Pell Frischmann

Tom na Clach Wind Farm Extension

Appendix 7.A: Transport Assessment

February 2022

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Prepared for

Nan Clach Extension Limited

16 West Borough
Wimborne
Dorset
BH21 1NG

Prepared by

Pell Frischmann

93 George Street
Edinburgh
EH2 3ES

INFINERGY Pell Frischmann

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1 Introduction

1.1 Purpose of the Report

Pell Frischmann (PF) has been commissioned by Nan Clach Extension Limited ('the Applicant'), to undertake a Transport Assessment (TA) for the proposed Tom na Clach Wind Farm Extension, approximately 8km north-east of Tomatin. The general site location is presented in Figure 1 below.

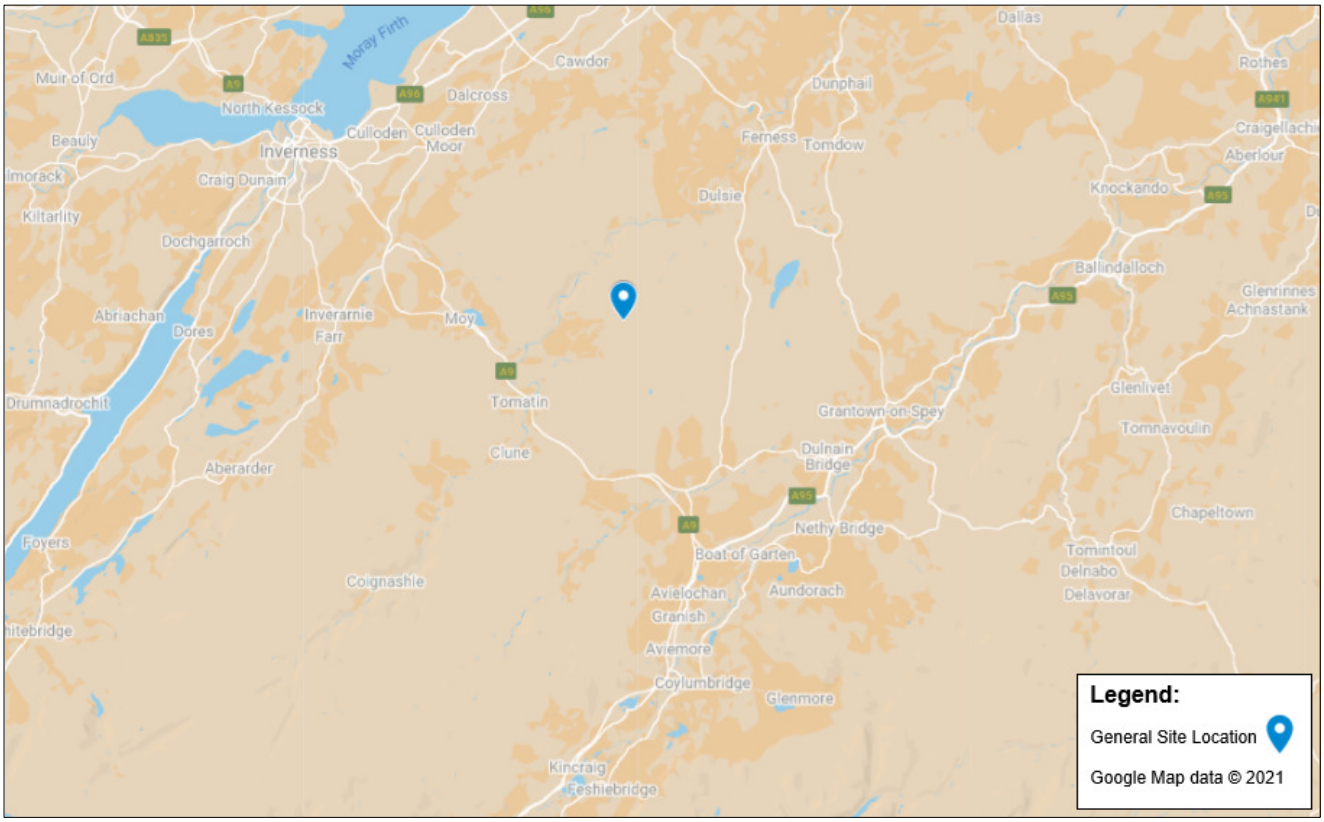

Figure 1 General Site Location

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.

1.2 Report Structure

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

- Chapter Two describes the site background and Proposed Development;
- Chapter Three reviews the relevant transport and planning policies;
- Chapter Four sets out the methodology used within this assessment;
- Chapter Five describes the baseline transport conditions;
- Chapter Six describes the trip generation and distribution of traffic in the study area;
- Chapter Seven summarises the traffic impact assessment;
- Chapter Eight considers mitigation proposals for development related traffic within the study network; and

- Chapter Nine summarises the findings of the TA and outlines the key conclusions.

2 Site Background

2.1 Site Location

The site is located at Cawdor Estate and Lethen Estate to the west of B9007. The footprint of the site is situated to the southeast of the operational Tom nan Clach Wind Farm (referred to hereafter as 'Operational Scheme') which comprises 13 turbines and was fully commissioned in January 2018.

An indicative site layout is presented in Figure 2.

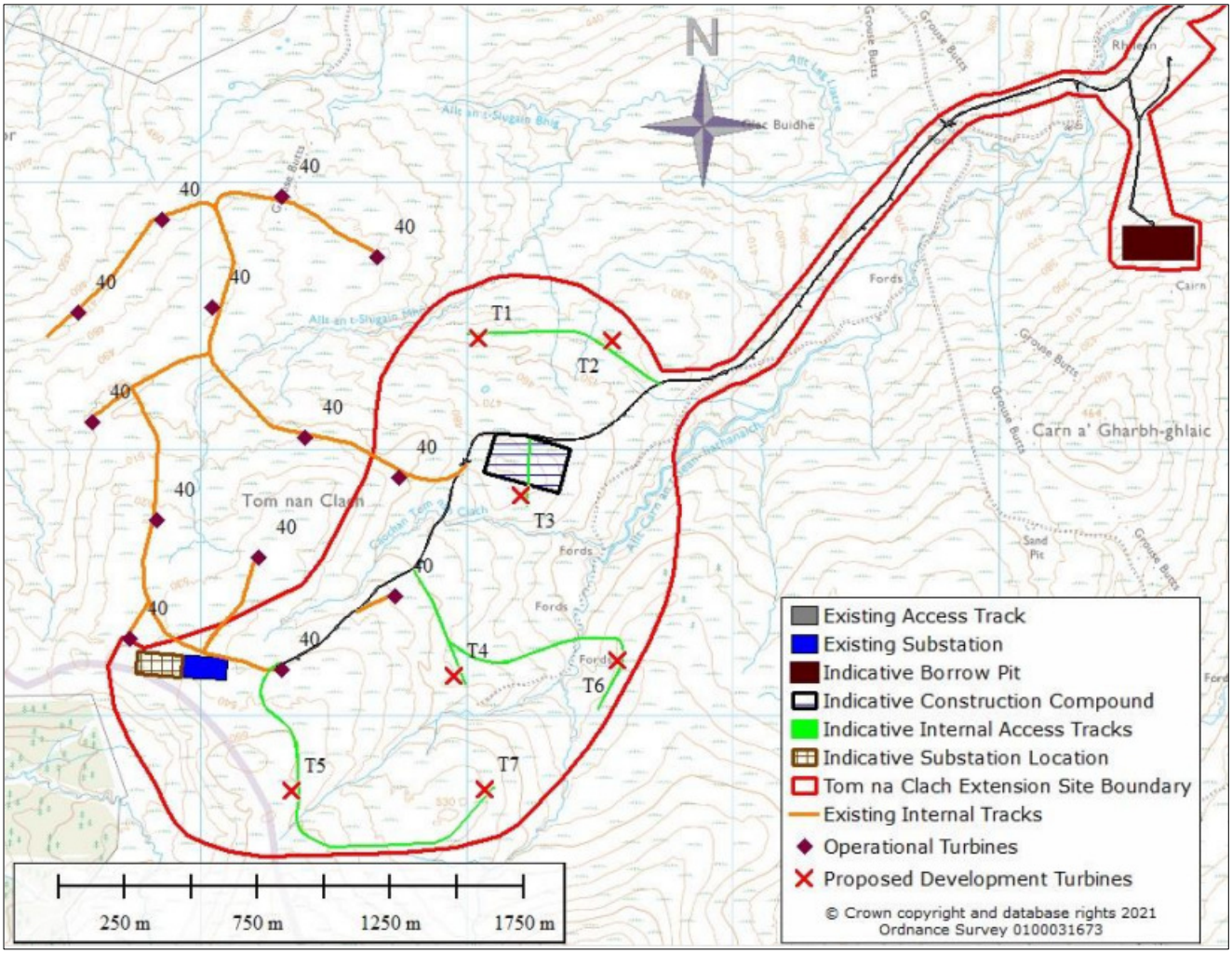

Figure 2 Indicative Site Layout (courtesy of Infinergy)

2.2 Proposed Development

The Scoping Report, which was issued to Scottish Ministers and the Energy Consents Unit on 06 April 2021, noted that the Proposed Development was to comprise *"Up to 8 wind turbines (with a maximum blade tip height of up to 149.9m)".* Following additional studies and consultations it was decided to reduce the number of turbines from eight to seven.

The Proposed Development is therefore to comprise the following:

- Up to seven wind turbines (with a maximum blade tip height of up to 149.9m) with associated infrastructure turbine foundations and hardstandings;
- An onsite network of underground cables linking the turbines to a grid connection;
- A series of onsite access tracks connecting each of the turbine locations to the existing access track;
- An onsite substation and control/maintenance building;
- Temporary works including a construction compound;
- A permanent anemometer mast to measure wind speed and wind direction;
- On-site borrow pit/s; and
- A battery storage array.

This Transport Assessment will consider the traffic impacts associated with the revised scheme comprising up to seven wind turbines.

The Proposed Development will be designed to have an operational life of 40 years.

2.3 Candidate Turbines

The Applicant have indicated that they wish to consider the worst case components from a Vestas V136 at a tip height of 149.9m as their candidate turbine. The details of the components have been provided by Vestas and are detailed in Table 1 below.

Table 1 Turbine Size Summary

Component	Length	Width (m)	Height / Min. Diameter (m)	Weight (t)
Blade	66.500	4.265	2.750	15.701
Nacelle Housing	12.940	3.981	3.387	67.566
Top Tower	29.000	3.350	3.268	41.500
Mid Tower	28.840	3.650	3.350	58.500
Base Tower	21.726	(4.010) 3.650	3.650	73.500

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 the route assessments.

Examples of the vehicles and trailers that are likely to transport loads are shown in Figures 3 and 4.

Figure 3 Super Wing Carrier with Loaded Turbine Blade

Figure 4 Typical Tower Transport Trailer

3 Policy Context

3.1 Introduction

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

3.2 National Policy and Guidance

3.2.1 Scottish Planning Policy (SPP) 2014

The purpose of the SPP is to set out national planning policies which reflect Scottish Ministers' priorities for the operation of the planning system and for the development and use of land.

3.2.2 National Planning Framework 3 (2014)

Scotland's National Planning Framework (NPF3) sets the context for development planning in Scotland and provides a framework for the spatial development of Scotland as a whole. It sets out the Scottish Government's development priorities over the next 20 to 30 years and identifies national developments which support the development strategy. Scotland's third NPF was laid in the Scottish Parliament on 23 June 2014.

The Draft National Planning Framework 4 (Draft NPF4) was laid in Parliament on 10 November 2021 and places a greater emphasis on sustainable development and renewable energy in order to achieve a net zero target by 2045. The Scottish Parliament will consider the Draft NPF4 for up to 120 days.

3.2.3 Onshore Wind Turbines; Online Renewables Planning Advice (May 2014)

The most recent 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. This is important for the movement of abnormal indivisible loads during the construction period, ongoing planned maintenance and for the decommissioning phase.

3.2.4 Transport Assessment Guidance (2012)

Transport Scotland's (TS) Transport Assessment Guidance was published in 2012. It aims to assist in the preparation of Transport Assessments (TA) for development proposals in Scotland such that the likely transport impacts 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 impacts but that the specific scope and contents of a TA will vary for developments, depending on location, scale, and type of development.

3.2.5 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."

3.3 Local Policy

3.3.1 Highland-wide Local Development Plan (2012)

The Highland-wide Local Development Plan (LDP) was adopted by The Highland Council (THC) in April 2012 and is the established planning policy for the Highlands. It sets out a settlement strategy and spatial framework for how the Council foresees development occurring in the forthcoming twenty-year period.

The LDP does not contain any specific policy guidance for the Proposed Development. However, Policy 56 is relevant with regards to general transport policy. The relevant transport elements from this policy are:

"*Development proposals that involve travel generation must include sufficient information with the application to enable the Council to consider any likely on- and off- site transport implications of the development and should:*

- *incorporate appropriate mitigation on site and/or off site, provided through developer contributions where necessary, which might include improvements and enhancements to the walking/cycling network and public transport services, road improvements and new roads; and*
- *incorporate an appropriate level of parking provision, having regard to the travel modes and services which will be available and key travel desire lines and to the maximum parking standards laid out in Scottish Planning Policy or those set by the Council.*

When development proposals are under consideration, the Council's Local Development Strategy will be treated as a material consideration.

The Council will seek the implementation and monitoring of Green Travel Plans in support of significant travel generating developments."

3.3.2 Guidance on the Preparation of Transport Assessments (2014)

THC has prepared guidance on how Transport Assessments (TA) should be prepared for development sites within The Highlands. The guidance was published by THC in November 2014.

This TA has noted the guidelines and has provided the required assessment.

3.3.3 Roads and Transport Guidelines for New Developments (2013)

THC document outlines the guidance and standards for the provision of infrastructure within the council area which includes the design and construction of all new roads associated with development proposals.

THC's Roads and Transport Guidelines for New Developments document provides guidance in relation to transport implications of onshore wind farm developments. The document notes that:

"For wind farm proposals, a developer should be aware that the Council will require a Transportation Assessment (TA) to be submitted that must consider the existing road network, transportation constraints and potentially sensitive routes or communities.

A wind farm vehicular site access must provide appropriate visibility splays and suitable surface water drainage. Within the site, the wind turbines are likely to be located some distance from the nearest public road, requiring internal access tracks to be constructed. As the access tracks need to accommodate abnormal loads, they have to be of a suitable width. These tracks are normally constructed from hard-core material and the developer will usually be encouraged/allowed to use material obtained from borrow pits within the site area, to

reduce construction traffic. On-site concrete batching should also be considered, as this can also result in a reduction of associated vehicles on the local road network.

A suitable turning area must be constructed within the site, to accommodate abnormal load delivery vehicles, construction vehicles and future maintenance vehicles. During the construction period, a wheel-wash system shall be provided."

3.4 Policy Summary

The Proposed Development can align with the stated policy objectives and the design of the site and proposed mitigation measures will ensure compliance with national and local objectives.

4 Study Methodology

4.1 Introduction

There are three phases of the life of the Proposed Development. All three phases 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 all of the three phases, the decommissioning phase involves fewer trips on the network than the construction phase, as minor elements of infrastructure are likely to be left in place, adding to local infrastructure that can potentially be used for further agricultural or leisure uses in the future.

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.

It should be noted however the construction effects are short lived and transitory in nature.

4.3 Scoping Discussions

The Applicant submitted a Scoping Report to THC and Transport Scotland in respect of the Environmental Impact Assessment which included a section considering traffic and transport. A full review of the scoping opinion is provided in the Chapter 7 Traffic & Transport of the EIA.

5 Baseline Conditions

5.1 Access Arrangement

The Proposed Development would be accessed through the Operational Scheme's access junction on B9007. The existing junction will be upgraded to meet the standards of THC in order to accommodate access and egress movements of the Abnormal Indivisible Loads (AIL) delivery vehicles. Visibility splays of 160m in both directions with a set-back distance of 4.5m from the centre of the access junction will be provided. It is proposed that all vehicular traffic would use this access.

Vehicles would then continue to the site through new and existing private access tracks. The new access tracks would be designed to accommodate all predicted loads and traffic for both the construction and operational phases of the Proposed Development.

Abnormal Indivisible Load deliveries would be delivered to the site from the Port of Inverness and subsequently by the A9, A95, A938 and B9007.

5.2 Study Area Determination

Scoping was undertaken with THC and Transport Scotland in order to agree the scope of the TA and develop a suitable study area. The study area includes local roads that are likely to experience increased traffic flows resulting from the Proposed Development. 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 delivery route of the AILs involves travelling from the Port of Inverness and accessing the strategic network via the A9 trunk road network, the A95 trunk road, the A938 and the B9001. It is anticipated that construction related traffic will follow the same route.

The study area for the highway links which are to be assessed as part of this assessment are therefore as follows:

- A9, between Daviot and Granish;
- A95, between Granish and Dulnain Bridge;
- A938, to the east of Duthil; and
- B9007, between Duthil and the site access.

The network is depicted by a blue line in Figure 5.

Figure 5 Study Area

5.3 Pedestrian and Cyclist Networks

A review of THC's Core Path Plan (https://highland.maps.arcgis.com/apps/webappviewer) indicates that there are no Core Paths along the A938 or the B9007 on the route towards the site access. The pedestrian network within the study area is limited which would be typical of a rural setting.

A review of Sustrans cycle network plan of the United Kingdom indicates that there are no National Cycle Routes within the vicinity of the site.

5.4 Road Access

5.4.1 A9

The A9 is a major road which connects Perth to Scrabster and forms part of the trunk road network. The road is operated by BEAR Scotland on behalf of Transport Scotland. Between Inverness and the north of Moy the road comprises a dual-carriageway which then merges into a single carriageway for the remainder of the route within the study area. Within the study area, the road is subject to a 60 mph speed limit in the main, although sections of dual carriageway have a 70 mph limit.

5.4.2 A95

The A95 forms part of the trunk road network and connects Aviemore to Keith. The road is operated by BEAR Scotland on behalf of Transport Scotland. The A95 is mainly subject to the national speed limit, however this reduces when travelling through villages.

5.4.3 A938

The A938 is a single carriageway which is maintained by THC and is approximately 6m in width. There are a number of field accesses along the road as well as a small number of farm / residential accesses outwith Dulnain Bridge and Duthill.

The A938 is mainly subject to the national speed limit, which reduces to 30mph when travelling through Dulnain Bridge and reduces to 40mph through Duthill. In the vicinity of the A938 / B9007 priority junction, the A938 is subject to the national speed limit.

5.4.4 B9007

The B9007 is a single carriageway which is subject to the national speed limit and is maintained by THC. The B9007 is approximately 4m in width. Passing places are present and signed along the length of the route.

The southern section of the B9007, which is included in the study area, was previously used as a delivery route for the Operational Scheme.

5.5 Existing Traffic Conditions

Traffic data used in this assessment has been sourced from historic traffic count data provided by the UK Department for Transport (DfT). The count sites are as follows:

1. A9, to the north of Moy – DfT Count site 20726;
2. A95, to the north of Avielochan – DfT Count site 1056;
3. A95, to the south of Dulnain Bridge – DfT Count site 77101;
4. A938, to the east of Dulnain Bridge – DfT Count site 20867;
5. A938, to the south of Tullochgribban High – DfT Count site 30986; and
6. B9007, to the south of the site access – DfT Count site 811532.

The locations of the traffic survey sites are shown in Figure 6.

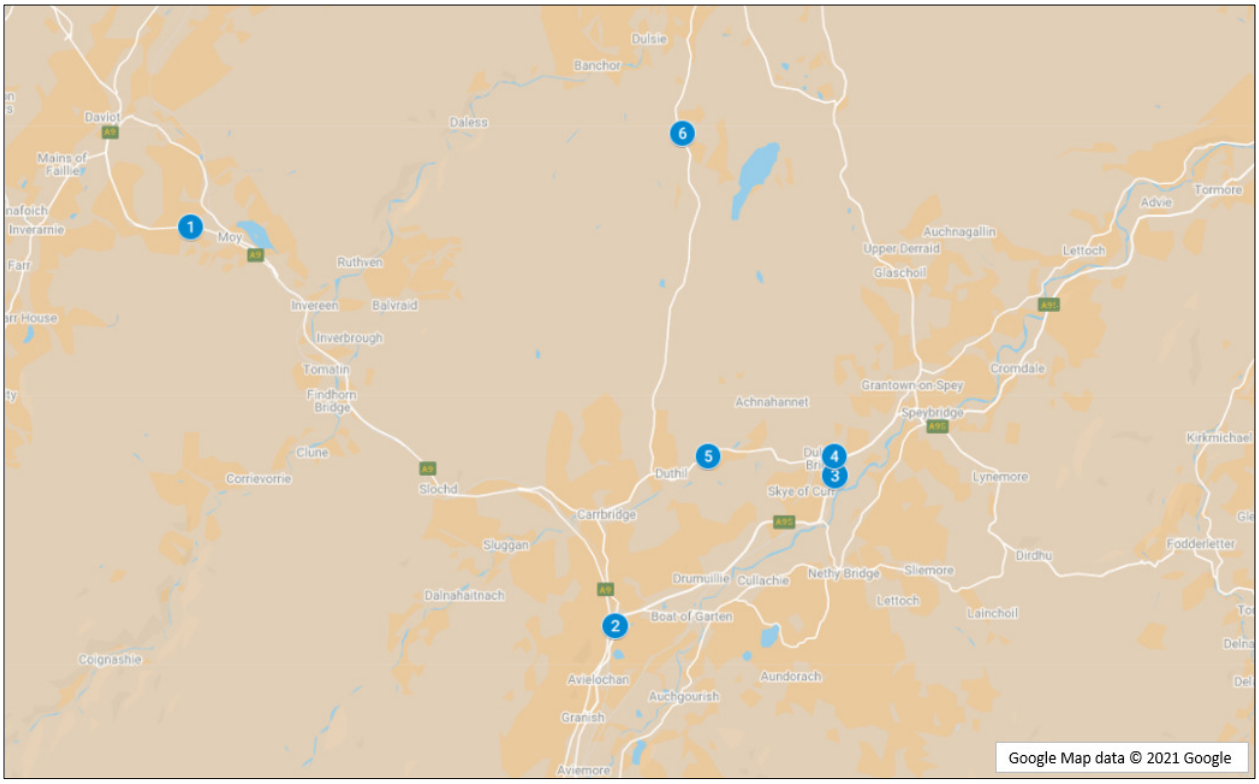

Figure 6 Traffic Count Site Locations

Traffic count data for 2019 was obtained from the count site information. The 2019 traffic data was then factored to 2021 traffic data by applying a National Road Traffic Forecast (NRTF) high growth. The NRTF high growth factor for 2019 to 2021 is 1.030.

The traffic count data allowed the traffic flows to be split into vehicle classes and the data has been summarised into cars / Light goods vehicles (Lights) and heavy goods vehicles (HGVs) (all goods vehicles >3.5 tonnes gross maximum weight and buses).

A summary of the 24-hour average daily traffic for each of the count sites is presented in Table 2.

Table 2 24-hour Average Daily Traffic Data (2021)

Survey Location	Cars & Lights	HGV	Total
A9, to the north of Moy	6,587	735	7,322
A95, to the north of Avielochan	5,691	619	6,310
A95, to the south of Dulnain Bridge	3,797	570	4,366
A938, to the east of Dulnain Bridge	2,093	176	2,269
A938, to the south of Tullochgribban High	1,710	139	1,849
B9007, to the south of the site access	453	21	474

5.6 Accident Review

Road traffic accident data for the 3 year period commencing 01 January 2018 through to the 31st December 2020 was obtained from the online resource crashmap.co.uk which uses data collected by the police about road traffic crashes occurring on British roads where someone is injured.

The locations and severity of the recorded accidents within the study area are shown in Figure 7.

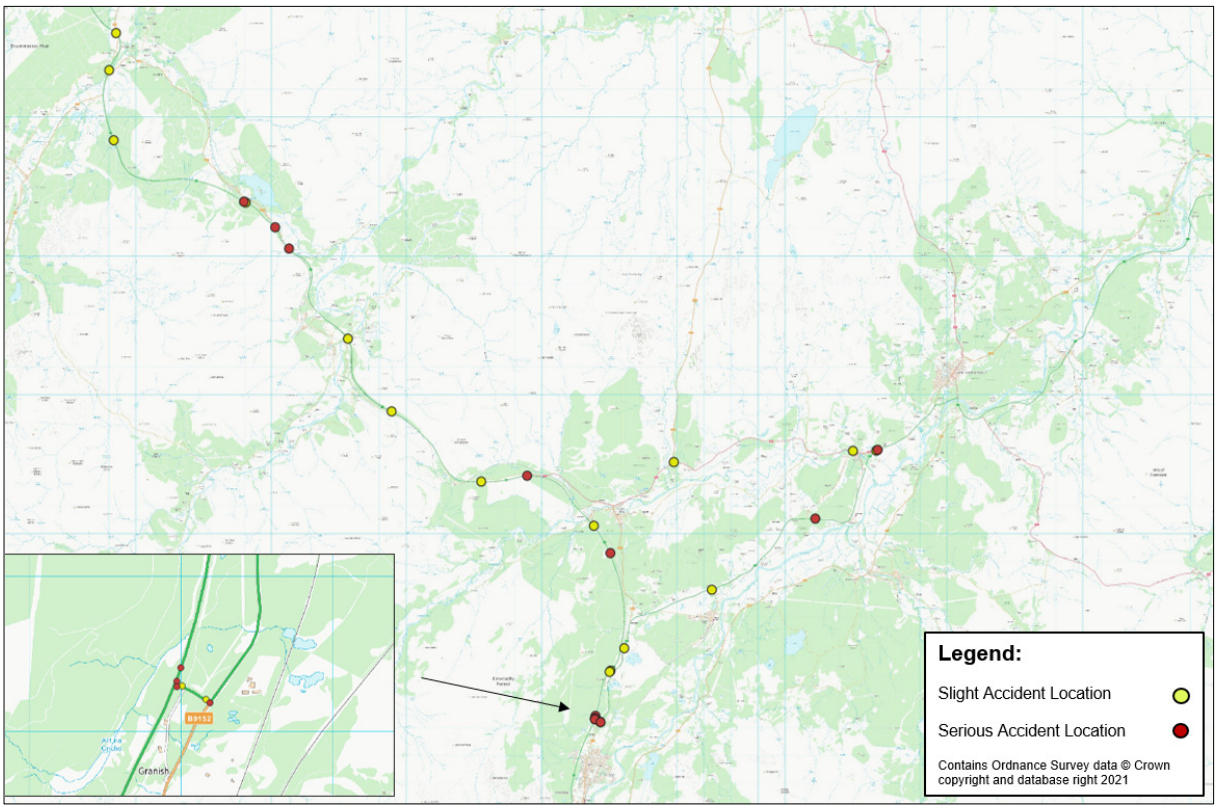

Figure 7 Accident Locations

A summary analysis of the incidents indicates that:

- A total of 28 accidents were recorded within the study area over the reviewed three year period;
- Of those 28 accidents, 17 were recorded as “Slight”, 11 were recorded as “Serious” and none were recorded as “Fatal”;
- A total of 16 accidents were recorded along the A9, ten along the A95, one along the A938 and one at the A938 / B9007 priority junction;
- Three accidents (two serious and one slight) were recorded in the vicinity of the A9 / A95 priority junction and each involved HGVs;
- Two incidents (one serious and one slight) were recorded in the vicinity of the A95 / B9152 priority junction and involved cars;
- Two incidents were recorded in the vicinity of the A938 / A95 priority junction. One of the incidents involved a car and an HGV. There is no vehicle information available within the Crashmap search for the other accident;
- HGVs were involved in a total of 14 accidents which included seven along the A9, six along the A95 and one at the A938 / B9007 priority junction;
- Young drivers were involved in a total of five accidents;
- Four accidents recorded a child casualty;
- None of the recorded incidents involved a motorcycle; and
- None of the recorded incidents involved a pedestrian or cyclist.

5.7 Baseline Traffic Conditions

Construction of the project could commence during 2023 if consent is granted and is anticipated to take up to 14 months depending on weather conditions and ecological considerations.

To assess the likely effects during the construction and typical operational phase, base year traffic flows were determined by applying a National Road Traffic Forecast (NRTF) high growth factor to the surveyed traffic flows.

The NRTF high growth factor for 2021 to 2023 is 1.024. These factors were applied to the 2021 traffic data in Table 2 to estimate the 2023 Base traffic flows shown in Table 3. This will be used in the Construction Peak Traffic Impact Assessment.

Table 3 24-hour Average Daily Traffic Data (2023)

Survey Location	Cars & Lights	HGV	Total
A9, to the north of Moy	6,745	753	7,498
A95, to the north of Avielochan	5,827	634	6,461
A95, to the south of Dulnain Bridge	3,888	583	4,471
A938, to the east of Dulnain Bridge	2,143	180	2,324
A938, to the south of Tullochgribban High	1,751	142	1,893
B9007, to the south of the site access	464	21	485

6 Trip Generation

6.1 Construction Phase

6.1.1 Trip Derivation

During the 14 month construction period, the following traffic will require access to the to the Site:

- Staff transport, in either cars or staff minibuses;
- Construction equipment and materials, deliveries of machinery and supplies such as concrete and crushed rock; and
- Abnormal loads consisting of the wind turbine sections and also two heavy lift cranes.

Average monthly traffic flow data were used to establish the construction trips associated with the site based on the assumptions detailed in the following sections. It should be noted that there may be minor variances in the calculations due to rounding.

6.1.2 Construction Staff

Staff would arrive in non-HGV vehicles and where possible will be encouraged to car share. The workforce onsite will depend on the activities undertaken, but, based on previous wind farm construction site experience for a project of this scale which suggests three staff per turbine during the short peak period of construction is likely, the maximum number of staff expected onsite could be around 21 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 27 vehicle trips (14 inbound and 14 outbound) per day during the peak period of construction.

6.1.3 Abnormal Indivisible Load Deliveries

The turbines are broken down into components for transport to the Site. The nacelle, blade and tower sections are classified as AIL due to their weight, length, width and height when loaded. For the purposes of the report, the 'worst case' numbers of components requiring transport are illustrated in Table 4.

Table 4 Turbine Components

Component	Number of Components per turbine
Rotor Blades	3
Tower Sections	3
Nacelle	1
Hub	1
Drive Train	1
Nose Cone	1
Transformer	1
Ancillary	1
Site Parts	0.2

In addition to the turbine deliveries, two high capacity erection cranes would be needed to offload a number of components and erect the turbines. One crane is likely to have a capacity up to 1,000 tonnes and will be escorted by boom and ballast trucks to allow full mobilisation onsite. A smaller erector crane would also be present to allow the assembly of the main crane and to ease the overall erection of the turbines.

Escort vehicles would accompany the AIL convoys to support the traffic management measures. Up to four vehicles would be deployed and it is assumed that three turbine components would be delivered per convoy. This would result in 22 convoys on the network, with a total of 176 escort journeys (88 trips in and 88 trips out).

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 site via HGV. These would include fuel, site office supplies and staff welfare. At the height of construction, it is assumed that up to 40 journeys to site are made (20 in and 20 out) per month.

6.1.5 Material Deliveries

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

The site is large enough to warrant on-site batching of concrete. All turbine and substation foundation concrete will be mixed on site, with deliveries of cement powder and water being delivered by HGV tankers. Sand and aggregate will be delivered by tipper HGV and is expected to originate at quarries located near the A9 to the south of Inverness.

The total volume of concrete required on site is 5015m3. The individual deliveries associated with the raw materials have been estimated and result in inbound trips of 11 cement tankers, 159 sand & aggregate tippers and 64 water tankers.

Foundation calculations for the turbine bases and the substation are detailed in Table 5 below.

Table 5 Reinforcement Deliveries

Element	Weight / Installation (t)	Total Weight (t)	Lorry Capacity (t)	Inbound Trips	Total Journeys
Turbine Foundation	100	700	30	24	48
Substation Foundation	75	75	30	3	6

The onsite access tracks will be constructed from crushed rock and the material would be won from the site via the borrow pit or when creating the cuttings and other earthworks. Some material will need to be imported to the site to create the infrastructure to access the borrow pit. This material would also be used to help create the crane pads.

The access tracks would generally be 5m in width and would be designed to accommodate 13 tonne axle loads. In addition to the roads, crane pads will be constructed to enable the turbine erection process. The tracks, crane pads and compounds will require geotextile in the foundations.

To provide a robust assessment of potential traffic impact, it has been assumed that 50% of the material for tracks, hardstanding's and compound areas will be imported from the site. This represents an overestimate, with the expectation that the borrow pit will be more than adequate source for material., as occurred for the Operational Scheme when it was constructed. The assessment is therefore an over-estimate and is considered robust.

The estimate of imported material is detailed in Table 6.

Table 6 Track Material Deliveries

Element	Volume / Installation (m^3)	Total Weight (t)	Lorry Capacity (m^3)	Inbound Trips	Total Journeys
Assumed 50% of required stone	12,071	26,557	20	1,328	2,656

Geotextile will be delivered to site in rolls. A total of 78 large rolls may be required at site and would be delivered by HGV which would require a total of eight journeys (four trips in and four trips out).

Cables will connect each turbine to the internal substation and control building. Trip estimates for the cable materials are provided below in Tables 7 and 8.

Two cables are to be provided within each cable trench and would be backfilled with cable sand. The cable materials would be likely sourced from the central belt and would access the site via the A9 and subsequently by A95, A938 and B9007.

Table 7 Cable Trip Estimate

Element	Total Cable Length (m)	Length per Drum (m)	Number of Drums	Inbound Trips	Total Journeys
Cables	8100	500	16	2	4

Table 8 Cable Sand Trip Estimate

Element	Volume / Installation (m^3)	Total Weight (t)	Lorry Capacity (m^3)	Inbound Trips	Total Journeys
Cable Sand	1,367	2,187	20	110	220

A substation will be constructed on the site. This will require deliveries of building materials and structural elements and would result in 48 journeys.

A total of 20 journeys (10 trips in and 10 trips out) will be associated with battery deliveries.

The resulting traffic generation estimates have been plotted onto the indicative construction programme to illustrate the peak journeys on the network. Table 9 illustrates the trip generation throughout the construction programme.

Table 9 Construction Traffic Profile

Activity	Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Site Establishment & Remediation	120	150											150	120
Site Plant Deliveries	10	20											20	10
General Site Deliveries	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Imported Bulk Materials		443	443	443	443	443	443							
Batching Materials					58	58	58	58	58	58	58	58		
Reinforcement						18	18	18						
Cable & Ducting Deliveries							85							
Cabling Sand							73	73	73					
Geotextile Deliveries		2	2				2	2						
Substation Building and Batteries							12	12	12	12	20			
Cranage								10			10			
AIL Deliveries									85	85				
AIL Escorts									88	88				
Commissioning													44	44
Staff	180	360	601	601	601	601	601	601	601	601	601	601	360	300
Total HGV	*170*	*655*	*485*	*483*	*541*	*559*	*731*	*214*	*269*	*196*	*128*	*98*	*210*	*170*
Total Cars / LGV	*180*	*360*	*601*	*601*	*601*	*601*	*601*	*601*	*689*	*689*	*601*	*601*	*404*	*344*
Total Movements	**350**	**1015**	**1085**	**1083**	**1142**	**1160**	**1332**	**814**	**958**	**884**	**729**	**699**	**614**	**514**
Total HGV per Day	8	30	22	22	25	25	33	10	12	9	6	4	10	8
Total Cars / LGV per Day	8	16	27	27	27	27	27	27	31	31	27	27	18	16
Total per Day	**16**	**46**	**49**	**49**	**52**	**53**	**61**	**37**	**44**	**40**	**33**	**32**	**28**	**23**

Please note minor variances due to rounding may occur.

The peak of construction occurs in Month 7 with 61 journeys (27 Car / Lights and 33 HGV journeys).

6.1.6 Distribution of Construction Trips

The distribution of development traffic on the network would vary depending on the types of loads being transported. The assumptions for the distribution of construction traffic during the peak months would be as follows:

- All construction traffic enters the site via the site access on B9007.
- Deliveries associated with the batching of concrete will arrive via the A9.
- Sand and aggregate for use in the on-site batching plant will be sourced from local quarries. For the purposes of the assessment, it is assumed that all material will be taken from the quarries located along the A9, near Scatraig. The Balance of Plant (BoP) contractor will confirm final quarry and material sourcing with THC in the Construction Traffic Management Plan (CTMP).
- HGV deliveries associated with the HV electrical installation, control buildings, batteries, etc will arrive from the north via the A9;
- Staff working at the site are likely to be based locally. For the purpose of this assessment, it has been assumed that 60% of staff will come from Inverness, 20% from the south of Aviemore and 20% will come from the east of Dulnain Bridge; and
- General site deliveries will be via the A9 and A95. These are generally smaller rigid HGV vehicles.

Loads relating to the turbine components would be delivered from the Port of Inverness via the route shown in Figure 8. The port is the closest suitable port to site and as such is in line with the Government's "Water Preferred" policy towards AIL movements.

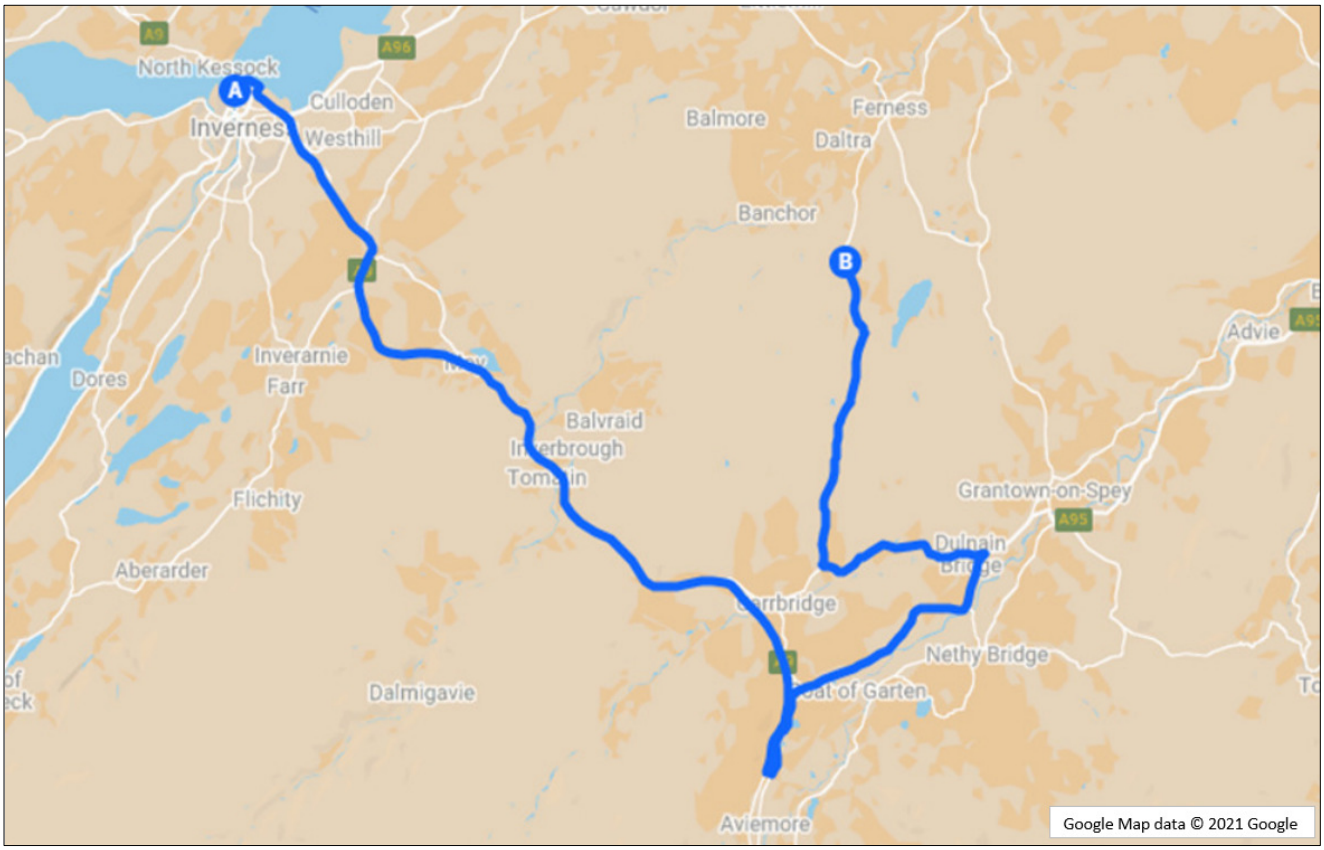

Figure 8 AIL Delivery Route

The Port of Inverness has been used extensively for wind turbine component deliveries for a large number of wind farms including the Operational Scheme and has sufficient quay availability as well as being suitably located for the trunk road network.

The proposed route for abnormal load equipment is as follows:

- Loads would exit the Port of Inverness and turn left onto Stadium Road;

- At Longman Roundabout loads would turn left and continue south on the A9;
- North of Granish loads would turn left onto the A95 and then left again to stay on the A95 northbound;
- At Dulnain Bridge loads would turn left onto the A938 westbound; and
- At Duthill loads would turn right onto the B9007 northbound and proceed to the proposed site access.

The potential access route to the site have been reviewed as part of the EIA Technical Appendix 7.2 AIL Route Survey Report.

The peak traffic flows have been developed and are illustrated in Table 10.

Table 10 Peak Construction Traffic

Survey Location	Cars & Lights	HGV	Total
A9, to the north of Moy	16	33	50
A95, to the north of Avielochan	22	33	55
A95, to the south of Dulnain Bridge	22	33	55
A938, to the east of Dulnain Bridge	27	33	61
A938, to the south of Tullochgribban High	27	33	61
B9007, to the south of the site access	27	33	61

Please note minor variances due to rounding may occur.

6.2 Committed Developments

Cairn Duhie Wind Farm (13/04142/S36) was granted section 36 consent and deemed planning permission in 2017 for 20 wind turbines with a blade tip height of up to 110m. There site is currently seeking planning permission for a re-design of the consented scheme (21/01521/S36) to comprise a total of 16 turbines with a blade tip height of up to 149.9m.

Lethen Wind Farm (21/00666/SCOP) and Ourack Wind Farm (20/00082/SCOP) are currently either in the scoping phase or consideration stage of their respective planning applications.

The applications outlined above have not been included as Committed Development in the traffic assessments as the revised Cairn Duhie design, Lethen and Ourack are not consented.

It should be noted that the proposed construction route associated with the consented Cairn Duhie Wind Farm will access the wind farm site from the north via the A96 and A939, and as such will not impact the study area for the Proposed Development. AIL access would be from the south using the same route as proposed for the Proposed Development, however no cumulative assessment is required as AIL movements can only occur for one scheme at a time due to police resourcing constraints.

Should any of the current scoping schemes, under planning consideration at present be consented, any crossover of traffic with the proposed development flows would be addressed via a traffic management plan. The inclusion of further traffic flows in the base line (i.e. including non-consented traffic) would dilute the potential impact that the proposed development would have. As such, the approach taken is considered to be an overly robust assessment.

The use of high NRTF growth factors for background traffic is considered robust for addressing smaller, non-significant traffic generation caused by smaller developments within the study area. As such, a robust assessment case has been provided in this report.

6.3 Decommissioning Phase

Prior to decommissioning of the site, a traffic assessment would be undertaken and appropriate traffic management procedures followed.

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

7 Traffic Impact Assessment

7.1 Construction Impact

The peak month traffic data was combined with the future year (2023) traffic data to allow a comparison between the baseline results to be made. The increase in traffic volumes is shown as percentage increases for each class of vehicle in Table 11.

Table 11 2023 Peak (Month 7) Daily Traffic Data

Survey Location	Cars & Lights	HGV	Total	Cars & Lights % Increase	HGV % Increase	Total % Increase
A9, to the north of Moy	6761	786	7548	0.2%	4.4%	0.7%
A95, to the north of Avielochan	5849	667	6516	0.4%	5.2%	0.9%
A95, to the south of Dulnain Bridge	3910	617	4526	0.6%	5.7%	1.2%
A938, to the east of Dulnain Bridge	2170	214	2384	1.3%	18.4%	2.6%
A938, to the south of Tullochgribban High	1778	176	1954	1.6%	23.3%	3.2%
B9007, to the south of the site access	491	54	546	5.9%	157.6%	12.5%

Please note minor variances due to rounding may occur.

The total traffic movements are not predicted to increase by more than 30% on all of the study network. However, it is predicted that the HGV movements along the B9007 will increase by 157.6%.

While the increase in total HGV movements is statistically significant, it is generally caused by the low HGV traffic along the B9007. The peak construction period will see an additional 33 HGV journeys (17 inbound and 17 outbound). This represents less than two inbound trips every hour during normal construction activities, which is not considered significant in terms of total flows.

It should also be noted the construction phase is transitory in nature and the peak of construction activities is short-lived.

A review of existing road capacity has been undertaken using the Design Manual for Roads and Bridges, Volume 15, Part 5 “The NESA Manual”. 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 12.

Table 12 2023 Daily Traffic Data (12 hr)

Survey Location	2023 Baseline Flow	Theoretical Road Capacity	2023 Base + Development Flows	2023 Base + Development Used Capacity %	Spare Road Capacity %
A9, to the north of Moy	7498	28800	7548	26.21%	73.79%
A95, to the north of Avielochan	6461	28800	6516	22.63%	77.37%
A95, to the south of Dulnain Bridge	4471	28800	4526	15.72%	84.28%
A938, to the east of Dulnain Bridge	2324	21600	2384	11.04%	88.96%
A938, to the south of Tullochgribban High	1893	21600	1954	9.05%	90.95%
B9007, to the south of the site access	485	3360	546	16.24%	83.76%

Please note minor variances due to rounding may occur.

The results indicate there are no road capacity issues with the Proposed Development and ample spare capacity exists within the trunk and local road network to accommodate construction phase traffic.

8 Framework Traffic Management Measures

8.1 Construction Phase

During the construction period, a project website, blog or Twitter feed would be regularly updated to provide the latest information relating to traffic movements associated with vehicles accessing the site. This would be agreed with THC.

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

- Agree AIL route modifications and improvements with THC and other relevant stakeholders. Works will include the temporary removal of obstacles such as bollards and road signs, trimming of vegetation, introduction of temporary traffic management measures, provision of load bearing surface / tar wedges along sections of the route, creation of a new track and junctions on the A9 and A938 to facilitate turning in advance of the A95 / A938 junction and upgrading of the existing site access to the Operational Scheme;
- Where possible the detailed design process would minimise the volume of material to be imported to site to help reduce HGV numbers;
- A site worker transport and travel arrangement plan, including transport modes to and from the worksite (including pick up and drop off times);
- A Traffic Management Plan;
- 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 the views of THC;
- Normal site working hours would be limited to between 0700 and 1900 (Monday to Friday and 0700 and 1300 (Saturday) though component delivery and turbine erection may take place outside these hours;
- Appropriate traffic management measures would be put in place on the B9007 to avoid conflict with general traffic, subject to the agreement of the roads authority. Typical measures would include HGV turning and crossing signs and/ or banksmen at the site access and warning signs;
- Provide construction updates on the project website and or a newsletter to be distributed to residents within an agreed distance of the site.
- Adoption of a voluntary speed limit of 15 mph for all construction vehicles through Dulnain Bridge;
- All drivers would be required to attend an induction to include:
    - A tool box 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.

THC may request an agreement to cover the cost of abnormal wear on its network is made.

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 condition of the road prior to any construction work commencing. This baseline would inform any change in the road condition during the construction phase. Any necessary repairs would be coordinated with THC's roads team. Any damage caused by traffic associated with the Proposed Development during the construction period that would be hazardous to public traffic would be repaired immediately.

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 review and any debris and mud would be removed from the carriageway using an onsite road sweeper to ensure road safety for all road users.

Before the AILs traverse the route, the following tasks would 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 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 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.

Advance warning signs would 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 9. 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 bagged over by the Traffic Management contractor.

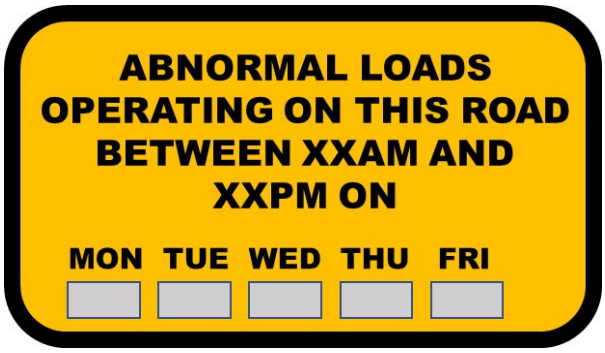

Figure 9 Example Information Sign

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 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 including Grantown on Spey Highland Games and Abernethy Highland Games;
- 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.

8.2 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 through to the site access junction. This will 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.

An SMS texting service may also be developed to help keep residents aware of movements.

8.3 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 abnormal loads convoys would be no more than three AILs 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 will need to be agreed with Police Scotland who have sole discretion on when loads can be moved.

8.4 Operational Phase Mitigation

Site entrance roads will be well maintained and monitored during the operational life of the development. Regular maintenance will be undertaken to keep the site access track drainage systems fully operation and to ensure there are no run-off issues onto the public road network.

9 Summary & Conclusions

Pell Frischmann (PF) has been commissioned by the Applicant to undertake a Transport Assessment (TA) for the proposed Tom na Clach Wind Farm Extension, approximately 8km north-east of Tomatin.

Existing traffic data established a base point for determining the impact during the construction phase and was factored to future levels to help determine the effect of construction traffic on the local road network.

The construction traffic would result in a temporary increase in traffic flows on the road network surrounding the Proposed Development. The maximum traffic effect associated with construction of the Proposed Development is predicted to occur in Month 7 of the construction programme. During this month, an average of 33 HGV movements is predicted per day and it is estimated that there would be a further 27 car and light van movements per day to transport construction workers to and from the Site.

A series of mitigation measures and management plans have been proposed to help mitigate and offset the impacts of both the construction and operational phase traffic flows.

No link capacity issues are expected on any of the roads assessed due to the additional movements associated with the Proposed Development. The effects of construction traffic are temporary in nature and are transitory.