairg and the A9	260274 891048	23/6/2017 18:20	Slight	Car and other un-specified vehicle	Fine with high winds, road surface dry Daylight	Vehicle 1 (un-specified vehicle) was struck from behind by vehicle 2 while travelling along the carriageway Casualty – 1x slight (36-45)	Driver error
	257754 896505	19/11/2020 18:35	Slight	Car x1	Fine with high winds, road surface wet Darkness	Limited data available, vehicle in the act of turning right at junction with A837 struck object Casualty – 2x slight (36-45 and 56-65)	Driver error
	267305 887610	7/1/2020 15:30	Slight	Car and van	Raining with high winds, road surface wet Daylight	Vehicles travelling on carriageway (not on bend) collided Casualty – slight, vehicle 2 (car) (66-75)	Driver error
	269372 886486	10/7/2019 16:52	Slight	Car x1	Raining with high winds, road surface wet Daylight	Vehicle travelling on carriageway on left hand bend, left carriageway and struck wall/fence Casualty – 1x slight (21-25)	Driver error
	271487 884429	5/10/2020 19:50	Slight	Car x1	Raining with high winds, road surface wet Darkness	Vehicle travelling on carriageway on right hand bend, left carriageway and struck wall/fence Casualty – 1x slight (21-25)	Driver error
	271455 884427	24/11/2019 22:55	Serious	Car x1	Fog or mist, road surface wet Darkness	Vehicle travelling on carriageway on left hand bend, left carriageway and struck wall/fence Casualty – 2x serious (16-20)	Driver error

Location	OS Grid Ref.	Date/Time	Severity	Type	Conditions	Summary	Probable Cause
	269894 885557	6/5/2020 15:04	Fatal	Motorcycle x1	Fine without high winds, road surface dry Daylight	Limited data available, vehicle in the act of negotiating left hand bend, resulted in accident Casualty – fatality (56-65)	Driver error
	260143 890850	23/12/2019 16:40	Fatal	Car x1 and pedestrian	Fine without high winds, road surface wet Darkness	Vehicle travelling along carriageway struck pedestrian crossing carriageway on drivers off-side Casualty – fatality (66-75)	Driver/pedestrian error
A839 between Lairg	266487 904148	1/9/2019 17:30	Slight	Car x1	Raining with high winds, road surface flooded Darkness	Limited data available, vehicle travelling along carriageway in vicinity of junction struck object Casualty – slight (16-20)	Driver error
	267511 904203	7/10/2021 12:40	Serious	Car x2	Fine without high winds, road surface dry Daylight	Vehicles travelling on carriageway (not on bend) collided Casualty – serious (66-75 and 46-55)	Driver error
	275153 900889	11/12/2020 17:59	Serious	Car x1	Raining without high winds, road surface wet Darkness	Limited data available, vehicle travelling along carriageway on right hand bend struck object Casualty – serious (26-35)	Driver error

A summary analysis of the incidents indicates that:

- 12 PIAs were recorded within the Study Area within the last five-year period.
- Of those 12 PIAs, six were “Slight” (50%), three were “Serious” (25%) and three were “Fatal” (25%).
- Of the three fatal PIAs recorded, only one involved a vulnerable road user (pedestrian between Ardgay and Bonar Bridge), the other two both involved motorcycles, the first to the south of the site on the A836 was the result of a head on collision on a bend, while the other located on the A836 at Ardmore occurred on a bend on the carriageway.
- No accidents were recorded on the A836 in the vicinity of the site access junction.
- Motorcycles were involved in two accidents, both “Fatal”. One child was injured in a “Slight” accident on the A839 in Lairg.
- Young drivers (16-20) were involved in two accidents, one “Slight” and one “Serious”.
- There were no reported accidents involving a bus or a pedal cycle in the Study Area.
- There were no recorded HGV accidents within the Study Area.

Based on the information available, it has been established that there are no specific road safety issues within the immediate vicinity of the proposed development that currently require to be addressed or would be exacerbated by the construction of the proposed development. There are no clusters of PIAs at any location on the study network and there are no recorded accidents involving HGVs for example.

10.6.3 Future Baseline

Construction of the proposed development could commence during 2024 if consent is granted and is anticipated to take up to 23 months depending on weather conditions and on-site environmental considerations.

To assess the likely effects during the construction, base year traffic flows were determined by applying a NRTF low growth factor to the surveyed traffic flows. The NRTF low growth factor for 2019 to 2024 is 1.033. These factors were applied to the 2019 survey data to estimate the 2024 Base traffic flows shown in **Table 0.7**. This will be used in the Construction Peak Traffic Impact Assessment.

Table 0.7: Baseline 2024 Traffic Conditions⁹

Survey Location	Cars & LGV	HGV	Total	% HGV
A836 Site Access	299	30	328	9.12%
A836 Lairg	1,885	145	2,030	7.12%
A839 Lairg	857	28	885	3.15%
A839 Rogart	857	28	885	3.15%
A836 Bonar Bridge	1,739	109	1,848	5.93%
A836 Ardgay	1,521	127	1,648	7.71%
A9 south of The Mound	4,120	320	4,440	7.21%
A9 at Glenmorangie	7,627	510	8,137	6.27%

⁹ Please note that growth assumptions can lead to minor rounding errors in quoted figure within this chapter and appendices.

In the scenario that the proposed development did not proceed, traffic growth on the road network would still occur.

10.6.4 Identified Receptors Following the Baseline Review

Following a review of the baseline information within the Study Area, the below receptors have been identified and will be considered in the assessment further in the chapter. The receptor sensitivities within the Study Area, noted below in **Table 10.8** are based upon the descriptions contained in **Table 10.2**.

Table 0.8: Receptor Sensitivity Summary

Receptor	Sensitivity	Justification
Users of A836	Medium	Where the road is a local A or B class road capable of regular use by HGV traffic.
Users of A836 in the vicinity of the Site	High	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs.
Users of A839	Medium	Where the road is a local A or B class road capable of regular use by HGV traffic.
Users of A9	Low	Where the road is Trunk or A-class, constructed to accommodate significant HGV composition.
Residents of Lairg	Medium	Where a location is an intermediate sized rural settlement, containing some community or public facilities and services.
Residents of Bonar Bridge	Low	Where a location is a small rural settlement, few community or public facilities or services.
Residents of Ardgay	Medium	Where a location is an intermediate sized rural settlement, containing some community or public facilities and services.
Residents of Edderton	Low	Where a location is a small rural settlement, few community or public facilities or services.
Other residents and communities along the A836	Negligible	Where a location includes individual dwellings or scattered settlements with no facilities.
Other residents and communities along the A839	Negligible	Where a location includes individual dwellings or scattered settlements with no facilities.
Other residents and communities along the A9	Low	Where a location is a small rural settlement, few community or public facilities or services.

Based on the indicators which are stated within the IEMA Guidelines, Users of the A836 in the vicinity of the Site Residents of Lairg, Bonar Bridge, Ardgay and Edderton are identified as sensitive receptors in this assessment. These locations will therefore be subject to 'Rule 2' of the IEMA Guidelines which requires a full assessment of effects if the traffic count locations are anticipated to be subject to an increase in 10% of total traffic.

All other locations within the Study Area not identified as sensitive receptors, would typically be subject to 'Rule 1' and assessed if traffic flows (or HGV flows) on highway links are anticipated to increase by more than 30% as a result of the construction of the proposed development. However, as requested by THC, the threshold value of 10% for significance in this respect has been applied.

10.7 Embedded Mitigation

10.7.1 Construction Phase Mitigation

Construction Traffic Management Plan

It would be proposed to prepare a CTMP for the construction phase of the proposed development, which would likely be a condition on any planning consent. The CTMP would build on the measures implemented on the existing CRWF, with the exact details agreed with THC prior to construction works commencing.

The CTMP for the existing CRWF prepared by Natural Power (document CRG-504-PMD-PCD-1203837, 15 April 2020) includes information in relation to the management of construction activities on the wider road network for both general construction traffic and abnormal loads. The report was undertaken in consultation with THC and confirmation on the suitability of the report to discharge Planning Condition 15 was provided by THC on 16 June 2022.

A summary of the key information included within the existing CTMP is provided below:

- information on abnormal loads, including routing and swept path assessments (SPAs);
- general traffic management measures;
- routing information;
- off-site improvement works, including road widening, passing place improvements, signage/lining details and mitigation works to accommodate abnormal loads;
- contractor CTMP, prepared by Roadbridge (original CRWF contractor) which focuses primarily on the management of construction vehicles and staff while on the site; and
- off-site improvement works, swept path assessments (SPAs) and an emergency response plan.

Within the Scoping Response prepared by THC, reference to the existing CTMP has been made as follows:

“A detailed Construction Traffic Management Plan has been agreed. In the main the approach for the existing development has worked reasonably well. However, some wear and tear work to the public road above the initial mitigation has been required. A similar approach for the extension appears acceptable.”

Furthermore, discussions with the area roads engineer for the Caithness and Sutherland area within THC have also confirmed that the works undertaken in relation to the management of construction traffic and the associated activities have generally been well received and no major issues highlighted. This is further supported by the monthly Planning Monitoring Officer (PMO) reports submitted by Natural Power to THC to provide monthly updates on the compliance or otherwise with planning conditions. This includes planning condition 15, which related to the CTMP whereby no major issues were reported.

Based on the above, it would, therefore, be proposed to use the CTMP for the existing CRWF for the proposed development, implementing those measures already agreed.

Off-site Mitigation Works

Road widening works were undertaken as part of the package of off-site mitigation works on the A836 for the existing CRWF. A site visit undertaken on 31 January 2023 to confirm the condition of these works and the general condition of the carriageway given that the majority of construction works associated with CRWF have been completed.

The site visit and review of the A836 has confirmed the following:

- the road widening and associated works remain in place;
- Dalnessie Estate access junction widening works remain in place;
- Forestry Land Scotland Haul Road junction widening works remain in place;
- the section of carriageway between Dalchork substation access junction through to the Dalnessie Estate access junction, is showing signs of wear, with potholes on the carriageway and areas of widening. In addition, at locations where widening has been constructed, there are sections with damaged carriageway edging; and
- those off-site mitigation works currently in place for general construction activities are of a sufficient scale to accommodate the works associated with the proposed development. No additional works are considered necessary out with general maintenance works.

Works in relation to removing the temporary widening and associated works has yet to be undertaken. Previous discussions with THC and as highlighted within the CTMP advised that all temporary widening works would be reinstated by covering with topsoil and reseeding, following completion of the abnormal load deliveries. This has not been possible at this time due to the time of year and weather conditions; however, the applicant remains committed to undertaking these works.

Recent discussions with the area roads engineer at THC have indicated that their preferred approach to these works would be as follows:

- remove widening works, reinstating carriageway to original condition and width, from the FLS junction (northern by-pass route junction) to the CRWF site access. Areas of widening to be covered with topsoil and reseeded; and
- retain widening works between Dalchork substation access junction through to the Dalnessie Estate access junction, for use by the proposed development (subject to obtaining planning consent) and neighbouring schemes, for example Strath Tirry Wind Farm.

The Applicant has confirmed their willingness to work with THC regarding the above and would welcome further discussions in this regard, including agreement on on-going maintenance of any retained areas of widening or other mitigation works by others, until such time as the proposed development is granted planning consent.

Wear and Tear Agreement

THC may require an agreement to cover the cost of abnormal wear and tear on the A836. There was a requirement for this to be included within the original CRWF, with the A836 included from the site access junction to its junction with the A839 in Lairg.

If required by THC, video footage of the pre-construction phase condition of the abnormal loads access route and the construction vehicles route would be recorded to provide a baseline of the state of the road prior to any construction work commencing. This baseline would inform any change in the road condition during the construction phase of the proposed development. Any necessary repairs would be coordinated with THC. Any damage caused by traffic associated with the proposed development, during the construction phase that would be hazardous to public traffic, would be repaired immediately.

There are a number of other development schemes in the area, either under construction or in the planning system, which would use sections of the A836 prior to the proposed development being constructed. It would, therefore, be proposed that the baseline for any wear and tear agreement would be the condition of the road at the commencement of the construction works for the proposed development. Any mitigation works required post-construction would only be required to return the road to its pre-construction condition.

Any damage to road infrastructure caused directly by construction traffic would be made good, and street furniture that is removed on a temporary basis would be fully reinstated.

There would be a regular road edge review and any debris and mud would be removed from the public carriageway to keep the road clean and safe during the initial months of construction activity.

Abnormal Load Transport Management Plan

There are a number of traffic management measures that could help reduce the effect of abnormal load convoys.

All abnormal load deliveries would be undertaken at appropriate times (to be discussed and agreed with the relevant roads authorities and police) with the aim to minimise the effect on the local road network. It is likely that the abnormal load convoys would travel in the early morning periods, before peak times while general construction traffic would generally avoid the morning and evening peak periods.

The majority of potential conflicts between construction traffic and other road users would occur with abnormal load traffic. General construction traffic is not likely to come into conflict with other road users as the vehicles are smaller and road users are generally more accustomed to them.

Potential conflicts between the abnormal loads and other road users can occur at a variety of locations and circumstances. The main potential conflicts are likely to occur:

- on the B9175, A9, A839 and A836 where the loads may straddle the centre line, where fast moving oncoming traffic may be encountered, etc.;
- within Lairg town centre where loads turn from the A839 onto the A836;
- where traffic turns at a road junction, requiring other traffic to be restrained on other approach arms; and
- in locations where high speeds of general traffic are predicted.

Advance warning signs would be installed on the approaches to the affected road network. Information signage could be installed to help assist drivers. The location and numbers of signs would be agreed post consent and would form part of the wider Traffic Management Proposal for the project.

The Abnormal Load Transport Management Plan would also include:

- procedures for liaising with the emergency services to ensure that police, fire and ambulance vehicles are not impeded by the loads. This is normally undertaken by informing the emergency services of delivery times and dates and agreeing communication protocols and lay over areas to allow overtaking;
- a diary of proposed delivery movements to liaise with the communities to avoid key dates such as local events;
- a protocol for working with local businesses to ensure the construction traffic does not interfere with deliveries or normal business traffic; and
- proposals to establish a construction liaison committee to ensure the smooth management of the project / public interface with the applicant, the construction contractors, the local community; and if appropriate, the police forming the committee. This committee would form a means of communicating and updating on forthcoming activities and dealing with any potential issues arising.

Public Information

Information on the turbine convoys would be provided to local media outlets such as local papers and local radio to help assist the public. Information would relate to expected vehicle movements from the port of entry (assumed to be the Port of Nigg) through to the site access junction. This would assist residents becoming aware of the convoy movements and may help reduce any potential conflicts.

The applicant would also ensure information was distributed through its communication team via the project website, local newsletters, and social media.

Convoy System

A police escort would be required to facilitate the delivery of the predicted loads. The police escort would be further supplemented by a civilian pilot car to assist with the escort duty. It is proposed that an advance escort would warn oncoming vehicles ahead of the convoy, with one escort staying with the convoy at all times. The escorts and convoy would remain in radio contact at all times where possible.

The convoys would be no more than three abnormal loads long, or as advised by the police, to permit safe transit along the delivery route and to allow limited overtaking opportunities for following traffic where it is safe to do so.

The times in which the convoys would travel would need to be agreed with Police Scotland who have sole discretion on when loads can be moved.

10.7.2 Operational Phase Mitigation

The site entrance would be well maintained and monitored during the operational life of the proposed development. Regular maintenance would be undertaken to keep the site access track drainage systems fully operational and the road surface in good condition and to ensure there are no adverse issues affecting the public road network.

10.8 Receptors Brought Forward for Assessment

10.8.1 Proposed Development Access Strategy

The proposed development would be accessed directly from the existing site access junction for CRWF, located approximately 120m south of the Vagastie Bridge on the A836, to the north of Lairg. As previously advised, it is proposed that traffic associated with the proposed development would utilise the same routes as those used during the construction of the CRWF.

Access for construction materials would be predominantly from the south via the A9, A836 and A839. On the A836, north of Lairg, the section between the Dalnessie Estate entrance and the existing forestry access just south of the Crask Bridge through Dalchork Forest would be used for all abnormal load and HGV traffic in accordance with the route used for CRWF.

It is proposed that all junctions used on the A836 operate as standard priority junctions only. It is not proposed to install temporary signal controls at any location, unless specifically requested by THC.

The impact of construction traffic entering and exiting the site has been considered on the A836 link within the assessment.

10.8.2 Construction Traffic

During the 23-month construction period, the following traffic would require access to the site:

- staff transport, either cars or staff minibuses;
- construction equipment and materials, deliveries of machinery and supplies such as sand; and
- abnormal loads consisting of the wind turbine sections and also a heavy lift crane, transported to site in sectional loads.

Average monthly traffic flow data were used to establish the construction trips associated with the site based on the assumptions detailed in **Technical Appendix 10.1**.

The distribution of construction trips on the network would vary depending on the types of loads being transported. All traffic would enter the site by way of the existing CRWF site access junction. All trips would approach from the south using the A836, with construction staff expected to be based at both Lairg and Bonar Bridge.

No external suppliers would be required for aggregate material, with all necessary material won on-site. With regards to concrete batching materials, sand etc., this would be supplied from local sources and the assessment has assumed the facilities located to the east of Ardgay for the supply of these materials. General construction, building supply deliveries, geotextile, cable and reinforcement deliveries would be made from the A9 via the A839 and A836.

Abnormal load deliveries associated with the turbine components would access the from Nigg via the A9, A839 and A836.

Using the assumptions above (and provided in greater detail in **Technical Appendix 10.1**), a construction programme has been developed for the proposed development. This has been used to determine timescales for the various deliveries and trips and is detailed in **Table 0.9**.

The peak of construction occurs in months 10 to 13 and 17 to 19 when there will be a total of 30 journeys per day. In months 10 to 13 this will be made up of 10 HGV journeys and 20 car / LGVs, while in months 17 to 19 this will be made up of 8 HGV journeys and 22 car / LGVs.

Please note that the figures quoted in **Table 0.9** are average flows that have been rounded to the nearest whole number. As such, there may be minor rounding errors reported.

Table 0.9: Construction Traffic Profile

Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site Establishment & Remediation	50	20															20	50
General Site Deliveries	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Reinforcement Deliveries								15			15							
Concrete Deliveries									119	119	119	119	119					
Cable and Ducting Deliveries										2	2	2	2	2				
Cabling Sand										16	16	16	16	16				
Geotextile Deliveries					8		8											
BESS Deliveries																		50
Cranage														10			10	2
AIL Deliveries														20	20	20	20	
AIL Escorts														16	16	16	16	
Commissioning and Demobilisation																	40	40
Staff	220	220	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440
Total HGV	90	60	40	40	48	40	48	55	159	177	192	177	177	87	60	60	90	142
Total Cars / LGV	220	220	440	440	440	440	440	440	440	440	440	440	440	456	456	456	496	480
Total Movements	310	280	480	480	488	480	488	495	599	617	632	617	617	543	516	516	586	622
Total HGV per Day	4	4	2	2	4	2	4	4	8	10	10	10	10	4	4	4	6	8
Total Cars / LGV per Day	10	10	20	20	20	20	20	20	20	20	20	20	20	22	22	22	24	22
Total per Day	14	14	22	22	24	22	24	24	28	30	30	30	30	26	26	26	30	30

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Activity	19	20	21	22	23
Site Establishment & Remediation	50				
General Site Deliveries	40	40	40	40	40
Reinforcement Deliveries					
Concrete Deliveries					
Cable and Ducting Deliveries					
Cabling Sand					
Geotextile Deliveries					
BESS Deliveries	50	50	50	50	
Cranage				2	
Abnormal Load Deliveries					
Abnormal Load Escorts					
Commissioning and Demobilisation	40				50
Staff	440	440	352	220	220
Total HGV	140	90	90	92	40
Total Cars / LGV	480	440	352	220	270
Total Movements	620	530	442	312	310
Total HGV per Day	8	6	6	6	2
Total Cars / LGV per Day	22	20	16	10	14
Total per Day	30	26	22	16	16

Please note variances due to rounding may occur.

Assumes that 100% of total estimated stone aggregate requirements will be imported to site.

Using the distribution of traffic described in **Technical Appendix 10.1**, the proposed traffic flows on the Study Area network at the peak of construction are illustrated in **Table 0.10**.

Table 0.10: Peak Construction Month Daily Traffic Data

Survey Location	Cars & LGV	HGV	Total	% HGV
A836 Site Access	20	10	30	33.33%
A836 Lairg	16	6	22	27.70%
A839 Lairg	6	4	10	40.00%
A839 Rogart	6	4	10	40.00%
A836 Bonar Bridge	10	6	16	38.00%
A836 Ardgay	0	6	6	100.00%
A9 south of The Mound	0	4	4	100.00%
A9 at Glenmorangie	0	4	4	100.00%

The peak month traffic data was combined with the future year (2024) traffic data to allow a comparison between the baseline results to be made. The increase in traffic volumes is presented in percentage increases for each class of vehicle and is illustrated in **Table 0.11**. Please note there may be minor rounding errors quoted in the tables.

Table 0.11: 2024 Peak Month Daily Traffic Data

Survey Location	Cars & LGV	HGV	Total	Cars & LGV % Increase	HGV % Increase	Total Traffic % Increase
A836 Site Access	319	40	358	6.70%	33.38%	9.13%
A836 Lairg	1,901	151	2,052	0.85%	4.24%	1.09%
A839 Lairg	863	32	895	0.70%	14.34%	1.13%
A839 Rogart	863	32	895	0.70%	14.34%	1.13%
A836 Bonar Bridge	1,749	116	1,864	0.58%	5.60%	0.87%
A836 Ardgay	1,521	133	1,654	0.00%	4.82%	0.37%
A9 south of The Mound	4,120	324	4,444	0.00%	1.25%	0.09%
A9 at Glenmorangie	7,627	514	8,141	0.00%	0.78%	0.05%

The total traffic movements are not predicted to increase by more than 10% on all of the study network, with the highest being on the A836, with an increase of 9.13%.

The total HGV traffic movements will increase by 33.38% on the A836. Whilst this increase could be considered high, it is generally caused by the relatively low HGV flows on the A836 and will see an additional 10 HGV journeys per day (5 inbound and 5 outbound). Over the course of a typical 12-hour day on Site, this is considered not significant in operational terms.

THC has requested that those impacts in terms of the structural effects of HGV traffic on the infrastructure should also be considered, with a threshold of 10% applied. Using this methodology, the A839 at Lairg and Rogart show an increase in HGV traffic of 14.34%. Again, as per the A836, this is a result of the relatively low HGV flows on the A839. The addition of construction traffic at this location, specifically in relation to HGV traffic would see an additional 4 HGV journeys per day (2 inbound and 2 outbound). Over the course of a typical 12-hour day on Site, this is considered not significant in operational terms.

A review of existing road capacity has been undertaken using the *Design Manual for Roads and Bridges, Volume 15, Part 5 “The NESAs Manual”*. The theoretical road capacity has been estimated for each of the road links that makes up the Study Area and the assessment is presented in **Table 10.12**.

Table 0.12: 2024 Daily Traffic (12h) Capacity Review Summary

Survey Location	2024 Baseline Flow	2024 Base + Development Flows	Theoretical Road Capacity (12hr)	Spare Road Capacity %
A836 Site Access	328	358	3,360	89.33%
A836 Lairg	2,030	2,052	21,600	90.50%
A839 Lairg	885	895	19,200	95.34%
A839 Rogart	885	895	21,600	95.86%
A836 Bonar Bridge	1,848	1,864	19,200	90.29%
A836 Ardgay	1,648	1,654	19,200	91.39%
A9 south of The Mound	4,440	4,444	28,800	84.57%
A9 at Glenmorangie	8,137	8,141	28,800	71.73%

The results indicate there are no road capacity issues with the addition of construction traffic associated with the proposed development and significant spare capacity exists within the trunk and local road network to accommodate all construction phase traffic.

In accordance with the IEMA Guidelines Rules 1 and 2 and based on the construction traffic data shown in **Table 10.11**, detailed assessments have been undertaken on the following receptors:

- Users of the A836 in the vicinity of the Site (High Sensitivity); and
- Residents of Lairg (High Sensitivity).

In addition, based on THC threshold of 10% in terms of HGV traffic on the Council infrastructure, detailed assessment has been undertaken on the following receptors:

- Users of the A839 at Lairg (Medium Sensitivity); and
- Users of the A839 at Rogart (Medium Sensitivity).

10.9 Potential Effects

10.9.1 Construction

An assessment of the likely effects has been undertaken using the previously described thresholds. The results of this are summarised below in

Table 0.13. The likely effects have assumed that the proposed mitigation measures described in **Section 10.7** are in place.

Table 0.13: Construction Phase Effects Assessment

Receptor	Severance	Driver Delay	Pedestrian Delay	Pedestrian Amenity	Fear & Intimidation	Accidents & Safety
Users of the A836 in the vicinity of the Site	moderate/ minor	moderate/ minor	moderate/ minor	moderate/ minor	moderate/ minor	minor
Residents of Lairg	minor	minor	minor	minor	minor	minor
Users of the A839 at Lairg	minor	minor	minor	minor	minor	minor
Users of the A839 at Rogart	minor	minor	minor	minor	minor	minor

The Moderate/Minor effects noted on the A836 have been reviewed against the physical characteristics of the road at the site access location, where pedestrian flows are insignificant due to the lack of infrastructure and pedestrian destinations. As such, professional judgement has been used and the severance, pedestrian delay, pedestrian amenity and fear & intimidation criteria can be reclassified as “minor”. The construction effects are therefore, Not Significant for these criteria, however for Driver Delay, prior to the application of mitigation measures road users are still likely to experience potentially Significant effects in accordance with the EIA Regulations. It should however be noted, that this effect is not solely in relation to the capacity or otherwise of the A836 in the vicinity of the Site, but in relation to the change in composition of vehicles types as a result of the construction of the Proposed Development, namely an increase in HGV traffic which will typically drive at slower speeds on more rural roads.

It should be noted that the impacts relate solely to the peak of construction activities and that the construction period is short lived and the effects transitory in nature.

10.10 Additional Mitigation and Enhancement

With regards to further mitigation measures for the construction phase, it is not proposed to provide any additional measures to those proposed in **Section 10.7 Embedded Mitigation**. The measures proposed are in line with those measures deemed suitable for the existing CRWF and given that the quantum of the proposed development is less than the existing scheme, it is considered that the measures would adequately address the potential impacts of the construction phase.

10.11 Residual Effects

10.11.1 Construction

The assessment confirms that the residual effects would be Minor and Not Significant following the implementation of the proposed mitigation measures. This conclusion has been based upon professional judgement following a review of the actual numbers of movements on the proposed Study Area, which could be considered statistically high in percentage terms at some locations, the impacts are low in actual physical numbers.

The traffic effects associated with the construction phase are temporary in nature and are confined to the construction phase only (anticipated to be 23 months). No long-lasting detrimental transport or access issues are associated with the proposed development. The proposed mitigation measures would help reduce the impacts of construction traffic and would improve road safety for all road users during this period.

10.12 Cumulative Assessment

The use of NRTF growth assumptions has provided a basis for general local development growth within the Study Area. The use of NRTF covers other committed development traffic flows within the Study Area. Sites that do not have planning consent cannot be considered as committed schemes and cannot be included in the proposed development assessment as they may be refused or may not progress beyond scoping.

A total of four consented wind farm schemes in close proximity to the proposed development, have been identified. These schemes have the potential to share sections of the access routes used during the construction phase of the proposed development. The consented schemes are as follows:

- Strath Tirry Wind Farm (20/05067/FUL);
- Sallachy Wind Farm (21/01615/FUL);
- Braemore Wind Farm (10/05102/S36); and
- Lairg 2 Wind Farm (21/00849/FUL).

No other significant traffic generating developments were noted in the Study Area that may occur during the construction period associated with the proposed development.

Strath Tirry Wind Farm is located to the south-east of the proposed development and accessed via the A836. The development comprises four wind turbines and associated infrastructure. Information contained within the EIA transport submissions, shows that the same access routes would be used as those identified for the proposed development. As such, the information in relation to construction trips within the Strath Tirry Wind Farm assessment works have been considered as part of the cumulative assessment.

Sallachy Wind Farm is located to the south-west of the proposed development, to the west of Loch Shin and accessed via the access road to the Cassley Hydro Power Station, off the A838. The development comprises nine wind turbines and associated infrastructure. Information contained within the EIA transport submissions, shows that the same access routes would be used as those identified for the proposed development, with the exception of the final section of the A836. As such, the information in relation to

construction trips within the Sallachy Wind Farm assessment works have been considered as part of the cumulative assessment.

Braemore Wind Farm was consented in 2017, however, the planning permission lapsed in October 2022, with no works commencing. As such, this development has been excluded from the cumulative assessment.

Lairg 2 Wind Farm was consented in June 2020 and construction activities are expected to commence in 2023 / 2024. The site is located to the south of the proposed development, in the vicinity of Lairg and is accessed from the A836 to the south. Information contained within the EIA transport submissions, shows that some sections of the access routes as those used for the proposed development would be used. Although it is likely that construction on Lairg 2 Wind Farm would commence prior to the proposed development getting consent, it has been included within the cumulative assessment, to ensure that a robust assessment has been undertaken.

The peak traffic flows for the committed developments were obtained from their respective planning application documents (see

Table 0.14) and then compared to the future baseline year.

Table 0.14: Proposed Development and Cumulative Developments Peak Traffic Summary

Survey Location	Proposed Development		Strath Tirry Wind Farm		Sallachy Wind Farm		Lairg 2 Wind Farm		Total Car & LGV	Total HGV
	Cars & LGV	HGV	Cars & LGV	HGV	Cars & LGV	HGV	Cars & LGV	HGV		
A836 Site Access	20	10	20	46	0	0	0	0	40	56
A836 Lairg	16	6	16	44	24	50	30	3	86	103
A839 Lairg	6	4	6	2	24	2	30	3	66	11
A839 Rogart	6	4	6	2	24	2	30	3	66	11
A836 Bonar Bridge	10	6	10	44	24	50	30	27	74	127
A836 Ardgay	0	6	0	44	12	50	30	27	42	127
A9 south of The Mound	0	4	0	2	0	2	30	3	30	11
A9 at Glenmorangie	0	4	0	2	0	6	30	29	30	41

Assuming a worst-case assessment, whereby all four of the above developments were constructed at the same time and the peak periods of construction activity occurred concurrently, it can be seen from **Table 10.14** that there would be an increase in the number of construction trips on the Study Area to that already considered within the Chapter. In order to demonstrate what impact this would have on the road network a capacity assessment has been undertaken using the *Design Manual for Roads and Bridges, Volume 15, Part 5 "The NESAs Manual"*. This has been undertaken in line with the assessment shown on **Table 10.2** for the proposed development.

Table 0.15 below shows the theoretical road capacity for each of the road links that makes up the Study Area. Together with the 2024 baseline traffic flows, with the addition of all construction trips for the four developments.

Table 0.15: Baseline 2024 Traffic Conditions

Survey Location	2024 Baseline Flow	2026 Base + Development Flows	Theoretical Road Capacity (12hr)	Spare Road Capacity %
A836 Site Access	328	424	3,360	87.38%
A836 Lairg	2,030	2,219	21,600	89.73%
A839 Lairg	885	963	19,200	94.99%
A839 Rogart	885	963	21,600	95.54%
A836 Bonar Bridge	1,848	2,049	19,200	89.33%
A836 Ardgay	1,648	1,817	19,200	90.54%
A9 south of The Mound	4,440	4,481	28,800	84.44%
A9 at Glenmorangie	8,137	8,208	28,800	71.50%

The above results indicate there would be no road capacity issues with the construction of the proposed development and committed developments running concurrently and there is significant spare capacity within the trunk and local road networks to accommodate construction phase traffic.

Furthermore, any effect of all four developments being constructed at the same time would be mitigated through the use of an overarching Traffic Management and Monitoring Plan for the developments and by introducing a phased delivery plan, which would be agreed with THC, TS and Police Scotland. This would ensure that the developments result in no significant detriment to the existing conditions and as such No Significant cumulative effects are predicted.

It should also be noted that it is not predicted that the potential traffic flow increases identified above would occur in the Study Area for the following reasons:

- it is highly unlikely that the peak traffic conditions for each development would occur at the same time due to differences in construction programmes, material supplies and developer resources;
- worst case assessments have been undertaken on a number of the developments, whereby all materials would be sourced off-site, when in fact, this scenario is highly unlikely to occur; and
- all abnormal load deliveries cannot occur at four separate developments on the same day due to restrictions on the numbers of loads moving on the network at the same time as set by Police Scotland.

10.13 Summary

The proposed development would lead to increased traffic volumes on the A836 and the surrounding road network during the construction phase. This increase would be temporary.

An assessment of likely effect using IEMA guidelines has been undertaken. This determined that Minor, Not Significant residual effects could be expected on the A836 road corridor from the site access junction through to Lairg and Rogart, relating to the increase in HGV traffic operating on the route. All other receptors within the Study Area have been scoped out of the assessment.

A range of mitigation measures are proposed, including the implementation of a comprehensive CTMP which would be agreed in advance with THC and TS. The proposed mitigation would reduce the effects of abnormal load and general construction traffic on the Study Area. The effects would be temporary and reversible.

No Significant residual effects are anticipated in respect of traffic and transport matters and the traffic impacts associated with the operational phase would be very low with less than ten service vehicles per week regularly accessing the site to carry out routine maintenance.

A cumulative assessment has been undertaken and the results indicate there would be no road capacity issues with all developments running simultaneously, with significant spare capacity on the road network. In the unlikely event of developments being constructed at the same time, this would be mitigated through the use of an overarching Traffic Management and Monitoring Plan, which would ensure no significant detriment to the existing conditions and as such No Significant cumulative effects are predicted.

Operational and decommissioning effects have been scoped out of the assessment.

A summary of the assessment undertaken within the chapter for the proposed development is provided in **Table 0.16**, while **Table 0.17** provides a summary of the cumulative assessment.

Table 0.16: Summary of Effects

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Construction					
Users of the A836 in the vicinity of the Site	moderate/minor	adverse	Implementation of Construction Traffic Management Plan, provision of construction traffic road signage, convoy escorts for abnormal load movements, abnormal load traffic management plan and provision of localised road improvement works. All works to be undertaken as per the measures implemented for the existing CRWF, as previously agreed with THC.	minor	neutral
Operation					
No operational effects anticipated					
Decommissioning					
Any decommissioning effects would be less than those predicted for the construction phase and have, therefore, been scoped out of the assessment.					

Table 0.17: Summary of Cumulative Effects

Receptor	Effect	Cumulative Developments	Significance of Cumulative Effect	
			Significance	Beneficial/ Adverse
None	None	None	None	None

10.14 References

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The Timber Transport Forum, ‘*Agreed Timber Route Map*’. Available at:

<https://timbertransportforum.org.uk/maps/agreed-routes>

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Department for Transport, traffic count data. Available at: <https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints>

Appendix 10.1 Transport Assessment