Pell Frischmann

Glentarken Wind Farm

Technical Appendix 11.1 - Transport Assessment

December 2024

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1 Introduction

1.1 Purpose of the Report

Pell Frischmann (PF) has been commissioned by SSE Renewables Wind Farms UK Ltd. (hereafter referred to as 'the Applicant') to undertake a Transport Assessment (TA) for the proposed Glentarken Wind Farm (hereafter referred to as the Proposed Development), which is located within the Drummond Estate in the Perth and Kinross Council (PKC) and Stirling Council (SC) administrative areas.

The report identifies the key transport and access issues associated with the Proposed Development, including the route for abnormal loads. The TA identifies where the Proposed Development may require mitigation works to accommodate the predicted traffic; however, the detailed design of these remedial works is beyond the agreed scope of this report. The findings of this report have informed the assessment of traffic and transport related effects in the Environmental Impact Assessment (EIA) Report **Volume 1**: **Chapter 11: Traffic and Transport**.

1.2 Report Structure

Following this introduction, the TA report is structures as follows:

- Section Two describes the Proposed Development;
- Section Three reviews the relevant transport and planning policies;
- Section Four sets out the methodology used in this assessment;
- Section Five describes the baseline transport conditions;
- Section Six describes the trip generation and distribution of traffic in the Study Area;
- Section Seven summarises the traffic impact assessment;
- Section Eight considers mitigation proposals for development related traffic within the study network; and
- Section Nine summarises the findings of the TA and outlines the key conclusions.

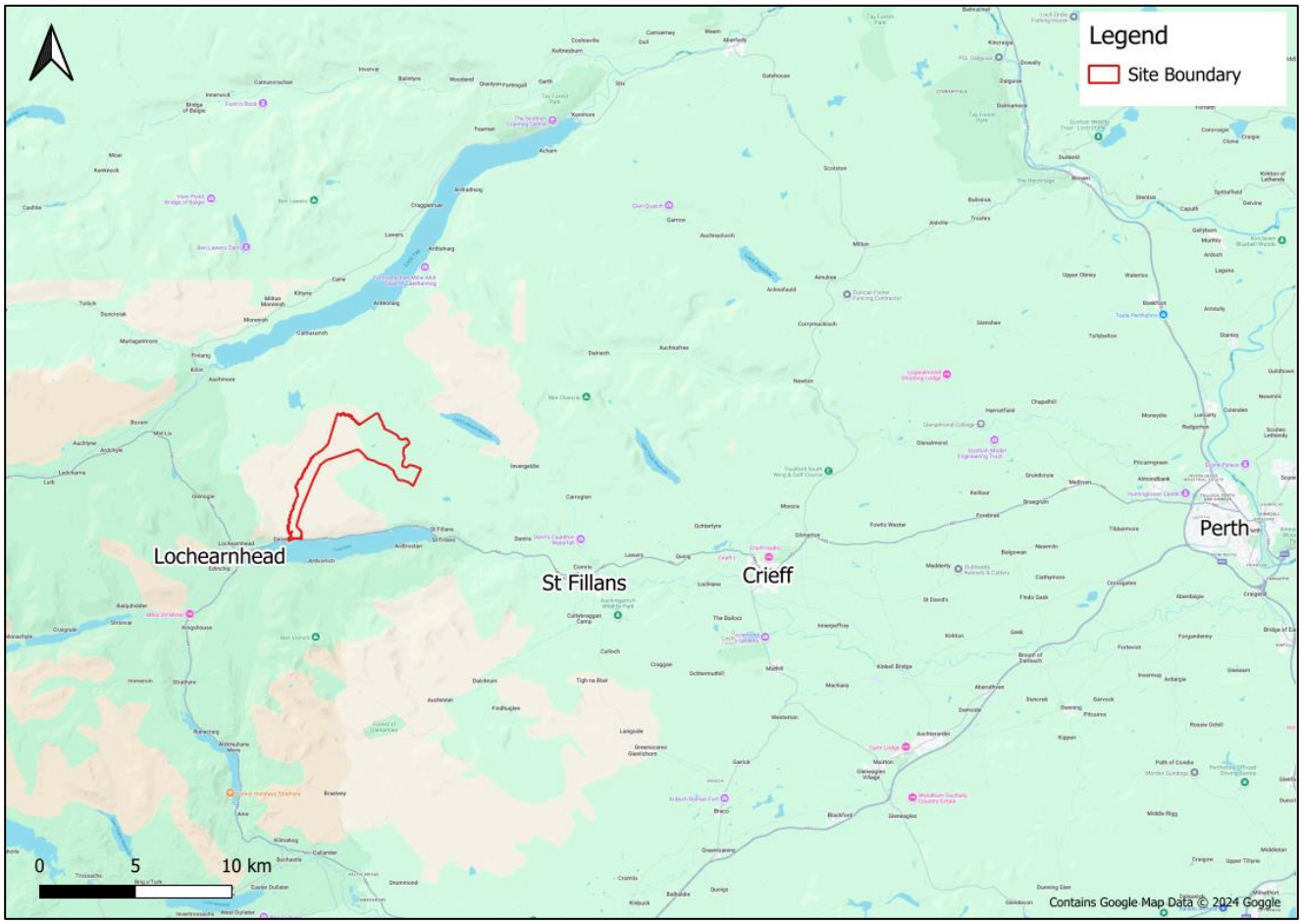
2 Site Background

2.1 Site Location

The application boundary (the Site) is located within the Drummond Estate, approximately 2.8 kilometres (km) east of Lochearnhead, 15.5 km west of Crieff, 35 km north of Stirling, and 45 km west of Perth. The Site, where the majority of turbines are to be located, is located within the PKC administrative area, with the access track and western extent of the Site location within the SC Administrative area.

The general location of the Site is shown in **Figure 1**.

Figure 1 Site Location



2.2 Proposed Development

The Proposed Development will comprise the following:

- Up to 12 Wind Turbine Generators (WTGs) of up to 180 m tip height with internal transformers;
- Turbine foundations;
- Battery Energy Storage Systems (BESS) with up to 50 MW capacity and 100 MW/h of storage;
- Crane hardstandings and associated laydown area at each wind turbine location;
- Approximately 15.6 km of on-site access tracks comprising 11.8 km of cut track, 2.8 km floated track and 1km of upgraded existing track, to connect to ancillary site infrastructure;
- An on-site substation, welfare building and store;
- A network of underground cabling to connect each wind turbine to the on-site substation;
- telecommunication infrastructure; Watercourse and culvert crossings;
- A LiDAR unit to collect meteorological and wind speed data, and associated hard stand; and

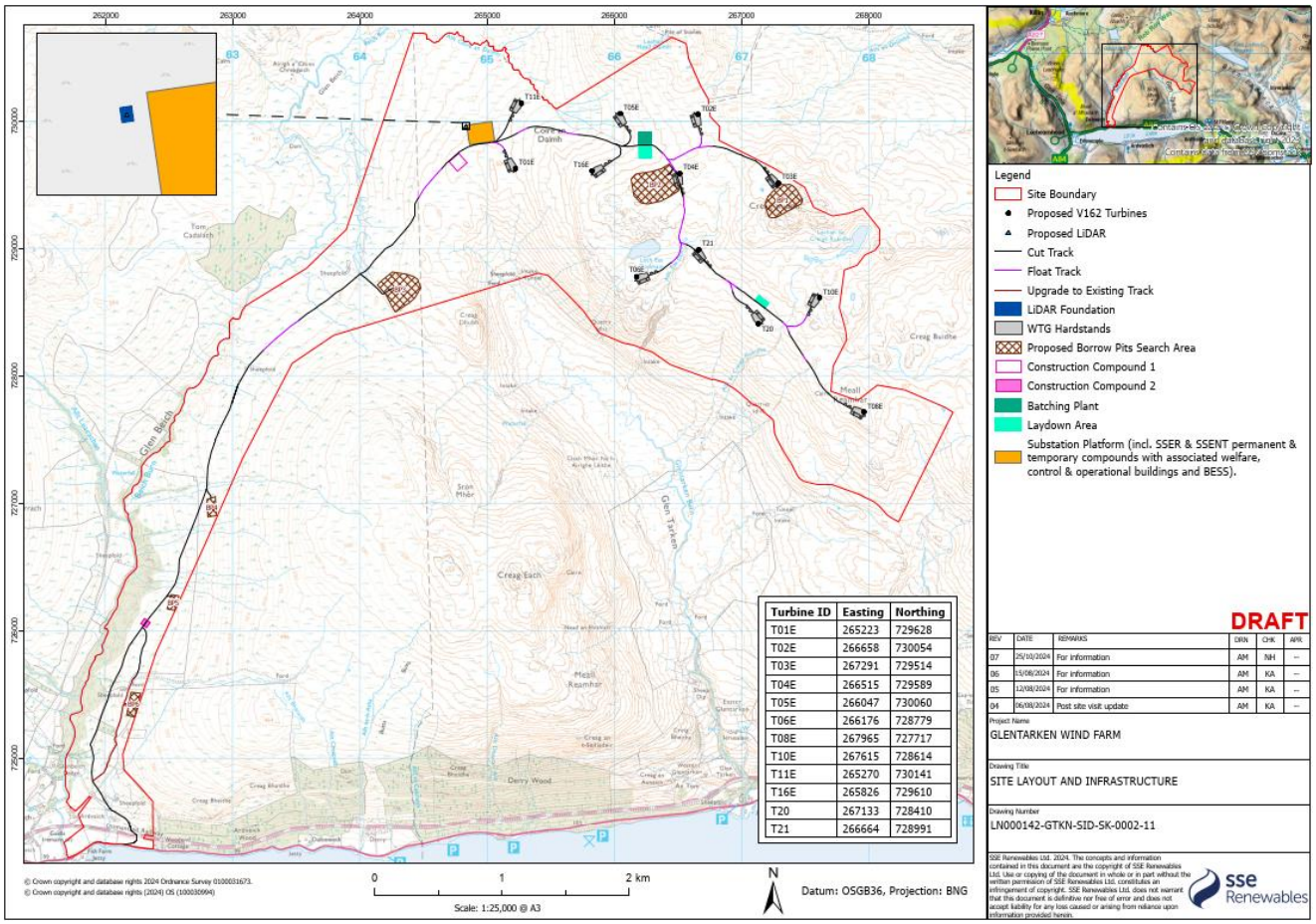
- Any other ancillary works required.

In addition to the permanent components, the construction phase would comprise the following temporary facilities:

- Site compound areas, including welfare facilities, site cabins, storage and parking;
- Batching plant facilities for temporary on-site concrete batching;
- ;
- Up to six borrow pits; and
- Any associated ancillary works required.

The Proposed Development is shown in **Figure 2**.

Figure 2 Proposed Development (courtesy of the Applicant)



A complete description of the Proposed Development for the purposes of the Environmental Impact Assessment (EIA) regulations is provided in EIA Report **Volume 1**: **Chapter 2: Development Description**.

2.3 Access Arrangements

The Proposed Development will be accessed from the A85 at Dalveich, located to the west of St Fillans, Perthshire via a new simple priority junction. The access junction will provide access to the Site for all AILs associated with the turbine deliveries, as well as access for heavy goods vehicles (HGVs) delivering construction materials and general site traffic.

An indicative layout of the proposed access junction is provided in **Annex A**, while a Stage 1 Road Safety Audit (RSA) of the proposals is provided in **Annex B**.

Construction traffic associated with the Proposed Development will generally approach from the south initially, then from the west and all AIL traffic will access from the Port of Entry (POE) at the Forth Ports Grangemouth Docks, utilising sections of proven AIL routes used during the construction of other wind farms in the area and within the Central Belt.

2.4 Candidate Turbines

The Vestas V162 turbine with a tip height of 180 m and a hub height of 99 m has been selected for the purposes of this assessment. The details of the components have been provided by Vestas and are detailed in **Table 1**. Note these are indicative component dimensions at this time and are subject to change.

Table 1 Turbine Component Summary

Component	Length (m)	Width (m)	Height/Min Diameter (m)	Weight (t)
V162 Blade	79.967	4.460	3.800	34.961
Base Tower	12.070	4.760	4.740	81.000
Mid Tower 1	18.760	4.740	4.687	86.000
Mid Tower 2	25.480	4.687	4.676	82.000
Mid Tower 3	29.960	4.676	4.421	76.000
Top Tower	30.000	4.421	3.978	60.000

A detailed Route Survey Report (RSR) has been prepared and appends this TA as **Annex C**. Note this has been undertaken on a Nordex N163 turbine, which has a larger kinetic envelope than the Vestas V162 and can therefore be assumed to be a worst case assessment of the route.

The selection of the final turbine model and specification will be subject to a commercial procurement process following consent of the application. The assumed dimensions may therefore vary slightly from those assumed as part of this assessment.

With regards to the equipment used to transport the turbine components, to provide a robust assessment scenario based upon the known issues along the access routes and constraints in moving larger loads a combination of trailer types will be required, particularly for the blade loads. It has been assumed that all blades would be carried on a Superwing Carrier trailer to reduce the need for mitigation in constrained sections of the route.

Where constraints are extreme, loads would be transferred onto a blade lifting trailer. This trailer has the ability to lift blades up to a maximum angle of 60 degrees, lifting blades over potential constraints and shortening the length plan view.

The hub, nacelle housing and top towers would be carried on a six-axle step frame trailer through the entire route.

Examples of the vehicles and trailers that are likely to transport loads are shown in **Figure 3** to **5** of this **TA**.

Figure 3 Superwing Carrier Trailer

Figure 4 Blade Lifter Trailer

Figure 5 Clamp Tower Trailer

3 Policy Context

3.1 Introduction

An overview of relevant transport planning policies has been undertaken and is summarised below for national and local government policies.

3.2 National Policy & Guidance

3.2.1 National Planning Framework 4 (NPF4)

The National Planning Framework (NPF) is a long-term plan for Scotland that sets out where development and infrastructure is needed in the country. NPF4 sets out the Government's plan looking forward to 2045 that will guide spatial development, set out national planning policies, designate national developments and highlight regional spatial priorities. It is part of the development plan, and so influences planning decisions across Scotland.

NPF4 puts the climate and nature crises at the heart of the Scottish planning system and was adopted in February 2023.

Policy 11: which relates to Energy makes specific reference to the impacts of construction traffic associated with renewable energy projects. Policy 11 states the following:

"e) In addition, project design and mitigation will demonstrate how the following impacts are addressed:

- *vi. impacts on road traffic and on adjacent trunk roads, including during construction."*

The assessment undertaken as part of this TA and the associated EIA Report **Chapter 11** has taken cognisance of this and provided appropriate mitigation where necessary.

3.2.2 Planning Advice Note (PAN) 75

Planning Advice Note (PAN) 75: Planning for Transport provides advice on the requirements for Transport Assessments. The document notes that:

"… transport assessment to be produced for significant travel generating developments. Transport Assessment is a tool that enables delivery of policy aiming to integrate transport and land use planning."

"All planning applications that involve the generation of person trips should provide information which covers the transport implications of the development. The level of detail will be proportionate to the complexity and scale of the impact of the proposal...For smaller developments the information on transport implications will enable local authorities to monitor potential cumulative impact and for larger developments it will form part of a scoping exercise for a full transport assessment. Development applications will therefore be assessed by relevant parties at levels of detail corresponding to their potential impact."

3.2.3 Transport Assessment Guidance (2012)

Transport Scotland's (TS) Transport Assessment Guidance was published in 2012. It aims to assist in the preparation of TA for development proposals in Scotland such that the likely transport effects can be identified and dealt with as early as possible in the planning process. The document sets out requirements according to the scale of development being proposed.

The document notes that a TA will be required where a development is likely to have significant transport effects, but that the specific scope and contents of a TA will vary for developments, depending on location, scale and type of development.

3.2.4 Onshore Wind Turbines, Online Renewables Planning Advice (May 2014)

The Scottish Government advice note regarding onshore wind turbines was published in 2014. The advice note identifies the typical planning considerations in determining applications for onshore wind turbines including landscape impact, impacts on wildlife and ecology, shadow flicker, noise, ice throw, aviation, road traffic impacts, cumulative impacts and decommissioning.

In terms of road traffic impacts, the guidance notes that in siting wind turbines close to major roads, pre-application discussions are advisable as this is important for the movement of abnormal indivisible loads during the construction period, ongoing planned maintenance and for decommissioning (if applicable).

3.3 Local Policy & Guidance

3.3.1 Perth & Kinross Council Local Development Plan 2 (2019)

The PKC Local Development Plan (LDP) - The Local Development Plan 2 (LDP2) was adopted on 29 November 2019 and is the Council's statutory corporate document that guides future development and use of the land. It acts as a catalyst for changes and improvement in the area and shapes the environment and economy of Perth and Kinross. The LDP2 sets out how the Council will work towards their Vision for Perth and Kinross, and shows which land is being allocated to meet the area's development needs up to 2029 and beyond.

Policy 33A: New Proposals for Renewable and Low-Carbon Energy of the overarching Policy 33:Renewable and Low-Carbon Energy, outlines the following in relation to transport implications associated with the development of renewable energy projects:

"(d) The transport implications, and in particular the scale and nature of traffic likely to be generated, and its implications for site access, road capacity, road safety, and the environment generally. (Applications with impacts on the Strategic Trunk Road Network will be subject to discussion and agreement with Transport Scotland).

(e) Construction and service tracks and borrow pits associated with any development."

3.3.2 Stirling Council Local Development Plan (2018)

The SC LDP - Stirling Local Development Plan, was adopted in October 2018 and is the Council's view on how the area should be developed from the plan's adoption to 2027, and beyond to 2037. The Plan covers the whole of the Stirling LDP area and replaces the Stirling LDP 2014 and all accompanying Supplementary Guidance.

Primary Policy 12: Renewable Energy sets out how local resources will be managed and how renewable energy developments will be supported where they comply with Policy 12.1: Wind Energy Developments and with all other relevant LDP policies. Specifically in relation to transport, the Policy states the following:

"(c) Proposals will also be assessed against the following criteria:

(viii) Public access, including impact on long distance walking and cycling routes and scenic routes identified in NPF.

(ix) Road traffic and adjacent trunk roads.

In support of the SC LDP, the Council has published Supplementary Guidance, specifically in relation to wind energy developments. The purpose of the Supplementary Guidance is to provide further information and detail in respect of LDP Policy 12.1 and includes an overview of national planning guidance, a summary of current locational and design guidance of Scottish Natural Heritage (SNH) and advice and guidance on a range of planning and environmental issues.

Specifically in relation traffic and transport, the Supplementary Guidance highlights construction activity as a potential community issue which requires consideration, stating the following:

"Construction is likely to involve considerable traffic and the passage of some large or very large vehicle loads. Any proposal for a wind energy development must demonstrate that the development will not have a significant adverse effect individually or cumulatively on the public or trunk road network. Developers will be required to undertake a Transport Assessment to establish the transport impacts of the construction traffic associated with the development, the suitability of the existing road network, the impact on existing road users and adjacent communities, and the requirements for any mitigation works. Where the trunk road network is to be used to transport turbine components to site then an abnormal load route assessment should be undertaken and submitted to Transport Scotland for consideration. The assessment should identify the preferred route to site and should identify any pinch points on the trunk road network where mitigation measures may be required. This should include preapplication negotiation with the Roads Authority, or Transport Scotland, in the case of a trunk road to agree the extent and nature of necessary strengthening, improvements and other mitigation works."

3.4 Policy and Guidance Summary

The Proposed Development can align with the stated traffic and transport policy objectives and the design of the Site and proposed mitigation measures will ensure compliance with national and local objectives. An assessment of the Proposed Development's compliance with planning policy is provided in the Planning Statement (supporting document to the EIAR),

4 Study Methodology

4.1 Introduction

There are three phases of the Proposed Development, which have been considered in this assessment and are as follows:

- The Construction Phase;
- The Operational Phase; and
- The Decommissioning Phase.

4.2 Project Phases – Transport Overview

Of the three phases, the construction phase is considered to have the greatest impact in terms of transport and potential impacts on the road network and sensitive receptors. Construction plant, bulk materials and wind turbine components will be transported to Site, potentially resulting in a significant increase in traffic on the study network.

The operational phase is restricted to occasional maintenance operations which generate significantly lower volumes of traffic that are not considered to be in excess of daily traffic variation levels on the road network.

The decommissioning phase involves fewer trips on the road network than the construction phase, as minor elements of infrastructure could be left in place, adding to local infrastructure that can potentially be used for further agricultural or leisure uses in the future.

It should be noted, however, that construction effects are short lived and transitory in nature, whilst the operational phase assessment has been assumed to be based typical operating conditions with occasional operational and maintenance traffic.

4.3 Scoping Discussions

The Applicant submitted a request for an EIA Scoping Opinion to the Energy Consents Unit (ECU) who then consulted PKC and SC in respect of the EIA which included a section considering traffic and transport. A full review of the Scoping Opinion is provided in EIA Report **Volume 1**: **Chapter 11**.

5 Baseline Conditions

5.1 Study Area Determination

The Study Area has been based on those roads that are expected to experience increased traffic flows associated with the construction of the Proposed Development. The geographic scope was determined through a review of the other developments in the area, Ordnance Survey (OS) plans and an assessment of the potential origin locations of construction staff and supply locations for construction materials.

Access for construction materials would be from the east and west on the A85. Where feasible, local materials will be sourced which will avoid traffic impacting on local communities as far as practicable.

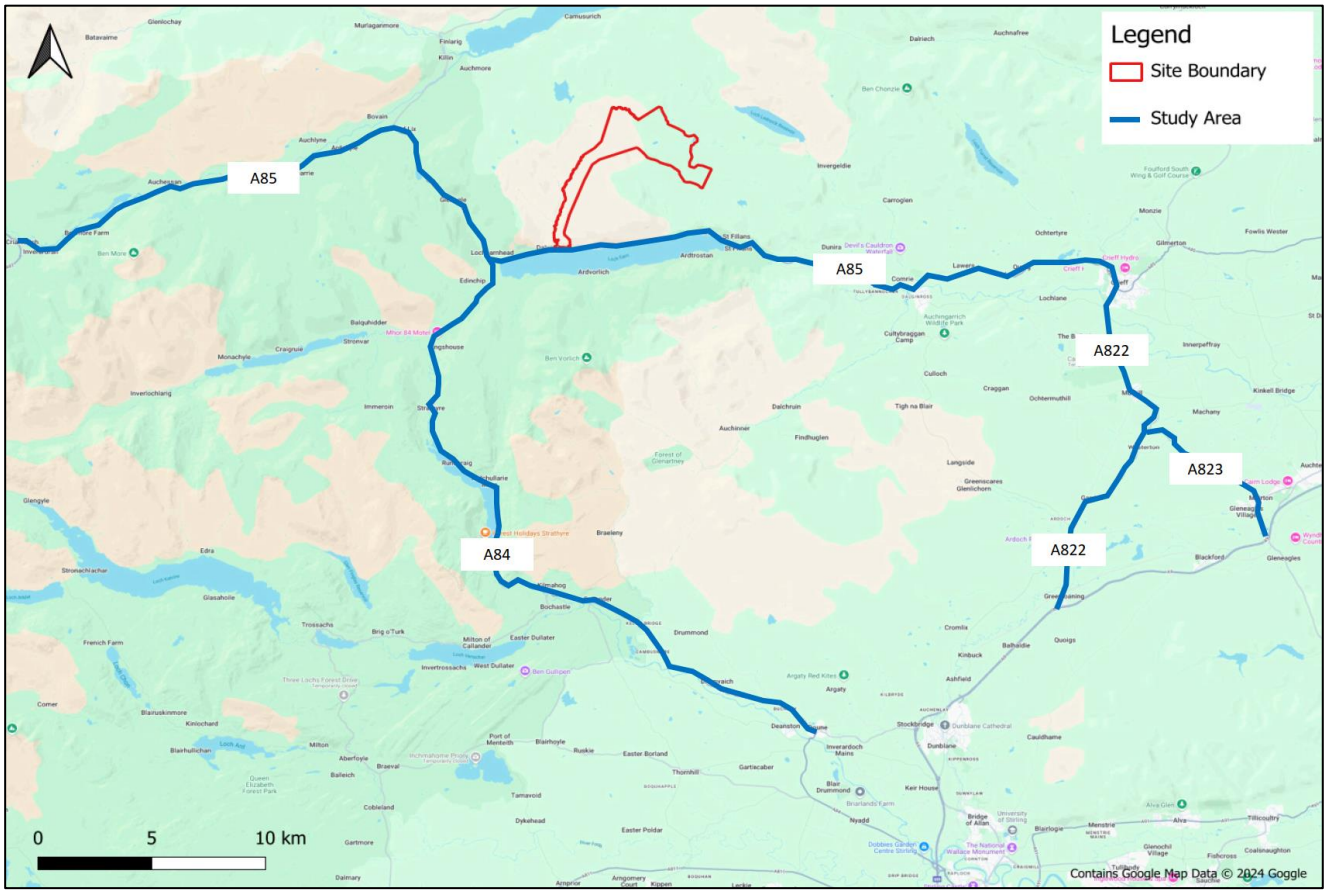
As detailed above, the likely POE used for the discharging of wind turbine components will be the Forth Ports Grangemouth Docks. AILs would likely route to the Site via the North Shore Road, A904, M9, A84 and A85 through to the Site access junction. Full details of the AIL route are provided later in the report and within **Annex C**.

Based on the above, the Study Area for the assessment has therefore been assumed to be:

- The A85 between Crieff and Crianlarich;
- The A822 between the A9 and the A85;
- The A823 between the A9 and its junction with the A822 to the south of Muthill; and
- The A84 between Doune and Lochearnhead.

Effects associated with construction traffic generated by the Proposed Development would be most pronounced in close proximity to the Site 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 Study Area is shown in **Figure 6** of this TA.

Figure 6 Study Area



5.2 Pedestrian and Cyclist Networks

There are no dedicated pedestrian facilities in the immediate vicinity of the Site, reflecting its rural setting. Further away from the Proposed Development in the wider Study Area, there are pedestrian facilities within the smaller settlements, as detailed below:

- Auchraw:
  - Sections of footway on one or both sides of the A85 carriageway, including drop kerbs and tactile paving at some locations.
- Lochearnhead:
  - Sections of footway on one or both sides of the A84 and A85 carriageways, including drop kerbs and tactile paving at some locations.
- St Fillans:
  - Sections of footway on one or both sides of the A85 carriageway.

Within the larger settlements, including Crieff, Dunblane, Callander, Muirton, Muthill and Doune, there are footways on one side or both sides of the carriageways. In addition, there are dedicated signal-controlled crossing points, drop kerbs and pedestrian refuge islands for pedestrians. The level of pedestrian infrastructure is commensurate with the scale of the local settlements and their relative rural setting.

There are a significant number of Core Paths and other path networks in the vicinity of the Proposed Development and within the wider Study Area. A review of the PKC Core Path network map[1] and the Loch Lomond and The Trossachs National Park (LLTNP) network map[2] have been undertaken and a summary of those within the Site

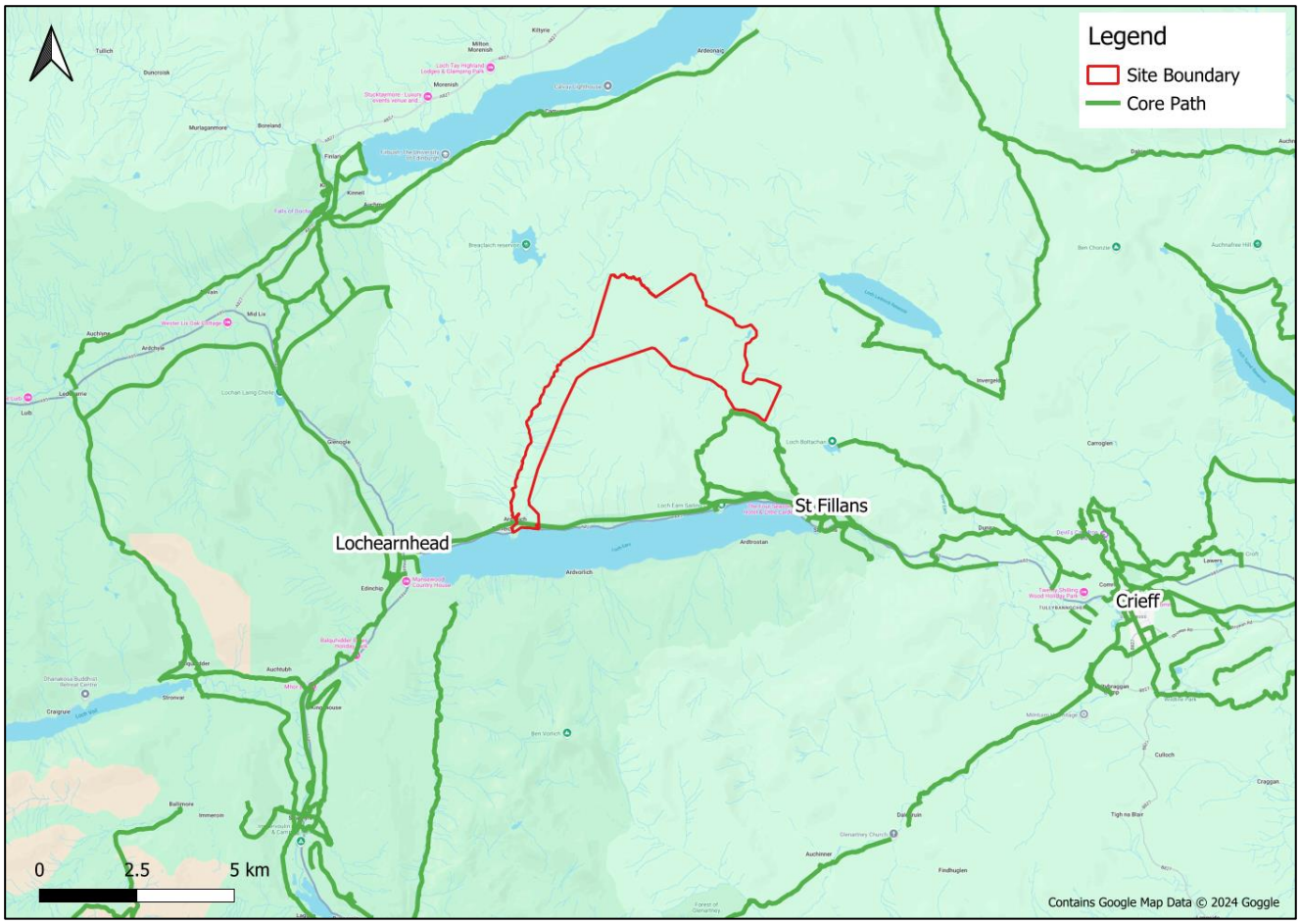
[1] Perth and Kinross Council, Core Path Plan: https://www.pkc.gov.uk/article/15439/Core-Paths-Plan-interactive-map [Accessed September 2024]
[2] Loch Lomond and The Trossachs National Park Plan: https://www.lochlomond-trossachs.org/plan-your-visit/map-downloads/ [Accessed September 2024]

boundary or in the immediate vicinity of the Site are detailed below in **Table 2**, while **Figure 7** shows the wider Core Path network.

Table 2 Core Paths

Name	Path Code	Type	Location
A85 (in LLTNP) north via Wester Glentarken to Glen Tarken	STFI/100	Off-road	PKC
Tarken Lodge (LLTNP) - Allt an Fhionn - Glen Tarken	STFI/101	Off-road	PKC
Forest Track Glentarken Wood at Creag Gharbh (partly in LLTNP)	STFI/105	Off-road	PKC
Glentarken path via Jerusalem & Glentarken Wood to disused railway	STFI/106	Off-road	PKC
Old railway, Dalchonzie to Tynreoch	STFI/103	Off-road	PKC
N/A	S1042	Off-road	LLTNP
N/A	S1172	Off-road	LLTNP

Figure 7 Core Path Network



A review of Sustrans National Cycle Network (NCN) map[3] indicates that NCN Route 7 is located to the west of the Site, running parallel to the A85 and for the most part are off-road. The route connects Balloch on the southern banks of Loch Lomond with Aberfoyle, Strathyre, Callander, Lochearnhead and Killin. It forms the southern section of the long-distance Lochs and Glens Way route and runs along a mixture of traffic-free paths and quiet road sections.

[3] https://www.sustrans.org.uk/national-cycle-network [Accessed August 2024]

5.3 Road Access

A85

The A85 is a trunk road in Scotland, providing a continuous route linking the east and west coasts at Oban and Dundee respectively. Between Crieff and Crianlarich it is a single carriageway road with one lane operating in each direction and is mainly subject to the national speed limit out with settlements, where it reduces to 30 miles per hour (mph) or 20 mph. Between Crieff and Crianlarich, the road is maintained by Bear Scotland (North West Trunk Roads) on behalf of TS.

A822

The A822 road runs through Perthshire, from the A9 at Greenloaning, rejoining the A9 at Dunkeld. It passes through the town of Crieff and intersects the A85 and A823. Between the A9 and the A85 at Crieff, the road is a single carriageway road with one lane operating in each direction and is mainly subject to the national speed limit out with settlements, where it reduces to 40 mph or 30 mph. The road is maintained by PKC.

A823

The A823 road runs from Crieff to Dunfermline, connecting with the A822 and A823(M) respectively. Between the A9 and its junction with the A822 to the south of Muthill, the road is a single carriageway road with one lane operating in each direction. The road is mainly subject to the national speed limit out with settlements, where it reduces to 30 mph. The road is maintained by PKC.

A84

The A84 is a trunk road in Scotland, linking Stirling in the south with Lochearnhead in the north. Between Doune and Lochearnhead it is a single carriageway road with one lane operating in each direction and is mainly subject to the national speed limit out with settlements, where it reduces to 30 mph. Between Doune and Lochearnhead, the road is maintained by Bear Scotland (North West Trunk Roads) on behalf of TS.

Road Suitability

The Agreed Timber Route Map[4] 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.

All 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.

[4] https://timbertransportforum.org.uk/ [Accessed August 2024]

5.4 Existing Traffic Conditions

To assess the impact of Proposed Development traffic on the Study Area, an Automatic Traffic Count (ATC) was undertaken on the A85 in close proximity to the Site access, over a seven-day period in June 2024 (17th to 23rd June). To complement the ATC surveys, existing traffic count data was obtained from the Department for Transport (DfT) [5] database and the TS[6] database, with 2023 data utilised.

The traffic count sites used were as follows:

1. A85 at the Site access (ATC);
2. A85 north of Lochearnhead (TS count site reference ATC06002);
3. A85 east of Crianlarich (TS count site reference ATC06001);
4. A85 east of St Fillans (TS count site reference ATC00001);
5. A822 north of Muthill (DfT count site reference: 40928);
6. A822 at Braco (DfT count site reference: 10927);
7. A823 north of Muirton (DfT count site reference: 50945);
8. A84 south of Lochearnhead (TS count site reference ATC06003); and
9. A84 at Doune (DfT count site reference: 765).

DfT and TS traffic data allow the traffic flows to be split into vehicle classes. The data was summarised into Cars/Light Goods Vehicles (LGVs) and HGVs (all goods vehicles >3.5tonnes gross maximum weight).

A National Road Traffic Forecast (NRTF) low growth factor was applied to the DfT survey data, to bring the traffic data up to the base year of 2024. The NRTF low growth factor for 2023 to 2024 is 1.005.

These sites were identified as being areas where sensitive receptors on the access routes would be located. A full receptor sensitivity and effect review is provided in EIA Report **Chapter 11**.

Figure 8 shows the location of the ATC, DfT and TS survey points, while **Table 3** summarises the Annual Average Daily Traffic (AADT) traffic data collected and used in this assessment.

[5] https://roadtraffic.dft.gov.uk/#6/55.254/-11.096/basemap-regions-countpoints [Accessed August 2024]
[6] https://ts.drakewell.com/multinodemap.asp [Accessed August 2024]

Figure 8 Traffic Count Locations

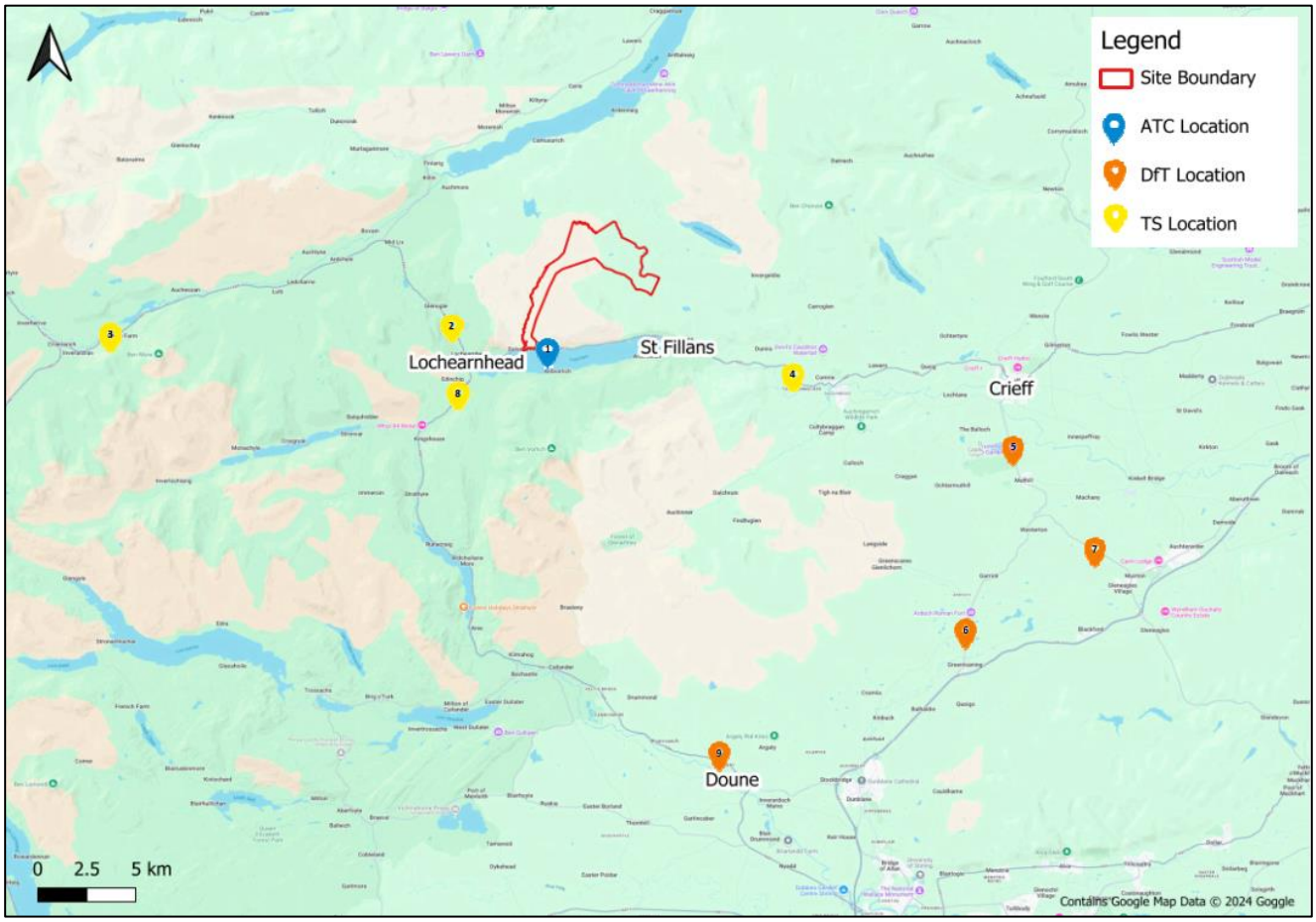


Table 3 24-hour Two-way Average Traffic Data (2024)

No.	Survey Location	Data Source	Cars & Lights	HGV	Total
1	A85 at the Site access	ATC	1,101	385	1,485
2	A85 north of Lochearnhead	TS	3,199	802	4,001
3	A85 east of Crianlarich	TS	3,017	378	3,395
4	A85 east of St Fillans	TS	1,640	286	1,927
5	A822 north of Muthill	DfT	4,509	109	4,618
6	A822 at Braco	DfT	3,004	91	3,095
7	A823 north of Muirton	DfT	1,158	54	1,212
8	A84 south of Lochearnhead	TS	3,186	371	3,557
9	A84 at Doune	DfT	6,680	375	7,055

Please note minor variances due to rounding may occur.

The ATC and TS survey locations which provided traffic volume data were also used to obtain speed statistics. The two-way seven-day average and 85th percentile speeds observed at the count sites are summarised in **Table 4**.

Table 4 Speed Summary (2024)

No.	Survey Location	Data Source	Mean Speed (mph)	85%ile Speed (mph)	Speed Limit (mph)
1	A85 at the Site access	ATC	40.1	45.2	50
2	A85 north of Lochearnhead	TS**	42.2	55.3	60
3	A85 east of Crianlarich	TS**	31.8	37.2	30
4	A85 east of St Fillans	TS**	50.7	58.1	60
5	A822 north of Muthill	DfT	-	-	-
6	A822 at Braco	DfT	-	-	-
7	A823 north of Muirton	DfT	-	-	-
8	A84 south of Lochearnhead	TS**	47.6	53.8	60
9	A84 at Doune	DfT	-	-	-

** No speed data available from DfT database*
*** Speed information obtained October 2024*

Speed information from the **Table 4**, suggests that the recorded speeds are broadly being adhered to within the Study Area, with only the Location 3 on the A85 east of Crianlarich being above the posted speed limit. A review of this location has shown that the permanent traffic counter is located immediately after the transition from the national speed limit to the 30 mph speed limit. As such, it will be capturing people accelerating out of the 30 mph zone and people slowing down on entering it. Police Scotland may wish to consider enforcement spot checks in these areas, if deemed necessary.

5.5 Accident Review

Personal Injury Accident (PIA) data for the five-year period covering January 2018 to December 2022 was obtained from the online resource CrashMap[7] which uses data collected by the police about road traffic crashes occurring on British roads, where someone is injured. TA Guidance[8] requires an analysis of the PIA on the road network in the vicinity of any development to be undertaken for at least the most recent 3-year period, however, to ensure a suitably robust review has been undertaken, five-years' worth of data has been included.

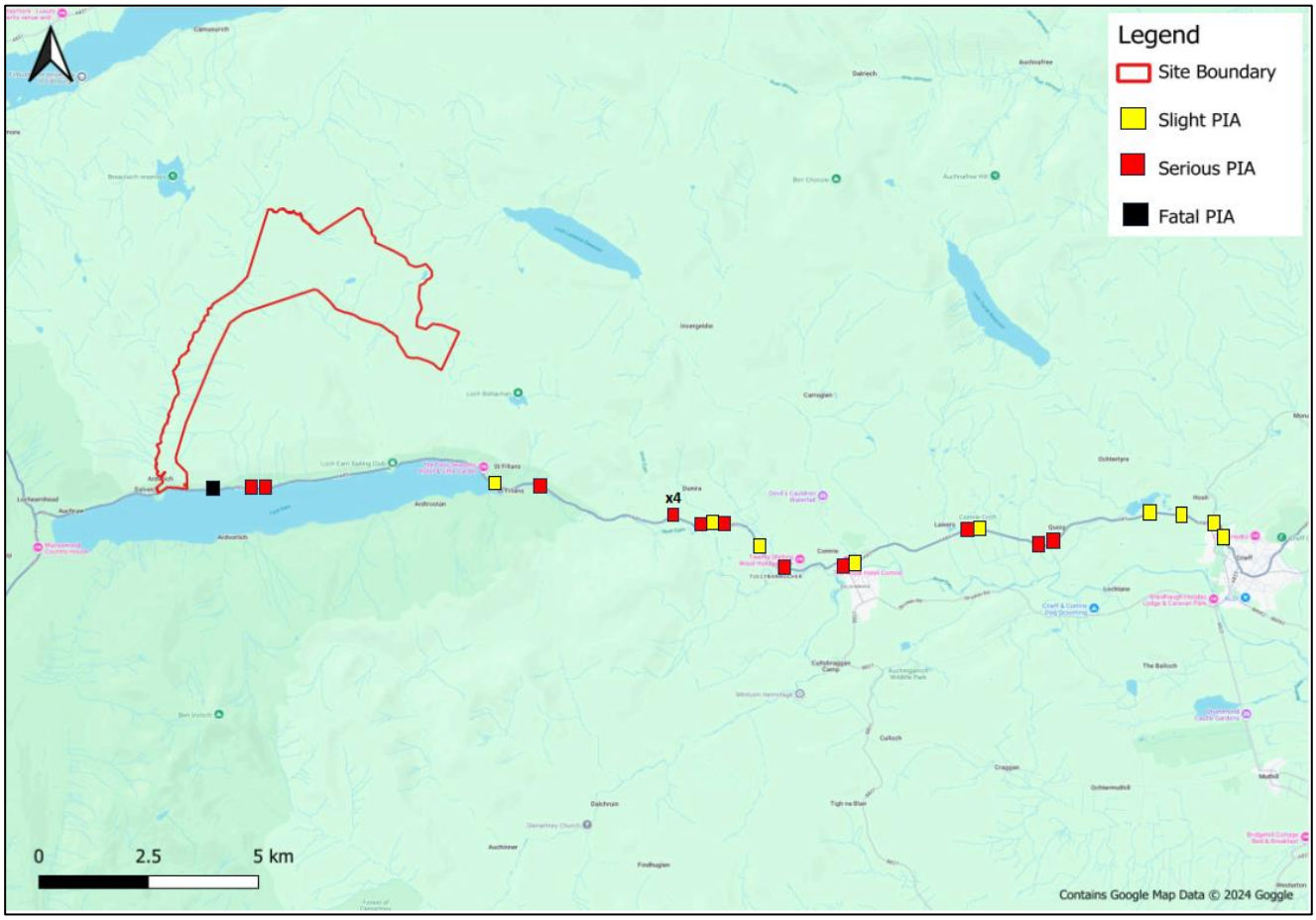
The statistics are categorised into three categories, namely "slight", "serious" and "fatal". Given the scale of the Study Area, the PIA review has been undertaken on the A85 within the Study Area, for the section between Crieff and Lochearnhead, which will be subject to all construction vehicles associated with the Proposed Development. The locations and severity of the recorded accidents within the Study Area are summarised in **Table 5**, while **Figure 9** shows their locations.

Table 5 Personal Injury Accident Summary

Location	Slight	Serious	Fatal	HGV Incidents
The A85 between Crieff and Lochearnhead	9	14	1	4
Total	**9**	**14**	**1**	**4**
Percentage	**37.5%**	**58.3%**	**4.2%**	**-**

[7] https://www.crashmap.co.uk [Accessed September 2024]
[8] https://www.transport.gov.scot/media/4589/planning_reform_-_dpmtag_-_development_management__dpmtag_ref__17__-_transport_assessment_guidance_final_-_june_2012.pdf

Figure 9 Accident Locations



A summary analysis of the incidents indicates that:

- A total of 24 accidents were recorded within the Study Area within the five-year period;
- Of those 24 accidents, seven were classed as “slight”, 14 as “serious” and one as “fatal”;
- The single fatality occurred on the A85 approximately 850 m to the east of the proposed Site access location. This was a single vehicle accident (motorcycle) and occurred on a slight bend on the carriageway, with the vehicle leaving the road and crashing down an embankment. The accident occurred at approximately 19:50 on a section of road where there is no street lighting present and trees lining both sides of the carriageway;
- Of the 24 recorded accidents, eleven of them involved motorcycles, with seven of these being single vehicle accidents, while the other four accidents involved multiple vehicles. All the accidents were recorded as “serious”, with the exception of the aforementioned fatality;
- Two accidents involved a pedal cycle, one “slight” and one “serious”. The “serious” accident resulted in an injury;
- Four of the recorded accidents involved HGVs, all of which were “slight”. All of the HGV accidents involved one or more cars;
- No recorded accidents involved a pedestrian;
- Four of the recorded accidents involved young drivers (17-20), with three recorded as “slight” and one as “serious”; and
- The majority of accidents occurred at junctions or bends on the carriageway.

In general, there are no clusters of PIAs at any location in the Study Area or high numbers of accidents involving HGVs for example. The majority of PIAs recorded occurred at or on approach to junctions / access to properties, where there is an increased interaction between vehicles and on bends.
It is however acknowledged that there has been a reasonably high number of accidents involving motorcycles, with four occurring at the same location, which could be attributed to the fact the local road network is used by a high number of tourists, including those undertaking motorcycle touring holidays.

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 or within the Study Area that currently require to be addressed or would be exacerbated by the construction of the Proposed Development.

5.6 Future Baseline Traffic Conditions

5.6.1 2030 Traffic Flows

Construction of the Proposed Development is estimated to commence during 2030 if consent is granted and is anticipated to last approximately 18 months depending on weather conditions and ecological 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 2024 to 2030 is 1.031. These factors were applied to the survey data to estimate the 2030 base traffic flows, as shown in **Table 6**. This forecast forms the baseline for the assessment of traffic and transport related effects in EIA Report **Chapter 11**.

Table 6: 24-hour Two-way Average Traffic Data (2030)

No.	Survey Location	Cars & Lights	HGV	Total
1	A85 at the Site access	1,135	397	1,531
2	A85 north of Lochearnhead	3,298	827	4,125
3	A85 east of Crianlarich	3,111	390	3,500
4	A85 east of St Fillans	1,691	295	1,986
5	A822 north of Muthill	4,649	112	4,761
6	A822 at Braco	3,097	94	3,191
7	A823 north of Muirton	1,194	56	1,250
8	A84 south of Lochearnhead	3,285	382	3,667
9	A84 at Doune	6,887	386	7,274

Please note minor variances due to rounding may occur.

5.7 Committed Developments

5.7.1 Onshore Wind Farm and Energy Related Planning Applications

A review of the PKC online planning portal[9], SC online planning portal[10] and the Scottish Government's Energy Consents Unit portal[11] was undertaken in the preparation of this assessment to identify any consented developments within the vicinity of the Proposed Development which would generate significant traffic within the same Study Area and should be included within the assessment.

The review has not identified any proposed wind farm or related planning applications that should be considered as a committed development and included within any cumulative assessment.

TA Guidance[12] advises that only those projects with extant planning permission or local development plan allocations within an adopted or approved plan require to be included in any assessment. Those projects in scoping or at the application stage should not be included in cumulative assessments as they have yet to be determined. When considering traffic impacts specifically in relation to the construction phase of a project, the potential traffic impact is highly speculative and as such, cannot be included in the assessment.

[9] https://planningapps.pkc.gov.uk/online-applications/search.do?action=simple&searchType=Application [Accessed September 2024]
[10] https://pabs.stirling.gov.uk/online-applications/ [Accessed September 2024]
[11] https://www.energyconsents.scot/ApplicationSearch.aspx?T=1 [Accessed September 2024]
[12] https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements

Based on the above, there are no current consented onshore wind farms or other energy related planning schemes that would share common access routes during their respective construction phases, which would require consideration as a committed development within the assessment.

5.7.2 Other Planning Applications

A review of the PKC and SC online planning portals was also undertaken for other developments with planning consent, which should be considered within this assessment. The review examined consented developments whose trips are considered significant in scale (i.e., has associated traffic impact of over 30%).

The review did not identify any other significant traffic generating developments in the Study Area that may occur during the construction period associated with the Proposed Development.

It should be noted that the use of NRTF low growth assumptions has provided a basis for general local development growth within the Study Area.

6 Trip Generation and Distribution

6.1 Construction Phase

6.1.1 Trip Derivation

During the 18-month construction period, the following traffic will require access to the Site:

- Staff transport, in either cars or staff minibuses;
- Construction equipment and materials, deliveries of machinery and supplies such as concrete materials and crushed rock;
- Components relating to the BESS element, substation components and associated infrastructure; and
- AILs consisting of the wind turbine sections and heavy lift cranes.

Average monthly traffic flow data was used to establish the construction trips associated with the Proposed Development, based on the assumptions detailed in the following sections. It should be noted that there may be variations in the following calculations due to rounding, which are not considered significant.

6.1.2 Construction Staff

Staff will arrive in non-HGV vehicles and where possible will be encouraged to car share. The workforce on-site will depend on the activities undertaken, but, based on previous wind farm construction site experience for a project of this scale which suggests four staff per wind turbine during the short peak period of construction is likely, the maximum number of staff expected on-site could be around 48 per day.

For the purposes of estimating traffic movements, it was assumed that 40% of staff would be transported by minibus and 60% would arrive by car (single car occupancy was assumed as the worst case at this stage with potentially fewer movements through car sharing).

Based on these assumptions, staff transport cars and light vehicles would account for a maximum of 48 vehicle movements (24 inbound trips and 24 outbound trips) per day during the peak period of construction.

6.1.3 Abnormal Indivisible Load Deliveries

The wind turbines are broken down into components for transport to the Site. The nacelle, blade and tower sections are classified as AILs due to their weight, length, width and height when loaded. For the purposes of the assessment, the 'worst case' numbers of components requiring transport are illustrated in **Table 7**.

Table 7 Turbine Components

Component	Number of Components per Turbine
Rotor Blades	3
Tower Sections	5
Nacelle	1
Hub	1
Drive Train	1
Nose Cone	1
Transformer	1
Ancillary	1
Site Parts	0.25 (parts shared between 4 wind turbines on one delivery)

In addition to the wind turbine deliveries, up to two high-capacity erection cranes would be needed to offload a number of components and erect the turbines. The cranes are likely to be mobile cranes with a capacity up to 1,000 tonnes that are escorted by boom and ballast trucks to allow full mobilisation on Site. Smaller erector cranes would also be present to allow the assembly of the main cranes and to ease the overall erection of the wind turbines.

Escort vehicles would accompany the AIL convoys to support the traffic management measures. Up to three vehicles would be deployed and it is assumed that three AIL turbine component loads would be delivered per convoy. This would result in 45 convoys on the network (excluding cranes), with a total of approximately 268 escort vehicle movements (134 inbound trips and 134 outbound trips).

Wind turbine components that do not classify as AILs, would be delivered in addition to these, resulting in a further approximate 78 movements (39 inbound trips and 39 outbound trips). All of these deliveries are expected to occur over a period of approximately five months.

The escort vehicles have been assumed to be police cars and light goods vehicles. Motorcycles may be deployed, depending upon Police resources.

6.1.4 General Deliveries

Throughout the construction phase, general deliveries will be made to the Site by means of HGV. These would include fuel, site office and staff welfare. At the height of construction, it is assumed that up to 40 journeys to Site are made (20 inbound trips and 20 outbound trips) per month.

6.1.5 Material Deliveries

Various materials will need to be delivered to Site to construct the site-based infrastructure. At the outset of the construction works, HGV deliveries will deliver plant and initial material deliveries to the Site to enable the formation of the Site compound and to deliver construction machinery.

The Site is large enough to warrant on-site batching of concrete. All wind turbine, substation foundation concrete will be mixed on-site, with deliveries of cement powder, water (if not sourced from site), sand and aggregates being delivered by HGV. For the purpose of this assessment, it is assumed that the cement powder and water will be delivered from local concrete suppliers to the south via the M9, A84 and A85.

If required, sand and aggregate not sourced from on-site borrow pits will be delivered by tipper HGV and is expected to come from local quarries. There are a number of potential suppliers including the following:

- Breedon Cambusmore Quarry, Callander, FK17 8LJ – aggregates (incl. sand and gravel);
- Tillicoultry Quarries Northfield, Denny, FK6 6RB – aggregates;
- Tillicoultry Quarries Craigfoot, Tillicoultry, FK13 6AZ – aggregates;
- A&L McCrae Clachan Quarry, Cairndow PA26 8BH; and
- Cemex Loanleven Quarry, Almondbank, Perth, PH1 3NF – aggregates.

The estimated total volume of concrete required onsite is 12,717 m³, based upon expected wind turbine foundation, substation foundation and miscellaneous uses across the Proposed Development. The individual deliveries associated with the raw materials have been estimated and result in inbound trips of 25 cement tankers, 1,158 sand and aggregate tippers, and 147 water tankers. It may be possible to extract some aggregate for use in concrete production from borrow pits within the Site, however 100% of the concrete aggregate has been assumed in the assessment to present a worst-case scenario. A summary of the vehicle movements associated with the production of concrete onsite is detailed in **Table 8**.

Table 8 Concrete Material Deliveries

Element	Volume / Installation (m³)	Inbound Trips	Total Movements
Sand / Aggregates	5,256	579	1,158
Cement	3,058	25	50
Water	4,403	147	294

Steel reinforcement required in the foundations across the Proposed Development for wind turbines, substation etc. are estimated to total 1,568 tonnes, resulting in a total of 106 vehicle movements (53 inbound trips and 53 outbound trips.

The proposed access track widths will vary on Site but will generally be between 7 and 8.6 m in width and would be designed to accommodate 13 tonne axle loads. In addition to the access tracks, crane hardstands will be constructed to enable the wind turbine erection process. While it is anticipated that in the order of 95% of these aggregate requirements will be sourced from the six onsite borrow pits, as a worst-case assessment, it is estimated that 50% of the aggregate material requirements will be imported to the Site. It is assumed that the aggregate material will arrive to Site from quarries to the south as detailed above.

The estimate of imported material is detailed in **Table 9**.

Table 9 Aggregate Material Deliveries

Element	Volume / Installation (m^3)	Total Weight (t)	Lorry Capacity (t)	Inbound Trips	Total Movements
Stone / Aggregates	126,868	279,109	20	13,956	27,912

Note this excludes sand / aggregate materials which are considered separately above within the concrete requirements information.

Geotextile will be delivered to Site in rolls. A total of 309 large rolls may be required at Site and will be delivered by HGV which will result in 32 vehicle movements (16 inbound trips in and 16 outbound trips).

Cables will connect each wind turbine to the substation compound. Trip estimates for the cable materials are provided below in **Table 10** and **11**. Four cables are to be provided within each cable trench and will be backfilled with cable sand.

Table 10 Cable Trip Estimate

Element	Total Cable Length (m)	Length per Drum (m)	Number of Drums	Inbound Trips	Total Movements
Cables	35,480	500	71	8	16

Table 11 Cable Sand Trip Estimate

Element	Volume (m^3)	Total Weight (t)	Lorry Capacity (t)	Inbound Trips	Total Movements
Cable Sand	2,994	4,789	20	240	480

Geotextiles will be used to shield the trench and ducting will be used to protect the cable when it runs under roadways, with a 20 vehicle movements predicted (10 inbound trips and 10 outbound trips).

One SSER substation building will be constructed on the Site. This will require deliveries of building materials and structural elements and will result in 250 vehicle movements (125 inbound trips in and 125 outbound trips). Battery storage deliveries will result in a further 108 HGV vehicle movements for battery, invertor and cabin / building deliveries etc (54 inbound trips in and 54 outbound trips).

The resulting traffic generation estimates have been plotted onto the indicative construction programme to illustrate the peak journeys on the network. **Table 12** illustrates the trip generation throughout the construction programme for each month, showing two-way construction vehicle movements, i.e. an inbound and outbound trip.

Table 12 Construction Traffic Profile (Two-Way Trips)

Activity	Class	Month											
		1	2	3	4	5	6	7	8	9	10	11	12
Site Establishment & Remediation	HGV	40	30										
General Site Deliveries	HGV	40	40	40	40	40	40	40	40	40	40	40	40
Bulk Material Deliveries	HGV	2,791	2,791	2,791	2,791	2,791	2,791	2,791	2,791	2,791	2,791		
Plant Deliveries	HGV	20	20										
Concrete Batching Deliveries	HGV									301	301	301	301
Reinforcement	HGV						35		35		35		
Cable & Ducting Deliveries	HGV											12	12
Cabling Sand	HGV											120	120
Geotextile Deliveries	HGV		16	16									
Substation	HGV											63	63
AIL Cranage	HGV												
Turbine Deliveries	HGV												
AIL Escorts	Car & LGV												
Battery Storage	HGV												
Commissioning	Car & LGV												
Staff	Car & LGV	528	792	792	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056
Total HGV	HGV	2,892	2,898	2,848	2,832	2,832	2,868	2,832	2,868	3,132	3,168	536	536
Total Cars / LGV	Car & LGV	528	792	792	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056
Total Movements		3,420	3,690	3,640	3,888	3,888	3,924	3,888	3,924	4,188	4,224	1,592	1,592
Total HGV per Day		132	132	130	130	130	132	130	132	144	144	26	26
Total Cars / LGV per Day		24	36	36	48	48	48	48	48	48	48	48	48
Total per Day		156	168	166	178	178	180	178	180	192	192	74	74

Please note minor variances due to rounding may occur.
Calculations assume that there are 22 working days per month.
Continues over the page.

Activity	Class	Month					
		13	14	15	16	17	18
Site Establishment & Remediation	HGV					30	40
General Site Deliveries	HGV	40	40	40	40	40	40
Bulk Material Deliveries	HGV						
Plant Deliveries	HGV					20	20
Concrete Batching Deliveries	HGV	301					
Reinforcement	HGV						
Cable & Ducting Deliveries	HGV	12					
Cabling Sand	HGV	120	120				
Geotextile Deliveries	HGV						
Substation	HGV	63	63				
AIL Cranage	HGV	10					10
Turbine Deliveries	HGV		86	86	86	86	
AIL Escorts	Car & LGV		67	67	67	67	
Battery Storage	HGV	36	36	36			
Commissioning	Car & LGV				40	40	40
Staff	Car & LGV	1,056	1,056	1,056	1,056	792	528
Total HGV	HGV	582	344	162	126	176	110
Total Cars / LGV	Car & LGV	1,056	1,124	1,124	1,164	900	568
Total Movements		1,638	1,468	1,286	1,290	1,076	678
Total HGV per Day		28	16	8	6	8	6
Total Cars / LGV per Day		48	52	52	54	42	26
Total per Day		76	68	60	60	50	32

Please note minor variances due to rounding may occur.
Calculations assume that there are 22 working days per month.

The peak of construction activity is expected to occur in month 10 when there will be a total of 192 vehicle movements per day, comprising 144 two-way HGV movements and 48 two-way car / LGV movements.

This would equate to approximately 16 two-way total vehicles movements or 12 two-way HGV movements per hour, across a typical 12-hour day, assuming a flat traffic profile i.e. vehicles distributed evenly across the day.

It should however be noted that the above is based on the assumption that 50% of aggregate materials would be imported to the Site from nearby quarries and should therefore be considered an over estimate of the number of HGV movements that will travel to and from the Site during the peak month of activity. As previously advised, the current estimates are that the onsite borrow pits will be able to provide approximately 95% of the onsite aggregate requirements. Should that be the case there would be a total of 78 vehicle movements per day, comprising 30 two-way HGV movements and 48 two-way car / LGV movements.

This would equate to approximately seven two-way total vehicles movements or three two-way HGV movements per hour, across a typical 12-hour day, assuming a flat traffic profile i.e. vehicles distributed evenly across the day.

6.1.6 Distribution of Construction Trips

The distribution of Proposed Development construction traffic on the network will vary depending on the types of loads being transported. The assumptions for the distribution of construction traffic during the construction phase are as follows:

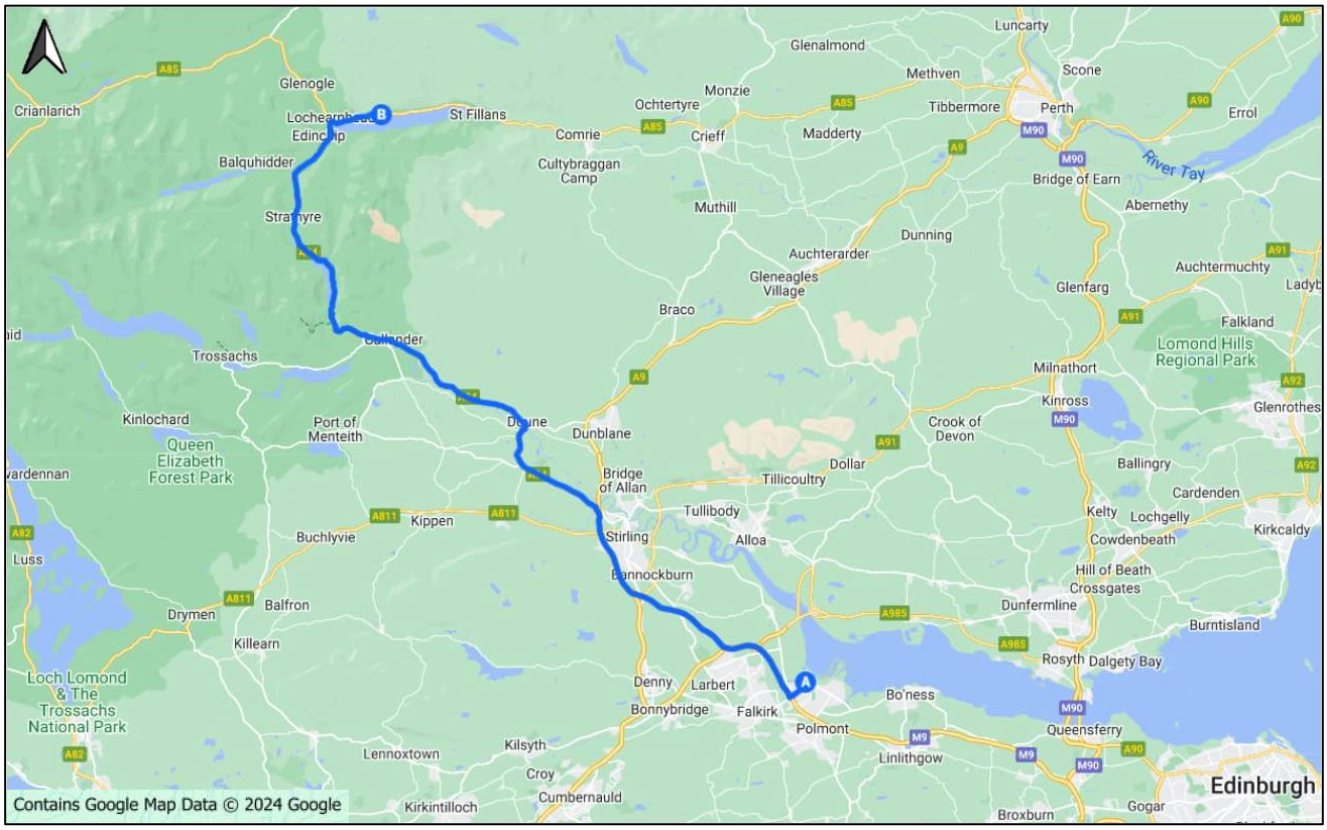
- All construction traffic enters the Site via the A85;
- Deliveries associated with concrete materials, such as cement powder and water, will be sourced from concrete suppliers, which for the purpose of this assessment will originate from the M9 to the south travelling through to the Site via the A84 and A85;
- For the purpose of this assessment, it is proposed that 50% of access track and hardstand aggregate requirements will be sourced from local quarries, which are assumed to originate from the A84 to the south from the Breedon Cambusmore Quarry, Callander, travelling through to the Site via the A84 and A85;
- For the purpose of this assessment, it is proposed that 100% of sand requirements will be sourced from the Clachan Quarry, travelling through to the Site via the A85 from the west;
- HGV deliveries associated with cabling and associated materials, etc. will arrive from the Central Belt to the south, travelling through to the Site via the M9, A84 and A85;
- Staff working at the Site are likely to be based locally. It is assumed that 10 % will come from the Dunblane area, 10 % from the Crieff area and the remaining 80 % from Perth to the east; and
- General site deliveries will be split 50/50 from the east and west on the A85, with those from the west arriving via the A84 and those from the east via the A822 and A85.

For the purposes of preparing EIA Report **Chapter 11** and this TA, it has been assumed that all AIL traffic will access the Site via the following route:

- Loads would exit the Port of Grangemouth onto North Shore Road;
- Loads will proceed to the M9 via the A904, joining the motorway at Junction 6 northbound/westbound;
- Loads will continue on the M9 until Junction 10, where they would depart the motorway and join the A84 westbound;
- Loads would continue on the A84, passing through Doune, Callander and Balquidder;
- At the junction with the A85 in Lochearnhead, loads will turn right onto the A85 eastbound; and
- Loads will pass through Lochearnhead before turning left into a purpose built access junction.

The above route is shown in **Figure 10**.

Figure 10 AIL Component Delivery Route



The above route has been considered, within the AIL RSR, provided in **Annex C**.

6.1.7 Peak Construction Traffic

Following the distribution and assignment of traffic flows to the Study Area network, the resultant daily traffic during the peak of construction (month ten) are summarised in **Table 13**.

Table 13 Peak Construction Traffic

Survey Location	Cars / LGV	HGV	Total
A85 at the Site access	48	144	192
A85 north of Lochearnhead	-	10	10
A85 east of Crianlarich	-	10	10
A85 east of St Fillans	44	2	46
A822 north of Muthill	-	2	2
A822 at Braco	-	2	2
A823 north of Muirton	-	2	2
A84 south of Lochearnhead	6	134	140
A84 at Doune	6	8	14

Please note that variances may occur due to rounding.

6.2 Decommissioning Phase

Prior to decommissioning of the Site, a traffic assessment will be undertaken in line with best practice at that time, and appropriate traffic management procedures followed.

The decommissioning phase would result in fewer trips on the road network than the construction or operational phase as it is considered likely that elements of infrastructure such as access tracks would be left in place and structures may be broken up on Site to allow transport by a reduced number of HGVs.

7 Traffic Impact Assessment

7.1 Construction Impact

The peak month (month ten) traffic data was combined with the future baseline year (2030) traffic data to allow a comparison between the baseline results to be made. The increase in traffic volumes is illustrated in percentage increases for each class of vehicle. This is illustrated in **Table 14**.

Table 14 2030 Baseline + Construction Development – Flows and Impact

Ref No.	Survey Location	Cars & LGV	HGV	Total Traffic	Cars & LGV % Increase	HGV % Increase	Total Traffic % Increase
1	A85 at the Site access	1,183	541	1,723	4.23%	36.30%	12.54%
2	A85 north of Lochearnhead	3,298	837	4,135	0.00%	1.21%	0.24%
3	A85 east of Crianlarich	3,111	400	3,510	0.00%	2.57%	0.29%
4	A85 east of St Fillans	1,735	297	2,032	2.60%	0.68%	2.32%
5	A822 north of Muthill	4,649	114	4,763	0.00%	1.79%	0.04%
6	A822 at Braco	3,097	96	3,193	0.00%	2.12%	0.06%
7	A823 north of Muirton	1,194	58	1,252	0.00%	3.57%	0.16%
8	A84 south of Lochearnhead	3,291	516	3,807	0.18%	35.05%	3.82%
9	A84 at Doune	6,893	394	7,288	0.09%	2.07%	0.19%

Please note minor variances due to rounding may occur.

The total traffic movements are predicted to increase by a maximum of 12.54 % on the A85, where the proposed Site access junction is located and as such all construction traffic will use. On the rest of the Study Area, the highest total traffic increase is 3.82 %, which occurs on the A84 south of Lochearnhead.

Table 14 shows that highest HGV traffic movements increase will occur on the A85, where it is estimated to increase by 36.30%. To put the increase into perspective, the A85 will see an additional 144 HGV movements per day or 12 HGV movements per hour over the course of a typical 12-hour shift. This is not considered significant in terms of overall traffic flows.

The next highest HGV traffic movement increase would occur on the A84 to the south of Lochearnhead, with a 35.05% increase which will see an additional 134 HGV movements per day, or 11 HGV movements per hour over the course of a typical 12-hour shift. This is not considered significant in terms of overall traffic flows.

A review of existing theoretical road capacity has been undertaken using The NESA Manual, formerly part of the Design Manual for Roads and Bridges, Volume 15, Part 5. The theoretical road capacity has been estimated for each of the road links for a 12-hour period that makes up the Study Area. The results are summarised in **Table 15**.

Table 15 2030 Peak Traffic Flow Capacity Review

Ref. No.	Survey Location	2030 Baseline Flow	2030 Base + Development Flows	Theoretical Road Capacity (12hr)	Spare Road Capacity %
1	A85 at the Site access	1,531	1,723	21,600	92.0%
2	A85 north of Lochearnhead	4,125	4,135	21,600	80.9%
3	A85 east of Crianlarich	3,500	3,510	28,800	87.8%
4	A85 east of St Fillans	1,986	2,032	21,600	90.6%
5	A822 north of Muthill	4,761	4,763	21,600	77.9%
6	A822 at Braco	3,191	3,193	21,600	85.2%
7	A823 north of Muirton	1,250	1,252	21,600	94.2%
8	A84 south of Lochearnhead	3,667	3,807	28,800	86.8%
9	A84 at Doune	7,274	7,288	21,600	66.3%

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.

8 Proposed Traffic Mitigation Measures

8.1 Construction Traffic

8.1.1 Construction Traffic Management Plan (CTMP)

During the construction period, a project website, blog or social media feed would be regularly updated to provide the latest information relating to traffic movements associated with vehicles accessing the Site. This will be agreed with PKC.

The following measures will be implemented during the construction phase through the CTMP:

- Agree AIL route modifications and improvements with PKC, TS and other relevant stakeholders. Works which will be required to facilitate turbine deliveries are outlined in the RSR, which is presented in **Annex C**;
- Where possible, the detailed design process will minimise the volume of material to be imported to Site to help reduce HGV numbers;
- A Staff Travel Plan, including transport modes to and from the worksite (including pick up and drop off times);
- A Transport Management Plan for AIL deliveries;
- All materials delivery lorries (dry materials) should be sheeted to reduce dust and stop spillage on public roads;
- Specific training and disciplinary measures should be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway;
- Wheel cleaning facilities may be established at the Site entrance, depending on the views of TS;
- Normal Site working hours will be limited to between 0700 and 1900 Monday to Friday and 0700 and 1400 on Saturdays though component delivery and turbine erection may take place outside these hours i.e. depending on when police escort is available;
- Appropriate traffic management measures will be put in place on the A85 leading through to the Site, to avoid conflict with general traffic, subject to the agreement of TS. Typical measures will include HGV turning and crossing signs and / or banksmen at the Site access and warning signs;
- Provide construction updates on the project website, social media feeds and a newsletter to be distributed to residents within an agreed distance of the Site;
- Adoption of a voluntary reduced speed limits, for example on the A85 and A84 and at other locations to be agreed with TS;
- All drivers will be required to attend an induction to include:
    - A toolbox talk safety briefing;
    - The need for appropriate care and speed control;
    - A briefing on driver speed reduction agreements (to slow Site traffic at sensitive locations through the villages); and
    - Identification of the required access routes and the controls to ensure no departure from these routes.

TS may request that an agreement to cover the cost of abnormal wear and tear on its road network is made. Video footage of the pre-construction phase condition of the abnormal loads access route and the construction vehicles route will be recorded to provide a baseline of the condition of the road prior to any construction work commencing. This baseline will provide evidence of any change in the road condition during the construction phase. Any necessary repairs will be coordinated with TS. Any damage caused by traffic associated with the Proposed Development during the construction period, which would be hazardous to public traffic, would be made safe immediately and repaired as soon as practicable.

Damage to road infrastructure caused directly by construction traffic will be remediated, and street furniture that is removed on a temporary basis will be fully reinstated.

There will be a regular road condition review, and any debris and mud will be removed from the carriageway using an on-site road sweeper to ensure road safety for all road users.

Before the AILs traverse the proposed delivery route, the following tasks will be undertaken to ensure load and road user safety:

- Ensure any vegetation which may foul the loads is trimmed back to allow passage;
- Confirm there are no roadworks or closures that could affect the passage of the loads;
- Check no new or diverted underground services on the proposed route are at risk from the abnormal loads; and
- Confirm the police are satisfied with the proposed movement strategy.

8.2 Abnormal Load Traffic

8.2.1 Abnormal Load Transport Management Plan

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

All AIL deliveries will be undertaken at appropriate times (to be discussed and agreed with the Local Authority, TS and Police Scotland) with the aim to minimise the effect on the local road network. It is likely that the abnormal load convoys will travel in the early morning periods before peak times while general construction traffic will generally avoid the morning and evening peak periods.

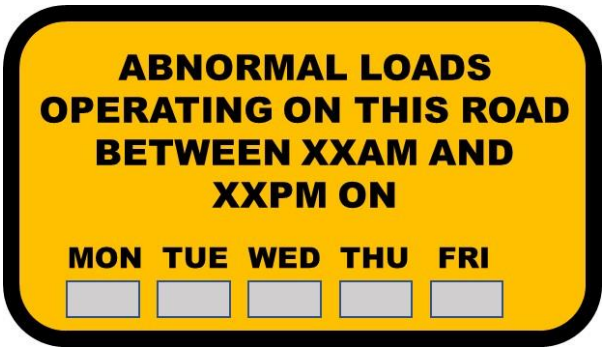
The majority of potential conflicts between construction traffic and other road users will occur with abnormal load traffic. General construction traffic is not likely to come into conflict with other road users as the vehicles are smaller and road users are generally more accustomed to them.

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 sections of single carriageway road or narrow road sections, for example on the A85 and A84;
- At locations where there are significant changes in the horizontal alignment of the carriageway, requiring the loads to use the full carriageway width;
- Where traffic turns at road junctions, requiring other traffic to be restrained on other approach arms;
- At locations where blade components may require to be lowered or raised when blade lifting trailer is being used; and
- In locations where high speeds of general traffic are predicted.

Advance warning signs will be installed on the approaches to the affected road network. Information signage could be installed to help assist drivers and an example is illustrated in **Figure 11**. Flip up panels (shown in grey) would be used to mask over days where convoys would not be operating. When no convoys are moving, the sign would be covered by the Traffic Management contractor.

Figure 11 Example Information Sign



This signage will assist in helping improve driver information and allow other road users to consider alternative routes or times for their journey (where such options exist). The location and numbers of signs would be agreed post consent and would form part of the Traffic Management Proposals for the project.

The Abnormal Load Transport Management Plan will 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 group 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.

8.2.2 Public Information

Information on the wind turbine convoys will be provided to local media outlets such as local papers and local radio to help assist the public.

Information will relate to expected vehicle movements from the POE through to the Site access junction. This will assist residents in understanding the timing of the convoy movements and may help reduce any potential conflicts.

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

8.2.3 Convoy System

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

The AIL convoys will be no more than three AILs vehicles 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 will travel will need to be agreed with Police Scotland who have sole discretion on when loads can be transported.

8.3 Recreation and Outdoor Access Plan (ROAP)

Within the Site, consideration has been given to pedestrians and cyclists alike due to potential interactions between construction traffic and users of the Core Paths. A Path Planning Study will be conducted post consent and will be secured through a planning condition if deemed necessary. Findings from the study will be used to formulate a set of measures into a Recreation and Outdoor Access Plan (ROAP) if required. A Draft ROAP is provided in **TA 12.2 (EIAR Volume 4).**

Users of the Core Paths / paths will be separated from construction traffic through the use of barriers. Crossing points will be provided where required, with path users having right of way and temporary diversions will be provided where necessary. Appropriate Traffic Signs Manual Chapter 8[13] compliant temporary road signage will be provided to assist at these crossings for the benefit of all users.

The principal contractor will ensure that speed limits are always adhered to by their drivers and associated subcontractors. This is particularly important within close proximity to the Core Paths, Rights of Way and at

[13] https://assets.publishing.service.gov.uk/media/5a74adeaed915d7ab83b5ab2/traffic-signs-manual-chapter-08-part-01.pdf

crossing points. Advisory speed limit signage will also be installed on approaches to areas where path users may interact with construction traffic.

Signage will be installed on the Site exits that makes drivers aware of local speed limits and reminding drivers of the potential presence of pedestrians and cyclists in the area. This will also be emphasised in the weekly toolbox talks.

No scoping response has been received from The British Horse Society, however measures implemented on similar schemes will be given consideration as part of the Proposed Development. These measures are predominantly focused around the interactions between HGV traffic and horses. Horses are normally nervous of large vehicles, particularly when they do not often meet them. Horses are flight animals and will run away in panic if really frightened. Riders will do all they can to prevent this but, should it happen, it could cause a serious accident for other road users, as well as for the horse and rider.

The main factors causing fear in horses in this situation are:

- something approaching them, which is unfamiliar and intimidating;
- a large moving object, especially if it is noisy;
- lack of space between the horse and the vehicle;
- the sound of air brakes; and
- anxiety on the part of the rider.

The British Horse Society has previously recommended the following actions that will be included in the Site training for all HGV staff:

- on seeing riders approaching, drivers must slow down and stop, minimising the sound of air brakes, if possible;
- if the horse still shows signs of nervousness while approaching the vehicle, the engine should be shut down (if it is safe to do so);
- the vehicle should not move off until the riders are well clear of the back of the HGV;
- if drivers are wishing to overtake riders, please approach slowly or even stop in order to give riders time to find a gateway or lay by where they can take refuge and create sufficient space between the horse and the vehicle. Because of the position of their eyes, horses are very aware of things coming up behind them; and
- all drivers delivering to the Site must be patient. Riders will be doing their best to reassure their horses while often feeling a high degree of anxiety themselves.

8.4 A Staff Travel Plan

A Staff Travel Plan will be deployed where necessary, to manage the arrival and departure profile of staff and to encourage sustainable modes of transport, especially car-sharing. A package of measures could include:

- Appointment of a Travel Plan Coordinator (TPC);
- Provision of public transport information;
- Mini-bus service for transport of Site staff;
- Promotion of a car sharing scheme;
- Car parking management; and
- Restrictions on parking, for example on the public road network and verges in the vicinity of the Site entrance.

8.5 Operational Phase Mitigation

The A85 and access tracks near the Site entrance will be well maintained and monitored during the operational life of the Proposed Development. Regular maintenance will be undertaken to keep the access track drainage systems fully operational and to ensure there are no run-off issues onto the public road network.

9 Summary and Conclusions

Pell Frischmann has been commissioned by SSE Renewables Wind Farms UK Ltd ('the Applicant') to undertake a Transport Assessment for the proposed Glentarken Wind Farm, which is located within the Drummond Estate in the Perth and Kinross Council administrative area.

The Proposed Development will be accessed from the A85 at Dalveich, located to the west of St Fillans, Perthshire via a new simple priority junction. The access junction will provide access to the Site for all Abnormal Indivisible Loads associated with the turbine deliveries, as well as access for HGVs delivering construction materials and general site traffic.

The majority of construction traffic associated with the Proposed Development will generally approach from the west on the A85, originating via the A84 to the south or A85 to the northwest. All AIL traffic will access from the POE at the Forth Ports Grangemouth Docks, utilising sections of proven AIL routes used during the construction of other wind farms in the area and within the Central Belt.

Existing traffic data from the DfT and TS was supplemented by new ATC surveys, with the data used to establish a base point for determining the impact during the construction phase and was factored to future levels (2030) to help determine the impact of construction traffic on the local road network.

The construction traffic will result in a temporary increase in traffic flows on the road network surrounding the Proposed Development. The maximum traffic increase associated with construction of the Proposed Development is predicted to occur in month ten of the construction programme. During this month, a total of 192 vehicle movements, comprising 144 two-way HGV movements and 48 two-way car / LGV movements are predicted.

It should however be noted that the above is based on the assumption that 50% of aggregate materials would be imported to the Site and should therefore be considered an over estimate of the number of HGV movements that will travel to and from the Site during the peak month of activity. As previously advised, the current estimates are that the onsite borrow pits will be able to provide approximately 95% of the onsite aggregate requirements. Should that be the case there would be a total of 78 vehicle movements per day, comprising 30 two-way HGV movements and 48 two-way car / LGV movements.

In addition, a review of the theoretical road capacity was undertaken for the Study Area which showed that with the addition of construction traffic associated with the Proposed Development, there was significant spare capacity within the road network.

A series of mitigation measures and management plans have been proposed to help mitigate and offset the impacts of the construction phase traffic flows for both general construction traffic and abnormal loads associated with the delivery of the turbine components. It is considered that these can be secured by planning condition.

The Proposed Development will lead to a temporary increase in traffic volumes within the Study Area during the construction phase only, however this can be appropriately and effectively managed. It is therefore concluded that there are no transport related matters which would preclude the construction of the Proposed Development Site.

Annex A: Indicative Access Junction Layout

Annex B: Stage 1 Road Safety Audit

Annex C: Route Survey Report