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INTRODUCTION

13.1 This Chapter considers the potential effects of the proposed development on Highways, Traffic and Transport. It sets out the assessment methodology adopted, existing conditions in the study area, proposed best practice methods and predicted effects prior to, and following, the application of mitigation measures to reduce potentially adverse effects on the road infrastructure, road users and local communities.

13.2 Potentially significant traffic related environmental effects may result from two key forms of potential impact:

- the transport configurations made for the movement of wind turbine components (blade, tower sections and motor), transported as abnormal loads. Abnormal loads are those which exceed the length, weight or height criteria defined in "Abnormal Load Movements – A brief guide to Notification and Authorisation requirements", Transport Scotland, June 2007, (Ref. 13.1); and
- the import of general construction materials, transported via "conventional" heavy goods vehicles (HGVs) and low loaders.

13.3 Both forms of potential impact are considered in this Chapter.

13.4 Abnormal Load components would be imported to the Site via the A96 from the port of Aberdeen northbound towards the A920 Site access road. Construction materials would be transported to Site in standard HGVs and would be sourced as locally as possible, arriving at the Site from the east, via the A920/ A96.

13.5 Construction workers commuting during the construction and commissioning periods of the proposed development would also generate light vehicle traffic. Light vehicles travelling to the Site would travel predominantly from the east, arriving from a variety of destinations.

13.6 The proposed development would generate occasional maintenance trips during the operational phase, which would not lead to any variation in the baseline traffic flows beyond that of every day fluctuation. The decommissioning phase would lead to an increase in trip generation, though at a lower level than is anticipated during the construction phase and without the requirement for abnormal loads.

LEGISLATION, PLANNING POLICY AND GUIDANCE

13.7 This assessment has been prepared according to the guidance document 'Transport Assessment and Implementation: A Guide' published by the Development Department of the Scottish Executive in 2005 (Ref. 13.2). This Chapter also takes account of the Institute of Environmental Management and Assessment (IEMA) Guidelines for the Environmental Assessment of Road Traffic (IEMA, 1993) and other departmental design standards.

13.8 The assessment presented within this chapter follows principle of assessment as set out in Transport Scotland –Transport Assessment Guidance (2012) (Ref. 13.3).

SCOPE AND CONSULTATION

Consultation

13.9 In April 2017, a request to the Scottish Ministers for a Scoping Opinion was submitted for the proposed development. The request was accompanied by a Scoping Report. A revised scoping report was submitted in October 2018 (with responses received in March 2019) setting out the revisions to scoping as a result of the revised tip height; the key issues identified by the consultees in relation to highways, traffic and transport are summarised in Table 13-1.

Table 13-1
Key Issues Raised During Scoping

Consultee	Summary of Key Issues (2017)	Further Comments Received March 2019	Addressed in Section
Transport Scotland	Confirmed general agreement with proposed approach. Stressed the need to assess the environmental impacts on the trunk road. Advised that the method to assess the impacts should comprise: • Determination of baseline traffic, sensitivity of the Site and existing receptors; • Review of development proposals; and • Assessment of significance of predicted impacts.	The increase in blade size results in the need for the swept path assessment to be undertaken again. The scope for will be as per the previously agreed scope. Other than a revised swept path, there is no proposed change to the traffic and transportation methodology.	Assessment of Effects Baseline Conditions The Proposed Development Assessment of Effects
Roads – Kincardine & Mearns/Marr	Confirmed no concern relating to EIA. A traffic management plan will be required.		Construction Traffic Management Plan (see Technical Appendix 13-4) and the CEMP (Technical Appendix3.1).
Sustrans	Confirmed that "*the proposed development does affect any Sustrans routes*".		n/a

13.10 Where relevant, the issues raised by each consultee have been used to develop the scope of assessment and to identify any specific matters that warrant more detailed analysis.

Effects Scoped Out

Operational Effects

13.11 It is estimated that the proposed development, once operational, would generate no more than five trips in any one day and zero trips on most days. Typical duties onsite would include routine maintenance, such as safety checks, and repairing faults. These visits would normally require light vans or similar vehicles and would use the same routes as those used during the construction phase.

13.12 Given the low staffing levels estimated there would be no material effect during the operation of the proposed development. The trips generated by the operational activities onsite would be no

greater than those expected and accounted for in background variations to the existing traffic flows on the adjacent roads. As such, negligible traffic flows would be indistinguishable from normal daily traffic flows on the primary road network. Therefore, detailed assessment of operational impacts has been scoped out of this assessment.

Decommissioning Effects

13.13 The proposed development has been designed with an operational life up to 30 years. At the end of this period or before time if necessary, the turbines would be decommissioned. It is currently anticipated that the decommissioning of the proposed scheme would lead to the following elements which would lead to future traffic movements:

- dismantling and removal of turbine components;
- removal of all turbine bases and cabling therein to a depth of one metre below ground level, with deeper infrastructure remaining in situ;
- removal of all hardstanding areas adjacent to turbines; and
- demolition and removal of the substation building, including external areas.

13.14 Trip generation associated with these activities would not exceed the average level of trip generation assessed for the construction phase, and is likely to be considerably lower. Therefore, detailed assessment of decommissioning impacts has been dealt with respectively.

APPROACH AND METHODS

13.15 The approach for the assessment of Highways, Traffic and Transport effects has been to define the level of traffic anticipated to access the proposed development during its construction phase, calculated from first principles and distributed over an anticipated construction programme.

13.16 The effects of the construction phase traffic have then been assessed against the measured baseline in terms of existing traffic levels, and then compared using standard practice criteria (detailed below).

13.17 The assessment is detailed against two worst case assumptions:

- all construction materials are assumed to be sourced from offsite locations, including a proportion of aggregates required for track construction, thus ensuring that the estimated level of trip generation has been considered as a worst case; and
- future traffic increases associated with the proposed development are measured against existing traffic flows, with no allowance for any growth in baseline traffic, thus ensuring that the highest level of impact has been assessed.

Study Area

13.18 The Highways, Traffic and Transport study area has been defined as the public road network in the vicinity of the proposed development which would be used by traffic accessing the Site.

13.19 The proposed development is located within Aberdeenshire Council (AC) administrative boundary

and is owned by Forestry and Land Scotland (FLS). The Site is approximately 6km south west of the settlement of Huntly and 55km north west of Aberdeen. Other nearby settlements include Rhynie, Haugh of Glass and Cabrach. The road network in the local vicinity of the Site is shown in Figure 13.1.

13.20 The area of the Site extends to 1,234ha, with Clashindarroch Forest forming part of the development area (owned and operated by FLS). Access to the Site would be from the A920 and would utilise as far as possible the existing onsite access tracks to the southern part of the Site where the proposed turbines would be located.

13.21 The layout of the proposed development in the context of the local road network is shown on Figure 13.1. The road network within the vicinity of the proposed development is defined by the nearby A96 which runs in a north to south orientated direction connecting Inverness in the north to Aberdeen in the south. The local roads away from the A96 are generally rural in nature and pass through small villages with some junction layouts being restrictive for abnormal loads (i.e. transportation of turbine components), and HGV movements.

13.22 The routes for construction access to the Site are considered below:

- for abnormal loads, deliveries would leave the Port of Aberdeen along Commerce Street and would travel north along the A96 towards Huntly, taking the A920 to the Site access;
- return trip abnormal load departures (with the transport configurations un-extended) would follow the same route back to Aberdeen but in reverse, taking the A920 east and then south on the A96 towards Aberdeen; and
- for conventional construction traffic, traffic would be routed to/from the Site access, eastbound along the A920, towards the A96.

13.23 Effects associated with traffic generated by the proposed development would be most pronounced near the access to the proposed development. As vehicles travel away from the proposed development, they would distribute across the wider road network. Beyond the study area, professional judgement suggests that effects relating to Highways, Traffic and Transport are unlikely to be significant.

13.24 The study area comprises the following:

- A920, east of the Site access;
- A96, from the A920/ A96 junction to 3km north; and
- A96, from the A920/ A96 junction to 3.5km south.

Information and Data Sources

13.25 The following data were obtained in order to determine the baseline conditions against which the effects of the proposed development could be assessed:

- two automatic traffics counts (ATCs) were undertaken by Nationwide Data Collection during a seven day period in June 2017. The ATCs were located on the A920 to the east of the proposed Site access location approx. 300m west of the A96/A920 junction and on the A96 approx. 300m north of the B9022/ A96 junction; and

- road traffic collision data for the five year period 2010 to 2015 collected from GIS sources from the Department of Transport (DoT). The locations of the recorded injury accidents are shown on Figure 13.2.

Field Survey

13.26 An understanding of the existing situation and baseline conditions within the study area was established through a visual inspection of the road network and a visual inspection of the abnormal load route, to establish the road conditions and to determine the most suitable route for abnormal loads. The visual inspection was undertaken between 30 May and 1 June 2017, with an additional Site visit undertaken in July 2019.

Assessment Methods

13.27 The likely significance of the potential effects from the proposed development that relate to Highways, Traffic and Transport have been determined by considering the magnitude of change in traffic movements and the sensitivity of any receptors which would be affected by these changes. This has been undertaken in accordance with the IEMA Guidance (1993) and standard good practice, based on the experience of the assessor.

13.28 The IEMA Guidance suggests that a day-to-day traffic flow variation of + or – 10% is to be expected in the baseline situation, and that projected traffic flow increases of less than 10% would be imperceptible to the general public and would create no discernible environmental impact. Therefore, increases in traffic levels of below 10% are considered insignificant.

13.29 Based on the IEMA Guidance, the following factors have been identified as being the most discernible potential environmental effects likely to arise from changes in traffic movements. These are therefore considered in the assessment as the potential effects which may arise from changes in traffic flows resulting from the proposed development:

- noise and vibration – the potential effect caused by additional traffic on sensitive receptors, which in this case would relate to residential properties near to the road (see also Chapter 14: Noise);
- driver severance and delay – the potential delays to existing drivers and their potential severance (i.e. separation from other areas, facilities and services within the local area);
- community severance and delay – the potential severance to communities and the delays to movements between communities;
- vulnerable road users and road safety – the potential effect on vulnerable users of the road (e.g. pedestrians / cyclists);
- hazardous and dangerous loads – the potential effect on road users and local residents caused by the movement of abnormal loads; and
- dust and dirt – the potential effect of dust, dirt and other detritus being brought onto the road.

13.30 The significance of the likely effect has been determined by consideration of the sensitivity of receptors to change, taking account of the specific issues relating to the study area, and then the magnitude of that change.

Sensitivity of Receptors

13.31 The potential sensitivity of receptors to changes in traffic levels has been determined by considering the study area and the presence of receptors in relation to each potential impact.

13.32 The IEMA guidelines provide two thresholds when considering predicted increases in traffic, whereby a full assessment of the impact is required:

- where the total traffic would increase by 30% or more (10% in sensitive areas); and/or
- where the HGV traffic would increase by 30% or more (10% in sensitive areas).

13.33 In this context, the IEMA Guidance does not define a sensitive area and therefore the assessor has made a judgement based on experience and the nature of the study area. The assessment study area as defined above includes the A920 (east of the Site access) and a section of the A96 stretching from circa (c.) 3km north of the A920/ A96 junction and c. 3.5km south of the A920/ A96 junction.

13.34 On consideration of the possible sensitivity of the area, and in the context of the IEMA guidelines, the study area is not considered to be sensitive and the 30% threshold applies. This means that a full assessment of environmental impact is not required on road links where the increase in traffic (either total traffic or HGV traffic) would not exceed 30%. However, it is the case that some receptors would be more sensitive than others to change and the 30% threshold is used as a guide only, with each group of receptors considered individually.

13.35 Table 13-2 considers the sensitivity of each group of receptors.

Table 13-2
Receptor Sensitivity

Impact	Low Sensitivity	Medium Sensitivity	High Sensitivity
Noise	No sensitive receptors.	Presence of sensitive receptors near to the road.	Presence of sensitive receptors adjacent to the road.
Driver severance & delay	Road network not affected.	Road network not experiencing congestion at peak times.	Road network experiencing congestion at peak times.
Community severance & delay	No presence of existing communities severed by road. Presence of existing communities with high level of existing severance (subjective assessment).	Presence of existing communities with a moderate level of existing severance (subjective assessment).	Presence of existing communities with low existing severance (subjective assessment).
Vulnerable road users	High sensitivity.		
Road safety	High sensitivity.		

Impact	Low Sensitivity	Medium Sensitivity	High Sensitivity
Hazardous & dangerous loads	No hazardous/dangerous loads generated by the proposed development.	Hazardous/dangerous loads (legally permitted on UK roads) generated by the proposed development.	Abnormal loads generated by the proposed development.
Dust & dirt	Limited presence of sensitive receptors (subjective assessment).	Low to medium presence of sensitive receptors (subjective assessment).	High presence of sensitive receptors (subjective assessment).

Magnitude of Impact

13.36 The magnitude of impact or change is considered according to the criteria defined in Table 13-3.

Table 13-3
Magnitude Criteria

Impact	Insignificant Effect	Significant Effect		
	Negligible	Minor	Moderate	Major
Noise & vibration	<25% increase in traffic	>25% increase in traffic. Quantitative assessment based on predicted increase in traffic against measured baseline (see Chapter 14: Noise).		
Driver severance & delay	<10% increase in traffic.	Quantitative assessment of road capacity based on existing traffic flows and predicted future traffic levels.		
Community severance & delay	<10% increase in traffic.	<30% increase in traffic.	<60% increase in traffic.	>60% increase in traffic.
Vulnerable road users	<10% increase in traffic.	Qualitative assessment of existing provision and future traffic levels.		
Road safety	<10% increase in traffic.	Quantitative assessment of existing accident records and predicted increases in traffic.		
Hazardous & dangerous loads	0% increase in traffic.	<30% increase in traffic.	<60% increase in traffic.	>60% increase in traffic.
Dust & dirt	<10% increase in traffic.	>30% increase in traffic.	<60% increase in traffic.	>60% increase in traffic.

Significance of Effect

13.37 Sensitivity and magnitude of change as assessed under the criteria detailed above are then considered collectively to determine the significance of effect. The collective assessment is a considered assessment by the assessor, based on the likely sensitivity of the receptor to the change (e.g. is a receptor present which would be affected by the change), and then the magnitude of that change. Effects of 'major' and 'moderate' significance are considered to be 'significant' in terms of the EIA Regulations.

Mitigation and Residual Effects

13.38 Mitigation measures would be considered as part of construction good practice and to seek to offset any effects which are assessed as significant. Following consideration of mitigation measures, an assessment of residual effects has been made.

Statement of Significance

13.39 At the end of the Chapter, a statement of significance is provided. This is a summary of the complete assessment for each receptor, taking into consideration any proposed mitigation measures, and reports the significance of the residual effects in compliance with the EIA Regulations.

Cumulative Effects Assessment

13.40 An assessment of the cumulative effect on the study area of all wind farms near to the Site (either proposed or under construction) which may utilise the same access routes as the proposed development has been undertaken.

Assumptions, Limitations and Confidence

13.41 The assessment has been undertaken under the assumption that general good construction practice would be deployed (i.e. embedded mitigation), including the following:

- a reputable construction contractor would be procured, with an Environmental Policy and good environmental track record;
- all HGVs delivering materials to the Site would be roadworthy, adequately maintained and sheeted as required;
- adequate traffic management and banksmen would be deployed for the movement of HGVs and abnormal loads; and
- HGV loads would be maximised to ensure that part load deliveries would be minimised.

BASELINE CONDITIONS

Introduction

13.42 This section details the baseline conditions that exist in the study area in relation to:

- existing road network (including abnormal loads route);
- traffic flows along the A920 and A96;
- road network performance; and
- accident data.

Existing Road Network

13.43 The existing road network in the vicinity of the Site comprises the A920 which runs in an east to west direction adjacent to the north of the Site. The A920 is a single carriageway rural road which

connects to the A941 in the west and to the A96 in the east. The A96 is a major trunk road and runs in a north to south direction connecting Inverness in the north to Aberdeen in the south.

13.44 Two routes were considered for the route of abnormal loads to the Site. These were:

- from Inverness docks, southwards along the A96 through Nairn, Elgin and Keith to the A920; and
- from Aberdeen docks, northwards along the A96 to the A920 Site access road.

13.45 The route from Aberdeen was deemed the most suitable route for the transportation of abnormal loads to the Site due to the shorter distance and the lesser impacts on sensitive receptors such as residential villages and towns. The Abnormal Load Route Assessment report (provided in Technical Appendix 13-1) provides the details of the route assessment.

13.46 The existing wind farm at Clashindarroch is serviced by an access track which joins with the A920 at a priority junction at Cairncraig. The access track junction is surfaced and laid out so as to accommodate the turning of abnormal load vehicles required for construction of the existing Clashindarroch Wind Farm.

Existing Traffic Flows

13.47 Baseline traffic flows were obtained from two ATCs located on the A920, approx. 300m west of the A96/A920 junction and on the A96 approx. 300m north of B9022/A96 junction. The locations of the ATCs are shown on Figure 13.1. The ATCs collected data continuously over the seven day period between 3 June 2017 and 9 June 2017, a period which lies outside of any school, public or bank holidays; the collection of traffic flow data for this period is standard practice. The counts were undertaken by 'Nationwide Data Collection' and the raw data are provided at Technical Appendix 13-2.

13.48 A summary of the average weekday (07:00 to 19:00 and 24-hour) traffic is provided in Table 13-4. The data includes directional and two-way flows for both ATCs.

Table 13-4
Average Weekday (07:00-19:00 and 24 hour) Traffic Flows

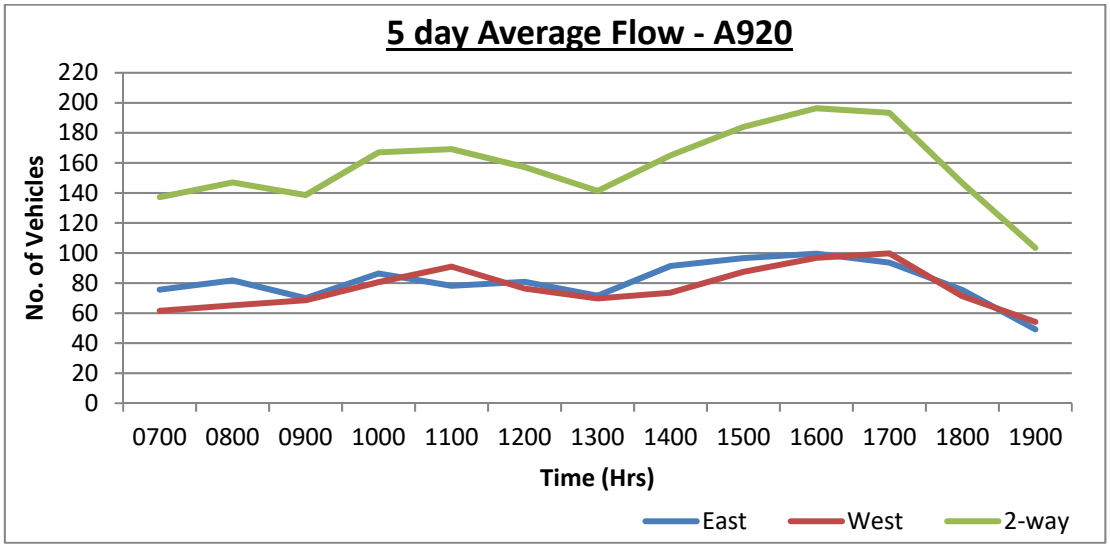
Location	Period	Eastbound			Westbound			Two-way		
		Total	HGV	% HGV	Total	HGV	% HGV	Total	HGV	% HGV
ATC 1-A920	12-hour	1001	137	14%	942	147	16%	1943	283	15%
	24-hour	1181	158	13%	1148	171	15%	2329	328	14%
ATC 2-A96	12-hour	3385	546	16%	3622	574	16%	7007	1120	16%
	24-hour	4345	675	16%	4401	671	15%	8746	1363	16%

13.49 Table 13-4 shows relatively low volumes of existing traffic on both the A96 and A920, with levels on the A920 significantly lower. The existing traffic levels on these roads are demonstrative of their remote location. The directional flow on the A920 is distributed relatively evenly between the eastbound and westbound direction, with HGV movements comprising approx. 14-15% of the total

vehicle numbers seen on the A920.

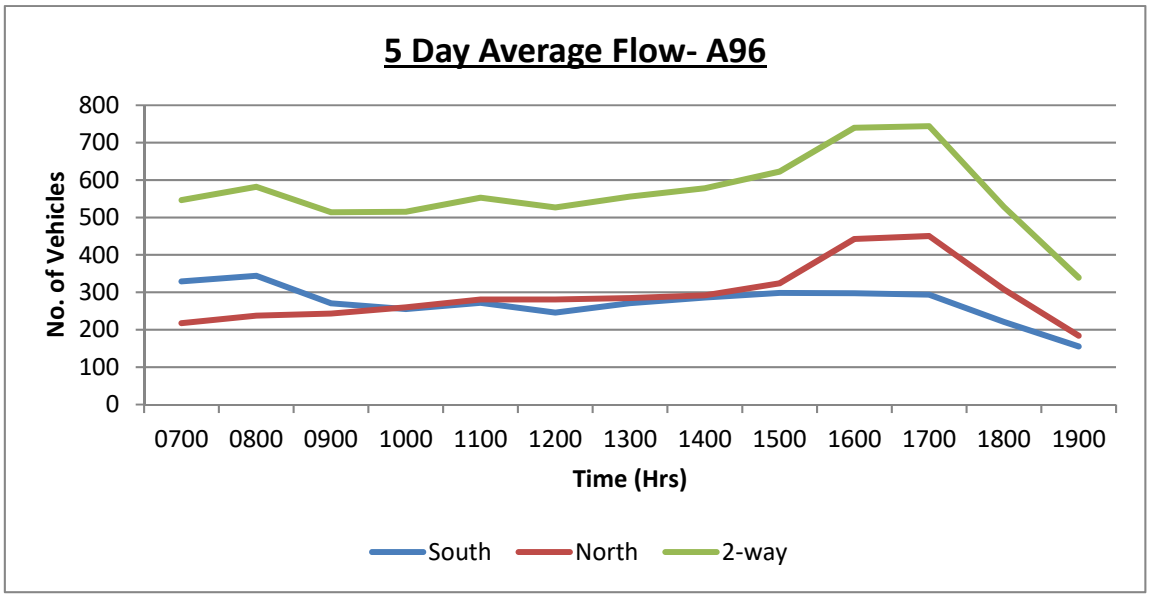
13.50 ATC 2, located on the A96 recorded slightly larger numbers of vehicles travelling southbound than northbound over both a 12 hour and 24 hour period. HGV numbers comprise approx. 16% of the total number of vehicles seen on this stretch of the road network.

13.51 Traffic flow profiles showing the east, west, north, south and two way traffic flows over a 12 hour period (7am (07:00) – 7pm (19:00)) have been plotted on Graphs 13-1 and 13-2. The data plotted have been obtained from an average of the weekday vehicle numbers recorded on by ATC1 and ATC2.



Graph 13-1
Traffic Flow Profile, A920 (ATC1)

13.52 Graph 13-1 shown above demonstrates that the A920 experiences fairly consistent vehicle flows throughout the day (approx. 60-100 vehicles per hour) without any clearly defined morning and evening peaks. The flows appear to be slightly higher during the afternoon, between 13:00 and 17:00. This demonstrates that there is a steady flow of traffic over 12 hours east and west.



Graph 13-2
Traffic Flow Profile, A96 (ATC2)

13.53 Graph 13-2 shows a relatively constant traffic flow on the A96 during the day, with a minor peak observed in the morning and a more significant peak observed at 16:00 to 18:00. Flows are tidal, with traffic heavier southbound (towards Aberdeen) in the morning and vice versa in the evening.

Capacity

13.54 The capacity performance of the A920 and A96 has been calculated from Design Manual for Roads and Bridges, Volume 5, Section 1 TA 46/97, (Ref. 13.4), and compared against existing 24 hour baseline traffic flows. The spare capacity has then been calculated and presented in Table 13-5.

Table 13-5
Capacity Performance on the A920 and A96

Location	Baseline Flow (24 hour)	Capacity	Spare Capacity
A920	2329	21,067	18,738 (89%)
A96	8746	22,743	13,997 (62%)

13.55 The A920 has spare capacity of approximately 89% and the A96 has spare capacity of approximately 62%.

Accident Data

13.56 Personal Injury Accident (PIA) data covering the study area was previously obtained for the five year period between 2010 and 2015; this has since been extended to comprise the most recent data available up to and including 2018. As stated previously, the study area comprises the following road network:

- A920 from the Site access junction to the A920/ A96 junction;

- A96 from the A920/ A96 junction to 3km north; and
- A96 from the A920/ A96 junction to 3.5km south.

13.57 The locations of recorded accidents are shown on Figure 13.2 and the raw data are included at Technical Appendix 13-3 and includes the location, severity and number of vehicles involved in each accident. Data detailing the specific causes of the recorded accidents and the exact classification of the vehicles involved in the accidents are not available.

13.58 The accident analysis is used to inform the review of the proposed route where any deficiencies in the road layout and condition are identified.

13.59 For clarification, those accidents recorded which resulted in slight injury indicate that the victim was likely to suffer from slight shock with occurrences of sprains or bruises from the accident, whereas a serious accident accounts for breakages, lacerations, concussion or hospital admittance.

13.60 A total of 22 accidents were recorded across the study area during the five year period. Of these, 14 resulted in slight injury and six resulted in serious injury. There were two fatalities recorded within the data period.

Fatal Accidents

13.61 Two accidents within the study area resulted in a fatality, accident references 4 and 21. Accident reference 4, involved a collision between three vehicles, resulting in the fatality of a 63 year old female (driver of vehicle 1), serious injury to the driver and rear seat passenger of vehicle 2 and slight injury to the front seat passenger of vehicle 2. There were no casualties recorded from within vehicle 3. The accident occurred on the A96, approx. 500m north of the A96/ B9022 junction and occurred during high winds with road surface conditions recorded as containing snow.

13.62 The second accident resulting in a fatality (reference 21) occurred further south on the A96, approx. 300m south of the Bridge over River Bogie. This accident involved a vehicle and a pedestrian and resulted in the fatality of a 62 year old male pedestrian who was crossing the A96 from the drivers' off-side. The accident occurred during darkness under wet or damp road conditions.

Slight/Serious Accidents

13.63 Three clusters of accidents are evident within the specified study area, these are:

- at the A96/ A920/ Deveron Road crossroad junction;
- on the A96, approx. 50m north of the Bridge over River Bogie; and
- at the A96/ A97 T-junction.

13.64 Each of the aforementioned accident clusters are discussed in further detail below.

A96/A920/Deveron Road Crossroad Junction

13.65 A cluster of 6 accidents occurred at this junction, as shown in Table 13-6. Five of the accidents at this location resulted in 'slight' injury with one resulting in a serious injury.

13.66 Accident reference 10 resulted in the serious injury of an 80-year old male and occurred during

darkness under wet/ damp road conditions.

13.67 Accident reference 8, involved an object in the road but no data are available on the type of obstruction that was present.

13.68 The remaining three accidents all resulted in slight injury and occurred during daylight under dry road conditions.

Table 13-6
Injury Accidents at the A96/ A920/ Deveron Road Crossroads

Accident Reference	Severity	Road Surface Conditions	Light Conditions	Other Factors
1	Slight	Dry	Daylight	None identified
6	Slight	Wet or Damp	Daylight	None identified
8	Slight	Dry	Daylight	Object on road
10	Serious	Wet or Damp	Darkness- No lighting	None identified
11	Slight	Dry	Daylight	None identified
13	Slight	Dry	Daylight	None identified

A96, Approximately 50m North of the Bridge Over River Bogie

13.69 A cluster of 4 accidents occurred approx. 50m north of the bridge over River Bogie, three resulting in slight injury and one resulting in serious injury as shown in Table 13-7. The accident resulting in serious injury involved a single car and occurred during darkness. The remaining three accidents all occurred during 'wet or damp' road conditions. Accident 7 involved 3 vehicles and resulted in 'slight' injury to a single casualty (79 year old female driver).

Table 13-7
Injury Accident Data north of the Bridge over River Bogie

Accident Reference	Severity	Road Surface Conditions	Light Conditions	No. of Vehicles Involved
7	Slight	Wet or Damp	Daylight	3
18	Slight	Wet or Damp	Darkness- No lighting	2
20	Slight	Wet or Damp	Daylight	1
22	Serious	Dry	Darkness- No lighting	1

A96/A97 T-junction

13.70 Two accidents occurred at the A96/A97 T-junction during the study period, one resulting in slight injury and the other resulting in a serious injury. The accident resulting in serious injury (reference 5) involved two vehicles and resulted in slight injury to the driver and passenger of one vehicle and serious injury to the driver of the other vehicle.

13.71 A third accident (reference 3) occurred approx. 100m north of this junction, at a private road/drive junction with the A96. This involved two vehicles and resulted in the slight injury of a 63 year old female driver.

A920 Site Access Road

13.72 One accident (reference 9) was recorded on the A920 circa (c.) 500m east of the Site access. This accident involved a single vehicle and occurred during 'wet or damp' road surface conditions and during darkness. The single casualty was a 37 year old female, front seat passenger.

Accident Summary

13.73 A total of 22 injury accidents have been recorded within the study area, the majority of which resulted in slight injury, with 6 accidents resulting in serious injury and two accidents resulting in a fatality.

13.74 On first consideration, it appears that there are clusters of accidents at three locations along the A96, however the review identifies that most of these clusters relate to accidents that have occurred during wet or damp road conditions or during darkness.

13.75 Of the two fatal accidents, one occurred when snow was present on the road and the other which resulted in the fatality of a pedestrian when a vehicle collided with the pedestrian, occurred during darkness with no lighting present. The adverse weather/light conditions are likely to have been a contributing factor along with driver error/poor driver observation and/or awareness.

13.76 There have been a number of single car accidents in no specific location along the A96, which would suggest that on occasion drivers do not take appropriate care with their speed.

13.77 Overall, it is assessed that the number and nature of recorded accidents are at the expected levels and severity that would be expected given the nature and use of the roads within the study area.

Existing Road Network Performance

13.78 The sections above provide an assessment of the existing baseline situation. The following may be concluded:

- the existing road network is laid out to allow substantial reserve capacity against existing traffic demand;
- the study area has a good accident record; and
- there are no further improvement works to proposed to roads within the study area.

PROPOSED DEVELOPMENT TRAFFIC

Introduction

13.79 The proposed development is described in Chapter 3: Description of the Development. Key elements of the proposed development that would generate traffic movements for the importation of materials include:

- widening of the Site access junction;
- upgrading onsite tracks,
- new access tracks;
- underground cabling along access tracks;
- 30m x 35m substation compound including a control building;
- 50m x 50m construction compound;
- a central laydown area to include a concrete batching compound;
- 112m high permanent met mast; and
- up to three borrow pits.

13.80 For concrete production, primarily for the laying of wind turbine foundations, an onsite concrete batching plant would be provided.

Site Access and Onsite Tracks

13.81 Vehicular access to the Site would be from the Craighead/Wellheads access junction with the A920, however the current Site access would be widened to allow for the movement of abnormal load vehicles (for transport configurations larger than that required for the construction of the Clashindarroch Wind Farm). The location of the proposed access junction is provided as Figure 3.1 and the existing access can be seen in the photograph at Plate 13-1.

13.82 Existing onsite forestry tracks from the Site access junction, southwards, would be utilised and upgraded where necessary. Approximately 10.9km of new access tracks leading to each of the 14 turbines would be constructed. The tracks would be left in place to provide access for maintenance, repairs and eventual decommissioning.

Plate 13-1
View of Existing Site Access

Construction Programme

13.83 An indicative approx. 18 month construction programme has been prepared and is set out in the construction timeline shown in Table 3-1 in Chapter 3: Description of the Development; it is assumed that construction would begin in 2022. An additional short period of reinstatement would follow on from the 18 month construction programme.

Material Quantities

13.84 The proposed development would require the transportation of a range of construction materials to the Site including aggregate for Site tracks, aggregate, cement and reinforcement for turbine foundations, cable and sand for cable installation. An estimation of the material quantities has been made, as discussed in the following sections.

Tracks

13.85 The development would require the upgrade of 1.95km of existing onsite forestry tracks and 10.9km of new Site track (SLR). In addition to this there would be the construction of eight turning heads, ten passing places, and a 500m met mast track.

13.86 It has been estimated that 80% of the aggregate required for the construction of these tracks would be from onsite borrow pits with the remaining 20% transported to the Site in 20 tonne HGVs from offsite sources. Table 13-8 shows the expected aggregate quantities that would be imported to the Site for each activity.

Table 13-8
Track Aggregate Quantities

Component	Length m	Width m	Depth m	Quantity	Total Volume m^3	Borrow Pit Won	Imported	Total Imported Volume (Tonnes)
New Site Tracks	10,900	7	0.8	1	61,040	48,832	12,208	24,416
Upgraded Site tracks	1,950	5	0.3	1	2,925	2,340	585	1,170
Met Mast Track	500	5	0.8	1	2000	1600	400	800
Turning Heads	80	5	0.8	8	2560	2048	512	1024
Passing Places	10	3	0.7	10	210	168	42	84

Turbine Foundations and Crane Hardstandings

13.87 The proposed development would involve the construction of up to 14 turbine foundations with adjacent crane pads for the mobile cranes used to erect the turbines. The estimated material quantities required for the turbine foundations, fill above turbine foundations and crane pads are shown in Table 13-9. The exact turbine foundation specification would depend on the ground conditions. Additionally, the final crane pad design would be determined by the turbine supplier according to their preferred erection method.

13.88 Delivery of cement would be required for use at the onsite concrete batching facility. It has been

assumed that cement would be imported to the Site in 22,500 litre tanks for storage onsite ready for use. The deliveries are assumed to be made each day Monday to Friday throughout February, March and April 2022.

Table 13-9
Turbine Foundation and Hardstanding Material Quantities

Component	Length	Width	Depth	Quantity	Total Volume m^3	Borrow Pit Won	Imported	Total Imported Volume (tonnes unless stated)
Fill above turbine bases	28	28	2	14	21,952	17,562	4,390	8,780
Turbine Foundation - Aggregate	20	20	0.5	14	2,800	2,240	560	1,120
Turbine Foundation - cement	N/A	N/A	N/A	-	6000	0	6000	6000 m^3
Turbine Foundation - reinforcement	N/A	N/A	N/A	14	N/A	0	520	520
Aggregate for Crane Hardstanding's	62	25	1	14	21,700	17,360	4,340	8,680
Aggregate for Additional Laydown	10	25	1	14	3,500	2,800	700	1,400

Additional Aggregate

13.89 In addition to the aforementioned aggregate quantities required for tracks and turbine foundations, aggregates would be required for the following:

- substation;
- aggregate required for met mast;
- laydown area; and
- construction compound.

13.90 It has been assumed that 100% of the required aggregate for these components would be imported from offsite sources. Table 13-10 shows the estimated imported volume of aggregate required.

Table 13-10
Additional Aggregate Quantities

Component	Length m	Width m	Depth m	Quantity	Total Imported Volume m^3	Total Imported Volume (Tonnes)
Substation	10	15	1	1	150	300
Met Mast	10	10	2.5	1	250	500
Laydown Area	150	100	0.5	1	7,500	15,000
Construction Compound	50	50	0.5	1	1250	2500

Cable Laying

13.91 Three underground power cables would run alongside the access track from each turbine to the proposed substation, with a further cable connecting to the existing SSE substation near Craighead/ Wellheads. Sand would be placed around the cable. It has been estimated that 1550m^3 (3100 tonnes) of sand would need to be imported from offsite. The cable would be delivered in drums which each hold 500m of cabling.

Turbine Components

13.92 Each turbine would require the transportation of 7 separate components, comprising 3 blades, 3 tower sections and the nacelle (motor). As there are up to 14 turbines, a total of 98 components would be required to be delivered as abnormal loads.

Trip Generation

13.93 The proposed development would lead to construction effects, resulting from the transportation of the above identified construction materials to the Site and the transportation of Site workers to and from Site. The following section describes the trip generation arising from construction activities, based on the indicative construction programme (Table 3-1 in Chapter 3: Description of the Development) and the material quantity estimates in Tables 13-8 to 13-10.

13.94 The operational and decommissioning phases of the development have been scoped out of the assessment as the operational phase would create negligible trips and trips generated from the decommissioning phase would be fewer than those created during construction. Therefore, this section provides detailed calculations and timing of trips arising through the construction phase only.

13.95 The key elements of construction work which would result in trip generation for abnormal loads and conventional construction work have been summarised in Table 13-11.

Table 13-11
Construction Activities Requiring Vehicle Trips

Key Work Element	Details and Assumptions	Conventional HGVs	Abnormal Loads
Site Establishment	Provision of hardstanding, cabins and plant for construction activities at commencement of construction and later removal from Site.	Yes	No
Widening of Site Access	Provision of plant and materials associated with widening the Site access at the A920.	Yes	No
Works by FLS	Felling of trees for development.	Yes	No
Access track upgrade and Construction	7.84km of new onsite track, together with passing places and turning heads. 1.95km of track needing upgrading. 20% of aggregate to be imported with the remaining 80% sourced from onsite borrow pits.	Yes	No
Crane Hardstandings, turbine laydown areas and turbine foundations	Construction of crane hardstandings at each turbine location with additional laydown areas for blades in addition to cement, aggregate and reinforcement materials for turbine foundations. Assumed 80% of aggregates to be sourced from onsite burrow pits with the remainder imported.	Yes	No
Control buildings and Substations	Construction of building foundations, structure and finishing's. Installation of electrical equipment and storage batteries.	Yes	Yes
Electrical Install	Delivery of sand and cables to connect turbines to substation.	Yes	No
Wind Turbine Delivery	Transport of abnormal load turbine components to Site. Bringing in of crane equipment to erect turbines. Includes escort vehicles associated with movement of abnormal loads.	Yes	Yes

13.96 From the indicative construction programme detailed in Table 3-1 (Chapter 3: Description of the Development), an estimate has been made of the traffic movements that would be generated during the construction phase.

HGV Trip Generation

13.97 The estimated material quantities provided in Tables 13-8 to 13-10, have been carried forward to calculate the trip generation of each material. Additional HGV trips such as the delivery of construction compound and control buildings have also been added. Based on the above calculations, the daily number of HGV trips predicted to arise during the construction phase has been calculated and spread over the construction period according to the relevant activity, as shown in Tables 13-12 and 13-13.

13.98 The likely two-way trips for HGVs have been established for each construction activity. To understand how these construction vehicle movements would translate to daily trip generation for

the whole Site, the numbers have been allocated through the construction period. Table 13-13 provides the maximum number of two-way trips expected during an operational day in each month of the construction period.

Table 13-12
HGV Material Delivery Trip Generation (Estimated)

Activity		Programmed Months	Quantities		Average Vehicle Capacity		Total Trips	No. of Days	Trips/ Day	2-way Trips
			Volume m³	Tonnes	Volume	Tonnes				
Site Establishment	Establish Temporary Compound- Aggregate	1-1	-	2500	-	20	125	10	13	26
	Widening Site access	1-1	-	-	-	-	-	-	10	20
	Install Welfare Services and Establish Water Supply	1-1	-	-	-	-	4	5	1	2
	Borrow Pit Development and Operation	1-11	-	-	-	-	4	261.5	1	2
	Establish Central Laydown Area and Procure Materials	2	-	16,400	-	20	820	24	34	68
Access track upgrade and construction	Construct access tracks	3-8	-	-	-	-	-	-	-	-
	Import Materials (Road Capping, etc.)	7-9	-	27,494	-	20	1,375	71	19	38
Turbine Foundations- Construct Turbine Foundations and Hardstandings	Crane Hardstandings - Aggregate	7-9	-	8,680	-	20	434	71	6	12
	Turbine Foundations - Aggregate	7-13	-	1,120	-	20	56	167	1	2
	Turbine Foundations - Concrete		6000	-	22.5	-	267	63	5	10
	Turbine Foundations - Reinforcement		-	520	-	20	26	167	1	2
	Fill above Turbine Bases- Aggregate		-	8,780	-	20	439	167	3	6
Control Buildings and Substation	Construct Buildings and External Equipment	4-13	-	-	-	-	20	238.5	1	2
	Internal Fit	14	-	-	-	-	0	24	0	0
	Met mast Construction and Erection - Aggregate	11-12	-	500	-	20	25	48.5	1	2

Activity		Programmed Months	Quantities		Average Vehicle Capacity		Total Trips	No. of Days	Trips/ Day	2-way Trips
			Volume m³	Tonnes	Volume	Tonnes				
	Substation- Aggregate	4-5	-	300		20	15	48	1	2
Electrical- Install wind farm Cabling	Import Sand	9-15	-	3100	-	20	155	167.5	1	2
	Import Cable		Length (m)	Drums	-	Drums/ Load				
			18600	38	-	3	13	167.5	1	2
Wind Turbine Delivery and Erection	Erect WTGs	11-14	98 components	-	-	Convoy of 3 AL vehicles	33	96.5	1	2
	Commission WTGs	15-17	-	-	-	-	0	-	-	-
	WTG/ WF Reliability Run and Grid Compliance	16-19	-	-	-	-	0	-	-	-
Take Over	Take Over	20-20	-	-	-	-	0	-	-	-
	Site Restoration	19-21	-	-	-	-	25	50	1	2

Table 13-13
Daily HGV Trip Generation over Construction Timeline

Activity		Programmed	Month																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site Establishment	Establish Temporary Compound- Aggregate	1-1	26																	
	Widening Site access		20																	
	Install Welfare Services and Establish Water Supply		2																	
	Borrow Pit Development and Operation	1-11	2	2	2	2	2	2	2	2	2	2	2							
	Establish Central Laydown Area and Procure Materials	2-2		68																
Works by FCS	Move felled lengths, logs and tree harvesting	2-4																		
	Wind Farm tree felling	6-7																		
Access track upgrade and construction	Construct access tracks	3-8																		
	Import Materials (Road Capping etc)	7-9							38	38	38									
Turbine Foundations- Construct Turbine Foundations and Hardstanding's	Crane Hardstandings - Aggregate								12	12	12									
	Turbine Foundations - Aggregate	7-13							2	2	2	2	2	2	2					
	Turbine Foundations - Concrete	7-9							10	10	10									
	Turbine Foundations - Reinforcement	7-13							2	2	2	2	2	2	2					
	Fill above Turbine Bases- Aggregate								6	6	6	6	6	6	6					
Control Buildings and Substation	Construct Buildings and External Equipment	4-13				2	2	2	2	2	2	2	2	2	2					
	Internal Fit	14-14																		
	Met mast Construction and Erection - Aggregate	11-12											2	2						
	Substation- Aggregate	4-5				4	4													
Electrical- Install wind farm Cabling	Import Sand	9-15									2	2	2	2	2	2	2			
	Import Cable										2	2	2	2	2	2	2			
Wind Turbine Delivery and Erection	Erect WTGs	11-14											2	2	2	2				
	Commission WTGs	15-17																		
	WTG/ WF Reliability Run and Grid Compliance	16-19																		
Take Over	Take Over	20-20																		
	Site Restoration	19-21																		
		Total (per day)	50	70	2	8	8	4	74	74	78	18	22	20	18	6	4	0	0	0

Summary of HGV Trip Generation

13.99 The majority of construction activities would incur HGV trip generation which would be spread over the period defined in the construction programme. Table 13-9 shows that the highest level of HGV trip generation would occur in months 7-9 of the construction period, with the maximum level of two-way trip generation of 78 HGV movements per day in Month 9 and 74 HGV movements per day in Months 7 to 8, when the material is being imported for the construction of internal access tracks and the turbine foundations. Over the 18 month construction period, HGV trip generation arising from the Site would amount to an average of 25 movements per day.

13.100 The assessment of impact arising from the trip generation detailed above, therefore, is based on the following scenarios:

- worst case normal day – 78 HGV movements per day (during month 9, note months 7-8 have a similar trip generation); and
- average case normal day – 25 HGV movements per day.

Light Vehicle Trips

13.101 Light vehicles are those which consist of smaller vehicles such as cars and vans, which would typically be associated with the workforce. It is envisaged that a maximum of 125 personnel would be required on the Site at any one time. Based on the conservative assumption that 20% of workers would car share, this would equate to 100 vehicle trips per day (200 two way movements per day).

Trip Distribution

HGV Trip Distribution

13.102 All construction vehicles would enter the Site from the east and travel along the A920 to the A920/ A96 junction. It is anticipated that 50% of the traffic would head north along the A96 and the remaining 50% would head south.

Light Vehicle Trip Distribution

13.103 It has been assumed that light vehicle trips would be distributed on the Highway in the same proportions as for the Clashindarroch Wind Farm, as shown by Figure 13.3. 25% of the light vehicle leaving the Site would turn left out of the Site onto the A920 heading west towards Dufftown with the remaining 75% turning right towards the A96. The split for vehicles traveling along the A96 from the A920 would see 30% head north towards Keith with the remaining 45% heading south.

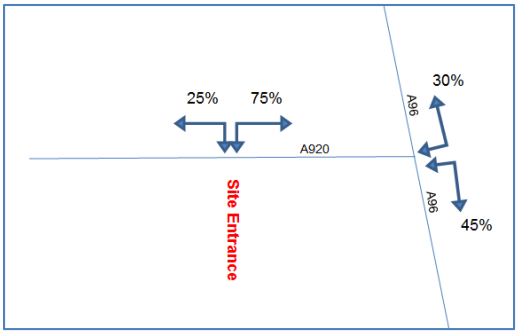


Figure 13.3
Light Vehicle Trip Distribution

Predicted Increase in Total Traffic

13.104 The increase in traffic flow along the A920 and the A96 to the east of the Site access has been calculated for the following two cases:

- the maximum trip generation occurring over the construction period; and
- the average trip generation throughout the entire active construction period.

13.105 Table 13-14 below shows the predicted daily total and HGV traffic increases for the two cases above, taking into account the trip distribution detailed above at paragraph 13.102. The baseline traffic flows are those observed on an average weekday over a 12hr period between 07:00-19:00.

Table 13-14
Predicted Increases in Traffic – 12 Hour Flows, Two-Way

Link	Road Section	Trip Case	Baseline		Development		Baseline + Development		Increase %	
			Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
1	A920 east of Site	Maximum day	1943	283	306	156	2,249	439	16%	55%
		Average day	1943	283	200	50	2143	333	10%	18%
2	A96 North of A96/A920 junction	Maximum day	7007	1120	135	78	7,124	1,198	2%	7%
		Average day	7007	1120	85	25	7,092	1,145	1%	2%

13.106 The results above indicate limited traffic flow increases, with all percentage increases below the IEMA thresholds. The largest increase is seen on the A920 east of the Site where the total traffic flows would increase by 16% in a worst case scenario, on the day that contains the maximum number of trips; in addition this is also when the largest percentage increase in HGVs would be seen, with a 55% increase above the baseline.

13.107 On an average day during the construction period, there would only be a 10% increase to all traffic and a 18% increase to HGVs. The A96 would experience very low increases above the baseline levels, with less than a 2% increase to the total traffic flows during both cases and less than a 7% increase in HGVs.

ASSESSMENT OF EFFECTS

13.108 This section provides an assessment of effects using the significance criteria described in Table 13-2 based on the predicted increases in traffic calculated in Table 13-14.

13.109 The IEMA Guidelines provide two thresholds when considering predicted increases in traffic, whereby a full assessment of impact would be required:

- where the total traffic would increase by 30% or more (10% in sensitive areas); and/or
- where the HGV traffic would increase by 30% or more (10% in sensitive areas).

13.110 As the study area (defined in paragraph 13.19) is not considered to be sensitive, with no sensitive receptors, the threshold of 30% therefore applies.

13.111 The construction working hours for the proposed development would be 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturdays. The impact of the proposed development has been assessed over the 12 hour weekday period, which considers the natural peak usage of the road network.

Effects on Noise and Vibration

Noise

13.112 Noise and vibration has been classified as a medium sensitivity receptor, as there is the presence of sensitive receptors (residential properties) near to, but not adjacent to, the roads within the study area.

13.113 As discussed in Table 13.3, Part 7 of the Design Manual for Roads and Bridges (DMRB) states that *"a change in noise level of 1dB is equivalent to a 25% increase or 20% decrease in traffic flows assuming all other factors remain unchanged"*. Additionally, paragraph 3.37 of DMRB states that *"a change in road traffic of 1dB $L_{A10, 18h}$ in the short term (e.g. when a project is opened) is the smallest that is considered perceptible"*.

13.114 The maximum traffic increase predicted for the proposed development is 306 vehicle movements per day. This represents a 16% increase in traffic on the A920 and less than a 2% increase on the A96. As this is less than the 25% increase criteria stated in DMRB the effect is considered to be **negligible.** A negligible increase to a medium sensitivity receptor is considered to be **Not Significant**.

Vibration

13.115 Vibration caused to property by road vehicles would either be airborne, causing the rattling of windows or, in very rare cases, caused through the road and property foundations. In both cases, vibration would only occur to properties located very close to the highway and for very heavy flows of HGV traffic.

13.116 The A920 Site access road has very few residential properties along it, all of which are set back from the carriageway edge. The study area comprises the A96 which currently supports a large number of HGV movements. The residential settlement of Huntly is situated to the east of the A96; however, the properties are set back from the carriageway edge with hedge/ tree borders along much of the

route. Therefore, the effects from vibration are considered to be **negligible** within the defined study area, and **Not Significant**.

Effect on Driver Severance and Delay

13.117 Driver Severance and Delay has been classified as a Medium Sensitivity Receptor (Table 13-2) as the road network would be affected by the development but is not currently experiencing congestion at peak times.

13.118 The IEMA Guidance states that there are a number of factors which determine driver severance and delay; these include delay caused by additional turning vehicles and additional parked cars at the Site, delays at junctions due to increased traffic, as well as delays at side roads due to reduced gaps in the oncoming traffic.

13.119 For the purpose of this assessment a <10% increase in traffic is considered negligible, with anything over 10% requiring a quantitative assessment of road capacity based on existing traffic flows and predicted future traffic levels.

13.120 The capacity performance of the A96 and A920 is detailed under "Existing Road Network Performance" above. Existing traffic levels on the A96 and A920 are substantially below the maximum theoretical capacity of the road. Table 13-15 considers the design capacity against the 24 hour baseline flows set out in Table 13-4.

Table 13-15
A920/A96 Spare Capacity

Location	Baseline Flow (24 hour)	Baseline Flow + Peak Dev	Capacity	Spare Capacity
A920	2329	2,635 (13% increase)	21,067	18,432 (88%)
A96	8746	8,881 (2% increase)	22,743	13,862 (61%)

13.121 It can be seen that there is substantial spare capacity on both of the roads within the study area to accommodate the construction generated traffic. Therefore, the proposed development would not lead to a material adverse capacity impact on the A920 or the A96.

13.122 Table 13-15 shows that the maximum peak development trip generation would result in an 13% increase in traffic on the A920 and a 2% increase in traffic on the A96. As this is below the 10% traffic increase assessment threshold, the effect on driver severance and delay is considered to be negligible and **Not Significant**.

Effect on Community Severance

13.123 The IEMA Guidance identifies severance as *"the perceived division that can occur within a community when it becomes separated by a major traffic artery*". As an example, a road that passes through a community such as a town or village, where perhaps amenities are located on one side of the road and residential properties are located on the other side, causes severance to the movements between those places. The degree of severance depends on the traffic levels on the road and the presence of adequate crossing opportunities.

13.124 There are no villages along the route within the study area on the A920 and the route along the A96 does not sever any communities, with Huntly being located to the east of the road. In addition, the nature of the road is such that communities are not accessed directly from the road and therefore this is considered a low sensitivity receptor.

13.125 In addition to this; the traffic increase on both roads within the study area is less than 10% and therefore classified as negligible impact. Negligible impact on a low sensitivity receptor results in a **Not Significant** effect.

Effects on Vulnerable Road Users

13.126 The impact of traffic on vulnerable road users would be most significant within settlements along the proposed access routes, where the presence of vulnerable road users, such as pedestrians and cyclists, is greatest. The A920 from the Site access to the A96 passes very few residential properties. In addition to this, no residential properties front the A96 within the study area.

13.127 Vulnerable road users are classified as a high sensitivity receptor, however as maximum construction traffic flows produce a traffic increase of less than 10%, the effect is considered to be negligible and **Not Significant**.

Effect on Road Safety

13.128 The accidents recorded within the study area are discussed in paragraphs 13.56 - 13.77. Both fatal accidents occurred under adverse weather and/or light conditions and driver error/poor driver observation appears to have been a contributing factor to both accidents.

13.129 Deliveries of the wind turbine components would follow the same route as that used for the Clashindarroch Wind Farm, and would be moved under suitable traffic management procedures, including the provision of banksmen at the Site access junction and appropriate warning signage.

13.130 The predicted number of construction trips (HGVs and light vehicles) is not considered significant and would be accommodated within the available capacity of the road network so as not to compromise road safety nor have an effect on existing accident levels.

13.131 The movement of abnormal loads has the potential to create a general hazard on the highway. Abnormal loads would be moved from the Port of Aberdeen along the A96 to the Site as detailed in the Abnormal Load Assessment Report (ALAR) dated September 2017 provided as Technical Appendix 13-1. The ALRA details that the Abnormal Loads must be delivered to the Site under controlled conditions and under a suitable escort. The manner in which abnormal loads are transported along the public highway/trunk road network would be subject to the approval of Transport Scotland, Aberdeenshire Council and Police Scotland in advance.

13.132 In summary, the proposed development would have no material adverse impact on the road safety of the local highways network. For receptors with a high sensitivity, the negligible impact results in **Not Significant** effect.

Effects Due to Hazardous and Dangerous Loads (Abnormal Loads)

13.133 The wind turbines would be transported to the Site from the port of Aberdeen via the A96. The abnormal loads would cause rolling lane closures along the dualled section of the route, and temporary road closures along any single carriageway sections of the route. This would cause short delays to road users within the area.

13.134 Each wind turbine consists of seven component parts: three blades, three tower sections and the nacelle (motor). Other loads would be associated with the delivery of the hub, cranes and drilling rigs, which would not be considered as Abnormal Indivisible Loads (AILs) however they would be delivered at a similar time.

13.135 There may be the potential to group the turbine component deliveries into a number of small convoys. This would allow the deliveries to occur over a reduced number of days, while only slightly increasing the impact on those days. If the 98 components were to be delivered in convoys of three, the deliveries could be completed over 33 days. Over the four month period allocated for the erection of the turbines, this would equate to approx. two delivery days per week. Turbine deliveries would be undertaken in consultation with the relevant Roads Authorities and Police Scotland and could include movements during the night which would reduce effects on road users at busier daytime periods. Deliveries would also usually be scheduled to avoid peak times of the day and school opening/closing times.

13.136 The access route report for abnormal loads is provided in Technical Appendix 13-1. The assessments undertaken for the transportation of the AILs has demonstrated a feasible route coming direct from the port of Aberdeen along the A96 to the A96/ A920 junction. The road is considered suitable for such movements, subject to localised temporary works at junctions to facilitate movements. Any modifications to junction layouts would be confirmed through a trial run and further surveys, and any modifications or works required to accommodate abnormal loads would be discussed with the Roads Authority and the necessary consents and permits would be obtained in advance of any works or delivery periods.

13.137 Transportation of the turbine equipment would lead to the following effects:

- the rolling closures of roads and footways causing temporary driver and pedestrian delay; and
- the perceived effect to pedestrians and vulnerable road users caused by the movement of large turbine components in close proximity to infrastructure.

13.138 The severity of these impacts is considered as follows:

- delays to drivers due to lane/road closures would be inevitable, though abnormal loads could travel in convoy as described above, and movements could be timed so as to avoid the peak hours. Abnormal load movements occurring outside of the peak hours would have a temporary minor adverse effect; and
- the perceived effect to residents is subjective and it is likely that the transport of abnormal loads close to properties could lead to local objection, stress and anxiety. However, there are no locations on the access route which would be specifically close to residential properties or other sensitive receptors. It is also important to note that the abnormal load movements would occur over a short period of time, the effect would therefore be temporary, minor

adverse.

13.139 Whilst not delivered as abnormal loads, the proposed development would also require the delivery of substation components via the A920/A96. These movements would be on articulated low loaders and would be moved under suitable traffic management procedures, including the provision of banksmen and appropriate warning signage. All deliveries to Site would be managed through best practice; the details of the measures to be applied are set out within the Construction Environmental Management Plan (CEMP) and the Construction Traffic Management Plan (CTMP).

13.140 There would be an unavoidable impact associated with the delivery of turbine components, however with suitable public awareness and the proposed grouping of component deliveries, the impact would be moderate adverse on the turbine delivery days but **Not Significant**. There may be the potential to group the turbine component deliveries into a number of small convoys. This would allow the deliveries to occur over a reduced number of days, while only slightly increasing the impact on those days.

Effects Due to Dust and Dirt

13.141 The movement of construction traffic to and from the Site would have the potential to bring dust, dirt and other detritus onto the highway. Given that the Site is relatively remote from the public highway, and accessed via a long access track, it is considered that the potential for the transfer of dust and dirt onto the highway would be minimal. Good construction practices, including the cleaning of vehicle wheels during wet periods and the sheeting of aggregate lorries would ensure that effects would be negligible and **Not Significant**. The best practice measures are set out within the CEMP and the CTMP.

MITIGATION MEASURES

13.142 In addition to the use of general good/best practice, the following mitigation measures would also be adopted to further minimise any effects from the proposed development:

- a Construction Traffic Management Plan (CTMP) would be developed for the movement of abnormal loads and for general access for HGV traffic (detailed in the CTMP/ CEMP, Technical Appendix 13-4;
- a trial run for abnormal loads would be undertaken prior to commencement of their delivery to confirm what issues could be expected with transport of abnormal loads; and
- provision of information, with regards to abnormal loads, to local residents and users of amenities to alleviate stress and anxiety.

13.143 The Construction Traffic Management Plan (CTMP) would be drawn up to secure permissions for the movement of abnormal loads, and would include details of any required temporary widening and other road improvement measures, together with detailed consideration of vehicle swept paths, loadings, structural assessments (where required) and temporary street furniture removal details. The document would be prepared in consultation with the Roads Authority, Transport Scotland and the emergency services, including Police Scotland. An element of preparation of the CTMP would be a Trial Run, which would be undertaken through a special licence, with the Roads Authority and police in attendance. A draft CTMP is provided in Technical Appendix 13-4.

RESIDUAL EFFECTS

13.144 Residual impacts are those likely to occur after the mitigation measures (above) have been incorporated into the proposed development. Potential residual impacts are likely to be those associated with delivery of the abnormal loads and resultant temporary road closures. In addition, an increase in traffic would add to the risk of general wear and tear to roads and verges. On minor roads this may be more apparent as traffic flows are likely to be limited to private vehicles. There are no significant residual impacts anticipated in relation to the proposed development.

FURTHER SURVEY REQUIREMENTS AND MONITORING

13.145 No further survey requirements are considered necessary.

SUMMARY OF PREDICTED EFFECTS

13.146 The predicted effects associated with the proposed development are summarised in Table 13-16. All of the impacts have been classified as 'temporary' as they would only occur during the 18 month construction programme with many occurring over much shorter time periods e.g. hazardous and dangerous loads would take place over a maximum of 91 days.

Table 13-16
Summary of Predicted Effects

Type	Duration	Sensitivity	Effect	Mitigation Measures	Residual Effect
Noise & vibration	Temporary	Low	Negligible	Production of a Construction Traffic Management Plan. Trial run for abnormal loads prior to commencement. Campaign of provision of information to local residents and users of amenities, to involve the community in the safe operation of the Construction Traffic Management Plan and to alleviate stress and anxiety.	Negligible
Driver severance & delay	Temporary	Medium	Negligible		Negligible
Community severance & delay	Temporary	Low	Negligible		Negligible
Vulnerable road users	Temporary	High	Negligible		Negligible
Road safety	Temporary	High	Negligible		Negligible
Hazardous & dangerous loads	Temporary	High	Minor		Minor
Dust & dirt	Temporary	Low	Negligible		Negligible

13.147 Noise and vibration, Community severance and delay and Dust and dirt have been classified as low sensitivity, due to the limited presence of sensitive receptors adjacent to the roads within the study area. Driver severance and delay has been classified as medium sensitivity, as the road network would be affected but is not currently experiencing congestion at peak times. The remaining receptors have been classified as high sensitivity receptors.

13.148 The predicted effects are considered to be negligible for all receptors, with the exception of

Hazardous and dangerous loads which has been classified as having a 'Minor' effect on abnormal load delivery days, with a negligible effect on all other days.

CUMULATIVE EFFECTS ASSESSMENT

13.149 Wind farms which are currently operational, under construction or in the planning stage, within a 40km radius of the Site are shown on Figure 7.7a. Operational wind farms generate minimal levels of traffic during the operational phase and therefore have minimal cumulative effect. Wind farms that may provide significant cumulative effect/utilise the same construction route during the construction of the proposed development are:

- Hill of Towie II Extension (Consented);
- Greenmyres Wind Farm (Consented); and
- Jericho Forest Wind Farm (Consented).

13.150 The assessments detailed in this Chapter have been based on the assumption that there would be no additional construction activities taking place with regards to other wind farm developments during the construction period for the proposed development: this ensures a worst case assessment in terms of traffic effect against baseline levels i.e. the baseline levels are not elevated by other construction traffic.

13.151 In the event that construction of the proposed development and any of the identified cumulative wind farm schemes (above) occur concurrently, this would not lead to any further environmental effect in transportation terms, beyond that assessed, provided that:

- abnormal load movements are programmed in conjunction with the police and the Roads Authority so as not to occur on the same day; and
- days of specific high density of traffic movement (e.g. concrete pour days) are programmed so as to not occur on the same day (to be enforced through inclusion as a factor within the CTMP, to be agreed with Police Scotland and the Roads Authority accordingly).

13.152 Consideration would be given to these and any other major developments that may be utilising the same roads during drafting and agreement of the CTMP.

STATEMENT OF SIGNIFICANCE

13.153 Following the assessment of predicted traffic impacts, the significance of the potential effects that could occur during construction after proposed mitigation measures are presented in Table 13-17.

Table 13-17
Summary of Significance

Type	Duration	Sensitivity	Effect	Significance
Noise & vibration	Temporary	Low	Negligible	Not significant
Driver severance & delay	Temporary	Medium	Negligible	Not significant
Community severance & delay	Temporary	Low	Negligible	Not significant
Vulnerable road users	Temporary	High	Negligible	Not significant
Road safety	Temporary	High	Negligible	Not significant
Hazardous & dangerous loads	Temporary	High	Minor	Not significant
Dust & dirt	Temporary	Low	Negligible	Not significant

13.154 Table 13-17 shows that all receptors have been classified as not being significant due to the negligible effect discussed above. Although hazardous and dangerous loads have been classified as resulting in a 'minor' significant effect, the number of days over which abnormal loads would be delivered to Site are so few that the over-all impact is considered to be **Not Significant**.

13.155 When taking account of consideration of all potential effects, it is considered that the proposed development would lead to an insignificant adverse effect in terms of traffic and transportation.

REFERENCES

Ref. 13.1: Transport Scotland (2007) Abnormal Load Movements – A Brief Guide to Notification and Authorisation Requirements.

Ref. 13.2: Development Department of the Scottish Executive (2005) Transport Assessment and Implementation: A Guide.

Ref. 13.3: Institute of Environmental Management and Assessment (1993) Guidance for the Environmental Assessment of Road Traffic.

Ref. 13.4: Design Manual for Roads and Bridges. Volume 5, Section 1, Part 3 TA46/97.