

Chapter twelve

TRANSPORT AND ACCESS

INTRODUCTION

12.1 This chapter provides an assessment of the predicted effects of the proposed development on the transport and access receptors.

12.2 The main objectives of the assessment are as follows:

- Establishment of the baseline;
- Identification of potential impacts;
- Identification of mitigation measures to ameliorate potential impacts; and
- Prediction of residual effects.

CONTEXT FOR ASSESSMENT

12.3 The main traffic and transport effects relating to the proposed development would be associated with the movements of Heavy Goods Vehicles (HGVs) transporting construction material such as aggregates, cement and steel, and the movements of Abnormal Indivisible Loads (AILs) required to deliver wind turbine components during the construction phase.

12.4 During the operational phase of the proposed development, the volumes of traffic would be minimal, although regular visits would be made for maintenance checks.

12.5 The decommissioning phase would involve fewer trips on the network than the construction phase, as elements of infrastructure such as access tracks and electrical connections would be left in place.

12.6 Taking into account the predicted traffic generation associated with the operational phase no impact assessments are considered necessary and the approach undertaken identifies traffic generation and mitigation options with a focus on the temporary construction and decommissioning phases.

12.7 The assessment has been undertaken in accordance with the 'Guidelines for Environmental Impact Assessment' (2005) produced by the Institute of Environmental Management and Assessment. These guidelines express that the separate Institute of Environmental Assessment (now IEMA) 'Guidelines for the Environmental Assessment of Road Traffic' (1993) should be used to characterise the environmental traffic and transport effects (off-site effects) and the assessment of significance of major new developments. A high level overview of the impacts of the traffic generation has been considered in accordance with the latter guidelines which provide the basis for a systematic, consistent and comprehensive appraisal of traffic impacts for a wide range of development projects. The document is referred to below as the IEMA guidelines.

Scoping and consultation

12.8 Consultations were undertaken with organisations that have a direct involvement or responsibility for roads in the study area as shown in Table 12.1. In summary, views were sought from Highland Council (THC) and Transport Scotland (TS) as Roads Authorities. The consultation responses are summarised in Table 12.1.

Table 12.1: Summary of Consultation Responses

Consultee	Comment	How Addressed
Highland Council – Email from Mark Clough (Transport Planning) 17/10/14 and THC Scoping Opinion 17/11/14	Identify all public roads affected by the development and set out their existing nature and condition.	Described within Baseline Conditions section of this chapter.
	Identify the anticipated impacts from the proposed development, including any cumulative impacts from other developments likely to be happening at the same time as your development.	Described within Potential Impacts and Cumulative Impacts sections of this chapter.
	Set out the proposed mitigation measures needed to tackle the anticipated impacts set out above.	Described within Mitigation section of this chapter.
	Details of any residual effects on the road network and its users following the implementation of the proposed mitigation	Described within Residual Effects section of this chapter.
	If relevant, the cumulative impact of traffic flows associated with power generation and transmission facilities at Farr, Dunmaglass, Moy, Tom nan Clach, Allt Duine and Torness that intend to make use of either the B851 or B861 should be taken into consideration.	Each development has been considered and discounted from inclusion in the assessment, as discussed in Cumulative Impacts section of this chapter.
	It is acknowledged that the turbine components will be delivered to the port of Inverness and will then access the site from the north along the B861. This route runs through large residential areas to the south of Inverness. The reasons for proposing this route will need to be clarified in the Transport Assessment, together with an assessment of the impacts and any mitigation needed. The Transport Assessment will also need to clarify which route(s) will be proposed for general construction traffic that are not abnormal loads.	These various issues are discussed within the Baseline Conditions, Potential Impacts and Mitigation sections of this chapter.
Transport Scotland	Overall there will be a minimal increase in traffic on the trunk road during the operation of the facility therefore the proposed development is not likely to have a significant impact on the operation of the trunk road network.	No response required.
	It is likely that many of the construction loads may be categorised as abnormal and authorisation from our management organisation BEAR will be required. It is advisable that BEAR Scotland are consulted as to the feasibility of transportation of these items to site.	The feasibility of the transport of abnormal components to site is addressed within the AIL routing section of the chapter.

Policy review

12.9 A review of relevant transport and planning policies and documents has been undertaken and is summarised in Table 12.2. The review provides the policy context for the proposed development.

Table 12.2: Review of guidance and policy

Document	Comment
Scottish Planning Policy, Scottish Government (2014)	With respect to wind farm developments and specifically transport, in subject policy A Low Carbon Place, SPP indicates that Planning Authorities should consider impacts on road traffic and adjacent trunk roads, but that considerations will vary relative to the scale of the proposal.
Hitrans Regional Transport Strategy, The Highlands and Islands Transport Partnership (2008)	The document outlines ten horizontal themes where it intends to focus action and investment during the 15 year term of the strategy. The themes relevant to this development are: <ul style="list-style-type: none"> • Development of a programme of investment to improve and maintain the locally significant rural road network which has suffered from under-investment in the past; • Preparation of a strategy for investment in ports and ferries; • Development of initiatives for reducing the cost of transport and travel; and • Development of ways to reduce and mitigate the climate change impact of travelling in, to and from the region.
Highland wide Local Development Plan, The Highland Council, (2012)	Policy 28 states that, ' <i>The THC will support developments which promote and enhance the social, economic and environmental wellbeing of the people of Highland.</i> ' Policy 28 goes on to state that proposed developments will be assessed on the extent to which they impact on approved routes for road and rail links. Policy 67 states that THC will pay particular attention to any significant effects on land and water based traffic and transport interests.
Local Transport Strategy, The Highland Council (2010)	The LTS characterises the rural road network as ' <i>winding single carriageway roads with passing places</i> '. THC manages a large number of bridges and has developed the 'Lifeline Bridges Programme' which 'would invest in bridges to maintain access, remove weight restrictions or reduce the weight restriction effect of HGV vehicles'. The Lifeline Bridge programme is designed to ensure that heavy goods are able to continue to effectively move around the network and this is important for potential Abnormal Indivisible Load (AIL) movements throughout the area. The LTS vision states that it seeks to ' <i>enable and facilitate sustainable development and economic growth</i> ', with the

Document	Comment
	objective that it would provide a transport network to enable sustainable economic growth.
Institution of Environmental Management and Assessment 'Guidelines for the Environmental Assessment of Road Traffic' (IEMA), 2005	The document notes that the separate 'Guidelines for the Environmental Assessment of Road Traffic' (1993) should be used to characterise the environmental traffic and transport effects (off-site effects) and the assessment of significance of major new developments. The guidelines intend to complement professional judgement and the experience of trained assessors.
Other Relevant Guidance	<p>The following further guidance documents have been taken into account in this assessment:</p> <ul style="list-style-type: none"> • 'Guidance on the Preparation of Transport Assessments' – The Highland Council (2014); • 'Transport Assessment Guidance' – Transport Scotland (2012); • 'Guidelines for Traffic Impact Assessments' – Institution of Highways and Transportation (IHT), 1994; • Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB) - Assessment and Management of Environmental Effects (2008); and • 'Guidelines for the Environmental Assessment of Road Traffic' – Institute of Environmental Assessment, (1993) referred to below as the IEMA guidelines.

METHODOLOGY

Baseline assessment

12.10 The baseline review focuses on the nature of the surrounding road infrastructure and the current level of traffic use and was informed by desktop studies, traffic surveys and consultation, comprising the following:

- Consideration of potential origin locations of construction staff and potential supply locations for construction materials to inform extent of local area roads network to be considered in the assessment;
- Review of responses to the scoping exercise;
- Collection of traffic flow data;
- Review of the relevant roads hierarchy;
- Review of sensitive junction locations;
- Review of any areas of road safety concerns;
- Review of accident data;
- Review of any other traffic sensitive receptors in the area (routes, communities, buildings etc); and
- Review of OS plans to derive a local area roads network.

12.11 Traffic flow and speed data was obtained through new Automatic Traffic Counts (ATC) in order to further enhance the understanding of the road network in the study

area and to identify potential constraints on the road network.

12.12 A swept path analysis exercise was undertaken to identify the extent of road improvements and realignment required for the abnormal loads. Areas identified for road works were subject to a series of desk top and field studies to assess the likely significant impacts associated with them. The results of the assessment are presented later in this chapter.

Effects evaluation

12.13 The IEMA Guidelines include guidance on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement was used to develop a classification of sensitivity for various receptors. This is summarised in Table 12.3.

Table 12.3: Classification of Receptor Sensitivity

Receptor	Receptor Sensitivity			
	Negligible	Low	Medium	High
Location (residents)	Individual dwellings or scattered settlements with no facilities	Small rural settlement, few community or public facilities or services	Intermediate sized rural settlement, containing some community or public facilities and services	Large rural settlement containing a high number of community and public services and facilities
Link (infrastructure)	Roads with no adjacent settlements including new strategic trunk roads that would be little affected by additional traffic and suitable for Abnormal Loads	Little or no traffic calming or traffic management measures	Some traffic calming or traffic management measures	Traffic control signals, waiting and loading restrictions, traffic calming measures
Link (road)	New strategic trunk road junctions capable of accommodating Abnormal Loads	Trunk or A-class road, constructed to accommodate significant HGV composition	Local A or B class roads, capable of regular use by HGV traffic	Minor rural roads, not constructed to accommodate frequent use by HGVs

12.14 The following rules, also taken from the IEMA Guidelines have been used as a screening process to define the geographical boundaries of this assessment:

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

12.15 The IEMA Guidelines identify the key impacts that are most important when assessing the magnitude of traffic effects from an individual development: Table 2.2 of Volume 11, Section 2, Part 5 of the DMRB entitled Assessment and Management of Environmental Effects sets out four levels against which the magnitude of these impacts should be assessed – major, moderate, minor and negligible. The impacts and levels of magnitude are discussed below:

- **Severance** – the IEMA Guidance states that, '*severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery.*' Further, '*Changes in traffic of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' [or minor, moderate and major] changes in severance respectively.*' However, the Guidelines acknowledge that '*the measurement and prediction of severance is extremely difficult.*' (Para 4.28).
- **Driver delay** – the IEMA Guidance notes that these delays are only likely to '*be 'significant [or major] when the traffic on the network surrounding the development is already at, or close to, the capacity of the system.*' (Para 4.32);
- **Pedestrian delay** – the delay to pedestrians, as with driver delay, is likely only to be major when the traffic on the network surrounding the development is already at, or close to, the capacity of the system. An increase in total traffic of approximately 30% can double the delay experienced by pedestrians attempting to cross the road and would be considered 'major';
- **Pedestrian amenity** – the IEMA Guidance suggests that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or its lorry component) is halved or doubled (Para 4.39). It is therefore considered that a change in the traffic flow of -50% or +100% would produce a 'major' change in pedestrian amenity;
- **Fear and intimidation** – there are no commonly agreed thresholds for estimating levels of fear and intimidation, from known traffic and physical conditions. However, as the impact is considered to be sensitive to traffic flow, changes in traffic flow of 30%, 60% and 90% are regarded as producing 'minor', 'moderate' and 'major' changes in severance respectively; and
- **Accidents and safety** – professional judgement would be used to assess the implications of local circumstances, or factors which may elevate or lessen risks of accidents.

12.16 To determine the overall significance of the impacts, the results from the receptor sensitivity and impact magnitude assessment are correlated and classified using a scale set out in Table 2.4 of Volume 11, Section 2, Part 5 of the DMRB and summarised in Table 12.4.

Table 12.4: Significance of Impacts

Receptor Sensitivity	Magnitude			
	Major	Moderate	Minor	Negligible
High	Large	Large/ Moderate	Moderate/ Slight	Slight

Receptor Sensitivity	Magnitude			
	Major	Moderate	Minor	Negligible
Medium	Large/ Moderate	Moderate	Slight	Slight/ Neutral
Low	Moderate/ Slight	Slight	Slight	Slight/ Neutral
Negligible	Slight	Slight/ Neutral	Slight/ Neutral	Neutral

12.17 In terms of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (the EIA Regulations), impacts would be considered to be of significance where they are assessed to be large or moderate.

12.18 The assessment of residual effects, following the implementation of mitigation, is summarised in Table 12.11 at the end of this Chapter.

Assessment methods

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

- Determine baseline;
- Review proposed development for impacts;
- Evaluate significance of identified impacts;
- Identify mitigation; and
- Assess residual effects.

BASELINE ASSESSMENT

Study area

12.20 Further to scoping discussions with the roads authorities, the impact assessment study focussed on the B851 between its junctions with the A9 and the B861 and also the B861 between its junctions with the A9 and the B8082.

12.21 The relevant section of the local road network is indicated in Figure 12.1.

Existing traffic flows

12.22 To determine the existing road usage, WYG commissioned week long classified ATCs and speed surveys for two sites on the B851 and B861 at the following locations:

- Site 1 – B851 north of the B861 junction; and
- Site 2 – B861 in the vicinity of the proposed site access.

12.23 The locations of the traffic count sites are illustrated in Figure 12.1.

Baseline traffic flows

12.24 Construction of the proposed development could be completed by 2016 if consent is granted by The Highland Council. For the purpose of this assessment, a 9 month construction period has been assumed.

12.25 To assess the likely impacts during the construction phase, 2016 Baseline traffic movements were assessed by applying National Road Traffic Forecast (NRTF) high growth factors to the surveyed traffic movements. Applying high growth factors provides a robust assessment as they represent higher than average growth and

account for general committed development traffic.

12.26 The NRTF high growth factor is 1.0359. This factor has been applied to the 2014 survey data to estimate the 2016 traffic movements shown in Table 12.5.

Table 12.5: 2016 Baseline Traffic Conditions (Average Daily Two Way Movements)

Survey Location	Cars + Lights	HGV	Total
B851	872	23	895
B861	613	15	628

Speed Survey

12.27 The ATC sites used to provide volumetric flow data were also used to collect speed statistics. The 5-day average and 85th percentile two way speeds observed at the two count locations are summarised in Table 12.6.

Table 12.6: Speed Survey Summary

Survey Location	Average Speed (mph)	85 th Percentile Speed (mph)	Speed Limit (mph)
B851	36.6	40.6	60
B861	37.1	43.7	60

12.28 The speed survey data indicates that both average and 85th percentile vehicle speeds are well below the statutory speed limit on both sections of road.

Accident history

12.29 WYG obtained road traffic accident data for the five years to 31st December 2013 over the study area from the online resource www.crashmap.co.uk.

12.30 This indicated that 2 personal injury accidents were recorded on the 8 miles of carriageway (i.e. two way) assessed for the five year period. Both of these took place on the B851. A further fatal accident was recorded on the A9 just to the south of its junction with the B851.

12.31 Of the two accidents on the B851, one was serious involving a single car travelling round a bend and one was slight, involving two cars. The fatal accident on the A9 involved a single motorcycle.

12.32 There is no common cause that can be found amongst the accidents; it is likely driver error or poor judgement played a factor in each. Neither of the accidents involved vehicles which would be classified as HGVs (goods vehicles >3.5 tonnes); this is important to note as a high proportion of movements associated with the proposed development will be undertaken by HGVs.

Footpath network

12.33 There are no Core Paths within or in close proximity to the development site that would potentially be affected by the construction or operation of the proposed development.

AIL routing

12.34 The nearest Port of Entry to the development site for wind turbine components

is Inverness.

12.35 Route reviews were undertaken to determine the most suitable route to the site for the movement of Abnormal Indivisible Loads (AILs) from the Port of Inverness. Access to the development site from the south by way of the A9/B851/B861 was discounted due to the constrained junction between the B851 and B861 within Inverarnie.

12.36 The preferred route will access the site by way of the B861 from the north as follows:

- Turn left from the Port onto Longman Drive and then turn left onto the A9;
- Turn left from the A9 onto Culloden Road and then turn left onto the B9006;
- Turn left from the B9006 onto the B8082 Sir Walter Scott Drive;
- Continue south west on the B8082;
- Turn left at the roundabout onto Morning Field Road;
- Morning Field Road continues as the B861; and
- Travel south on B861 to the proposed site entrance.

12.37 The average one-way journey by road is approximately 10 miles in length. The route from the port to the proposed site access is indicated in Figure 12.2.

12.38 A route survey identified a number of constraint points along the route including:

- Inverness Harbour Exit / Longman Drive junction;
- A9 / Culloden Road Junction;
- Culloden Road / B9006 Junction;
- B9006 / B8082 Roundabout;
- B8082 / Inches Retail Park Roundabout;
- B8082 / Stevenson Road Roundabout;
- B8082 / B861 Roundabout;
- B861 North of Balmore of Leys right / left / right bends;
- B861 South of Balmore of Leys right / left bends;
- B861 West of Newton of Leys right / left / right bends;
- B861 North of Black Woods of Leys right bend;
- B861 South of Leys Park House right / left bend and
- Proposed site entrance.

12.39 A detailed assessment, including swept path analysis, was undertaken of the constraint points to identify any mitigation required. The results of this are discussed later in the chapter.

Construction Traffic Routing

12.40 It is intended that all construction traffic would approach the development site from the south, using the junction of the A9 / B851, the B851 and the B861.

POTENTIAL IMPACTS

During construction

Types of vehicle traffic

12.41 During the assumed 9 month construction period, the following traffic would require access to the development site:

- Staff transport, either cars or staff minibuses;
- Construction equipment and materials, deliveries of machinery and supplies such as cement;
- Abnormal loads consisting of the wind turbine sections and also a heavy lift crane; and
- Abnormal load escort vehicles.

12.42 Works will include the upgrading of the site access junction, creation of sections of new access track, casting turbine foundations, creating electrical connection trenches, erecting a control building and erecting the turbines themselves.

12.43 With the exception of the turbine elements, the vast majority of traffic is normal construction plant and will include grading tractors, excavators, cranes, forklifts and dumper trucks. Most will arrive on site on low loader transporters.

12.44 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.

12.45 The components can be delivered on a variety of transport platforms, with typical examples illustrated in Photographs 12.1 to 12.3. Other components such as the nosecone, footings and tool boxes are transported using standard HGV vehicles. A typical turbine of this scale can be delivered in up to 14 deliveries, 7 of which would be abnormal loads.



Photograph 12.1 Typical blade transports



Photograph 12.2 Typical nacelle transport



Photograph 12.3 Typical tower transport

12.46 In addition to the turbine deliveries, a large erection crane would be needed to offload a number of components and erect the turbine. The crane is likely to be a mobile 1000 tonne crane that is escorted by boom and ballast trucks to allow full mobilisation of the crane on site.

Construction vehicle movements

12.47 Construction traffic movements were estimated using information from wind turbine manufacturers and contractors with experience of wind turbine construction. Trips within the development site were not included as they will not directly impact on the public road network. Construction personnel will generally travel to site in private vehicles and mini-buses and these will be parked at the construction compound or locally within the site. The construction programme is estimated to be approximately 9 months long. Construction working hours are likely to be between 8am – 6pm depending on light conditions with the exception of abnormal load deliveries which may take place outside these hours.

12.48 The typical trip generation for each element and activity in terms of personnel and material deliveries is illustrated in Appendix 12.1. Table 12.7 provides a summary of predicted daily two way traffic movements by month and vehicle type.

Table 12.7: Daily Construction Traffic Profile

	Month								
Vehicle Type	1	2	3	4	5	6	7	8	9
Cars & Lights	6	5	10	14	18	22	21	14	4
HGV including AILs	62	52	53	74	30	10	7	2	4
Total	68	57	63	88	48	32	28	16	8

12.49 The highest traffic movements would occur during Month 4 and will correspond with the delivery of imported stone for the construction of the site access tracks, forestry removal and the delivery of off-site batched concrete. This equates to approximately 1,918 movements (i.e. 959 inbound and 959 outbound trips) over the course of the month.

12.50 Assuming a 22 day working month, an average of 88 movements (44 inbound and 44 outbound) would be made each day in Month 4. Traffic flows would fall off substantially over the remainder of the construction period.

Development traffic distribution

12.51 The distribution of development trips on the network will vary depending on the types of loads being transported.

12.52 General construction traffic is likely to originate from a variety of locations.

12.53 Staff trips were assumed to originate from Inverness with half approaching via the B861 and half via the A9 and B851.

12.54 More specialist deliveries have different distributions on the network. The distributions for these trips were based on the following assumptions:

- All abnormal turbine loads will originate from the Port of Inverness and approach the site via the B861 north;
- Crane trips will access the site via B861 north;
- As far as possible, materials would be sourced from local suppliers. Based on the locations of local concrete and aggregate suppliers – Daviot and Mid Lairgs Quarries, it is assumed that deliveries of aggregate for access track

and concrete for foundations would approach from the B851, then the B861; and

- All other deliveries are assumed to originate evenly from the north and south and would be routed to the site via the proposed construction traffic route - A9, B851 and then B861.

Magnitude of Change

12.55 To estimate the total trips on the study network during the peak of the construction phase, construction traffic was distributed through the network and combined with the 2016 future year traffic data. The resulting Total with development traffic flows are indicated in Table 12.8.

Table 12.8: 2016 Total Traffic Conditions (Average Daily Two Way Movements)

Survey Location	Cars + Lights	HGV	Total
B851	879	97	976
B861	627	89	716

12.56 The traffic impact was determined by calculating the percentage increase in 2016 Total traffic over 2016 Baseline traffic for each of the roads within the study area being considered. The results are indicated in Table 12.9.

Table 12.9: Percentage Impact 2016 Total Traffic vs 2016 Baseline Traffic Movements

Survey Location	Cars + Lights	HGV	Total
B851	0.80%	321.74%	9.05%
B861	2.28%	493.33%	14.01%

12.57 While total traffic flows are not predicted to increase by more than 14.01% on either of the links within the study area, HGVs flows are predicted to increase by more than 300% on both the B851 and the B861. The uplift is high in percentage terms; however this is due to the very low baseline levels of HGV traffic on the links. The actual number of HGV movements being added for the peak month (22 working days) averages 88 per day, equating to around 7 additional HGV movements per hour.

Impact significance

12.58 On the basis of the classifications set out in Table 12.3 it is considered that the small settlement of Inverarnie at the junction of the B851 / B861 and the B851 and B861 themselves would be receptors of medium sensitivity. All users of roads within the study area are considered receptors subject to the same level of sensitivity as the route.

12.59 With reference to the IEMA Guidelines, total traffic flows are not predicted to increase by more than 30% on any links. However, due to the predicted uplift in daily two way movements of HGV traffic during the construction period, both the B851 and B861 have been taken forward to further assessment.

12.60 For various receptors, Table 12.10 summarises the predicted magnitude of the impact of the increase in traffic on the various impacts identified in the IEMA Guidelines with no mitigation in place.

Table 12.10: Receptor Review

Receptor	Potential Impact	Magnitude of Impact	Comment
Users of / residents adjacent to B class roads	Severance	Minor	<p>Increase in traffic could result in difficulties for people crossing the B class roads during the construction period. Crossing demand is not however observed to be high.</p> <p>As Total traffic volumes are not anticipated to change by more than 30%, the severance impact is considered to be minor.</p>
	Driver Delay	Minor	<p>Some delay to drivers delay may occur during the movement of the abnormal loads.</p> <p>The road network is not considered to experience any operational difficulties as traffic flows are low. The change in traffic volumes would not take the system close to its capacity limits. Any impact is therefore considered to be minor.</p>
	Pedestrian Delay	Minor	<p>Pedestrians could experience delay if their movements conflict with that of construction, and particularly AIL traffic. However, pedestrian movements are not observed to be high.</p> <p>Total traffic volumes anticipated to change by around 14% which could lead to minor delays for pedestrians.</p>
	Pedestrian Amenity	Major	<p>Pedestrian amenity could be affected where their movements conflict with that of construction, and particularly AIL traffic.</p> <p>Although pedestrian flows are noted to be very low, as the lorry component of traffic flows is anticipated to increase by more than 100%, it is considered that the impact could be major.</p>
	Fear and Intimidation	Negligible	<p>As Total traffic volumes are anticipated to change by substantially less than the 30% threshold, the impact is considered to be negligible.</p>
	Accidents and Safety	Minor	<p>There is limited potential for impact on safety due to driver frustration, particularly with regards to the transport of the abnormal loads and due to potential conflict between HGVs and pedestrians.</p>

During operation

12.61 During the operational phase of the proposed development regular visits would be made by light vehicles for maintenance checks. Also, there may be occasional abnormal load movements to deliver replacement components in the unlikely event of a major failure.

Magnitude of change

12.62 It is predicted that during the operation of the proposed development there will be up to 2 vehicle movements per week for maintenance purposes (cars and light goods vehicles).

Impact significance

12.63 In terms of the IEMA guidelines, such a small number of traffic movements and the associated percentage increase over Baseline traffic flows cannot be considered significant.

During decommissioning

12.64 Prior to decommissioning of the proposed development, anticipated to be 25 years from the opening year, a traffic assessment will be undertaken and appropriate traffic management procedures followed.

Magnitude of change

12.65 The decommissioning phase would likely involve fewer trips on the public road network than the construction phase as it is anticipated that elements of infrastructure such as access tracks and electrical connections would be left in place, adding to local infrastructure.

Impact significance

12.66 In terms of the IEMA guidelines, traffic movements associated with decommissioning would not be considered significant.

MITIGATION

During construction

Site Access

12.67 Access to the development site will be via a modified forestry access off the B861. Widening works will be required to facilitate the movement of loads.

12.68 In line with the Highways Agency's 'Design Manual for Roads and Bridges' (1992) a visibility splay of 4.5m x 160m will be provided.

12.69 An indicative design for the proposed site access is shown in Drawing A087138 SPA012 of Appendix 12.2.

Abnormal Indivisible Loads

12.70 In addition to works at the site access junction, mitigation works to the public road to accommodate predicted abnormal load movements were identified through a route survey and the swept path assessments for the potential route from the Port of Inverness through to the site access. These are indicated in Drawings A087138 SPA001 to SPA011 of Appendix 12.3 and summarised below:

- Inverness Harbour Exit / Longman Drive – section of fence would be temporarily removed to accommodate oversail and load bearing surface would be laid on east footway of Longman Drive to accommodate overrun;
- A9 / Culloden Road Junction – one lit traffic sign would be relocated to accommodate oversail;
- Culloden Road / B9006 Junction – load bearing surface would be laid on north footway of B9006 to accommodate overrun and signal head would be relocated to accommodate oversail;
- B9006 / B8082 Roundabout – loads would oversail nearside verge on entry to roundabout. No mitigation required;
- B8082 / Inches Retail Park Roundabout - central island of roundabout would be lowered to 400mm and sign to be temporarily relocated to accommodate oversail. Load bearing surface would be laid on east footway of roundabout exit to accommodate overrun;
- B8082 / Stevenson Road Roundabout – chevron sign on central island would be relocated to accommodate oversail. Other areas of oversail would be accommodated with no mitigation required;
- B8082 / B861 Roundabout – a lighting column, a chevron sign, two bollards and a traffic sign would be relocated to accommodate areas of oversail;
- B861 North of Balmore of Leys right / left / right bends – areas of hedge would require trimming back to accommodate areas of oversail;
- B861 South of Balmore of Leys right / left bends - areas of hedge would require trimming back to accommodate areas of oversail;
- B861 West of Newton of Leys left / right / left bends – areas of load bearing surface would be laid to accommodate overrun;
- B861 North of Black Woods of Leys right bend - loads would oversail verge on inside and outside of bend. No mitigation required; and
- B861 South of Leys Park House right / left bends - loads would oversail verge on inside and outside of bends. No mitigation required.

12.71 Before the abnormal loads traverse the route, the following tasks would be undertaken to ensure load and road user safety:

- An ESDAL (Electronic Service Delivery for Abnormal Loads) contacts search for the proposed loads using the Transport Scotland website to ascertain if there are any further constraints that are pertinent to the site. This will identify roads authority, police and statutory consultee constraints, should they exist;
- A review of clear heights with utility providers and the transport agencies along the route. The developer will ensure with providers that there is sufficient clearance with an appropriate safety factor, especially with respect to power lines;
- Trimming back of any vegetation which may foul the loads to allow passage;
- A review of forthcoming planned roadworks or closures that could affect the passage of the loads;

- A review of new and diverted underground services on the access route to ensure that there are none at risk from the abnormal loads;
- A review of maximum axle loading on structures along the access route with the various roads agencies prior to the loads being transported;
- Ensure that the various Police constabularies are satisfied with the route being used and that the local roads authorities have been further contacted regarding the proposed loads and suggested route; and
- A test run would be carried out to verify the proposed mitigation will permit the safe passage of abnormal loads.

12.72 A detailed Traffic Management Plan (TMP) would be developed in consultation with the police and roads authorities and agreed before deliveries to the development site commence, to ensure road safety for all road users during transit of development loads and to minimise any impact. Measures within the TMP could include:

- methods for managing the convoy and 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;
- specific construction traffic routes to minimise impact on unsuitable routes;
- a communications protocol to avoid delays with emergency vehicle traffic;
- a diary of proposed delivery movements to liaise with the communities to avoid key dates (such as fetes, etc); and
- working with local businesses to ensure the construction traffic does not interfere with deliveries or normal business traffic.

12.73 The abnormal load transports would be escorted by a number of vehicles, potentially including a police escort to assist a civilian escort car on specific sections of the route. It is proposed that an advance escort would warn oncoming vehicles ahead of the convoy, with the other escorts staying with the convoy at all times. The escorts and convoys should remain in radio contact at all times, where possible.

12.74 The transit of abnormal loads along areas of restricted geometry would be undertaken as a rolling closure to reduce the level of disruption to local traffic and residents. Subject to trunk road licensing conditions and police requirements, it is likely that the convoys would travel in the early morning periods, before peak times.

12.75 Advance warning signs would be installed on the approaches to the affected roads network. Temporary signage advising drivers that abnormal loads will be operating would be erected on the sections of the proposed route from the Port of Inverness through to the site access. The purpose of signage is to help improve driver information and allow drivers of oncoming traffic to consider proceeding to the nearest convenient passing point, or breaking their journey until the convoy has moved on.

12.76 To further improve driver information, it is suggested that Variable Message Signs (VMS), operated by Transport Scotland, are used to warn drivers of abnormal loads operating. This would display information warning of possible delays and would allow drivers to consider alternative routes if possible.

12.77 For return journeys, the extendible low loaders used for the delivery of the longer wind turbine components, would be retracted to ensure they leave the proposed site with a trailer length of no more than 16m.

12.78 Additionally, information on the movement of abnormal load convoys could be provided to local media outlets to help assist the public. These could include:

- Local Newspapers;
- Local Radio Stations;
- Community Councils;
- Applicant website; and
- The Highland Council website.

12.79 Information would relate to expected abnormal vehicle movements from the Port of Inverness through to the development site access. It is hoped that this level of information would make residents aware of convoy movements and help reduce any potential conflicts.

12.80 Appropriate permits would be obtained in order to facilitate the transportation of abnormal loads at specified times to be agreed with the roads and other statutory authorities. Likewise, appropriate permits would be obtained in order to facilitate the temporary removal of street furniture (e.g. signage) where this could be required during the transportation of abnormal loads.

General Construction

12.81 During the construction period the Applicant would maintain a website containing the latest information relating to traffic movements associated with vehicles accessing the development site. This would be agreed with the roads authorities.

12.82 The following measures would be implemented in relation to site operation and maintenance during the construction phase through a Construction Traffic Management Plan:

- All non AIL construction goods vehicles to approach the site from the south via the B851 and B861;
- Appropriate traffic management measures at the site access junction to avoid conflict with AILs and general traffic, subject to the agreement of the roads authority;
- All materials delivery lorries (dry materials) would be sheeted to reduce dust and stop spillage on public roads;
- Specific training and disciplinary measures would be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway;
- Drivers would be required to pass through any sensitive areas, to be agreed with the Highland Council Roads / Transport Scotland, at low speed; and
- Wheel wash facilities would be established at the site entrance.

12.83 All drivers would be required to attend an induction to include:

- A safety briefing;
- The need for appropriate care and speed control;
- A briefing on driver speed reduction agreements (to slow site traffic at sensitive locations);
- Identification of specific sensitive areas;

- Identification of the specified route; and
- The requirement not to deviate from the specified routes.

12.84 A construction liaison committee would be established to ensure the smooth management of the project/public interface. It is proposed that Airvolution Energy, the construction contractors, the local community, and if appropriate, the police form the committee. This committee would form a means of communicating and updating on forthcoming activities and dealing with any potential issues arising.

12.85 The local authority may require an agreement, a standard condition, to cover the cost of abnormal wear and tear on roads not designed for that purpose.

12.86 Video footage of the pre-construction phase condition of the abnormal loads access route and the construction vehicles route would be recorded to provide a baseline of the state of the road prior to any construction work commencing. This baseline would inform any change in the road condition during the construction stage of the proposed development and an appropriate proportion of the responsibility for the resulting repairs and maintenance would be agreed with the relevant road authority at the end of the construction phase. 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.

12.87 Road improvements would be carried out in agreement with The Highland Council and the appropriate statutory authorities to ensure that during delivery of turbine components minimal damage is caused to road surfaces, verges, street furniture and surrounding vegetation. 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.

During Operation

12.88 To eliminate the potential for nuisance from vehicle noise and dust, maintenance and monitoring of site roads and cleaning of public roads would be carried out as necessary.

12.89 No further mitigation measures during operation are proposed as it is predicted that there would only be a very small number of vehicle movements per week for maintenance purposes. Consideration may have to be given to the very occasional abnormal load movement to deliver replacement components, although any required mitigation to allow for this would have to be determined at the time.

During Decommissioning

12.90 Given that similar operations are required to decommission the proposed development, the mitigation measures would be comparable with those indicated for the delivery and construction period.

RESIDUAL EFFECTS

12.91 This section considers the assessment of traffic effects following the incorporation of the mitigation measures identified above. Effects during the operational phase have been scoped-out of the assessment, which therefore only considers those arising during the construction phase.

Residual Effects During Construction Phase

12.92 An evaluation of the potential impact of the increase in traffic on the local roads to be used as part of the route for construction traffic has been undertaken. This considered the traffic impacts on different environmental receptors identified in the IEMA Guidance with no mitigation in place (Table 12.10).

12.93 Table 12.11 summarises the potential environmental effects identified in the evaluation. It confirms that following the implementation of the identified mitigation, the only residual effects considered to be significant in terms of the EIA Regulations are those on pedestrian amenity. The impact on pedestrian amenity is assessed to be potentially moderate; however pedestrian flows are low in the area so the number of people that could be affected is likely to be minimal.

Table 12.11: Summary of Residual Effects Post Mitigation

Receptor	Receptor Sensitivity	Change	Mitigation	Magnitude of Change (post mitigation)	Significance of Residual Effects	Residual Significance
Residents close to and pedestrians using construction traffic route	Medium	Severance associated with increased traffic movements	Implementation of Construction Traffic Management Plan, application of speed limits, AIL movements controlled through Traffic Management Plan, traffic management at site access, restricted delivery hours	Minor / Negligible	Slight	Not significant
All users of construction traffic route	Medium	Driver delay associated with movement of abnormal loads	Load escorts, advance warning signage, website. Implemented through Traffic Management Plan	Minor / Negligible	Slight	Not significant
Pedestrians on construction traffic route	Medium	Pedestrian delay associated with AIL and construction traffic movements	Implementation of Traffic Management Plan and Construction Traffic Management Plan	Minor / Negligible	Slight	Not significant
Pedestrians on construction traffic route	Medium	Pedestrian amenity associated with AIL and construction traffic movements	Implementation of Traffic Management Plan and Construction Traffic Management Plan	Moderate	Moderate	Significant
Pedestrians on construction traffic	Medium	Fear and Intimidation	Implementation of Traffic Management Plan and Construction Traffic	Negligible	Neutral	Not significant

Airvolution Energy
Carr Ban Wind Farm

Receptor	Receptor Sensitivity	Change	Mitigation	Magnitude of Change (post mitigation)	Significance of Residual Effects	Residual Significance
route		associated with ALL and construction traffic movements	Management Plan			
All users of construction traffic route	Medium	Accidents and safety	Appropriate management of movement of ALLs, traffic management measures along the access route. Implemented through Traffic Management Plan and Construction Traffic Management Plan	Minor / Negligible	Slight	Not significant

CUMULATIVE IMPACTS

12.94 As requested by The Highland Council, consideration was given to the proposed development of a number of power generation and transmission facilities at Farr, Dunmaglass, Moy, Tom nan Clach, Allt Duine and Torness. A review of planning information for each of the sites identified the following:

- Farr – operational;
- Dunmaglass – under construction;
- Moy – ES transport chapter indicates that traffic associated with the scheme will only impact on the A9 and B9154;
- Tom nan Clach – Consented; currently only at scoping stage for a redesign of the consented scheme, no traffic information available;
- Allt Duine – ES transport chapter indicates that traffic associated with the scheme will only impact on the A9; and
- Torness – planning documentation indicates that traffic associated with schemes around Torness will not impact on the study area being considered in this chapter.

12.95 Reviews of the relevant documentation associated with the developments indicated that construction traffic associated with those developments would be unlikely to impact on the proposed construction route for the proposed development and that the construction programmes would not overlap.

12.96 No cumulative impacts are anticipated as a result of the proposed development as no other significant developments that would impact on the study area are anticipated to be under construction (the main period of traffic generation) within the same timescale.

CONCLUSIONS

12.97 The proposed development will lead to increased traffic volumes on a number of roads in the vicinity of the development site during the construction phase. The maximum traffic impact associated with construction of the proposed development is predicted to occur in month 4 of the programme. During this month, an average of 88 traffic movements are predicted per working day. Traffic volumes would fall off considerably outside the peak period of construction.

12.98 No significant capacity issues are expected on any of the roads within the study area due to the additional construction traffic movements associated with the proposed development as background traffic flows are very low and the links are of reasonable standard.

12.99 Traffic levels during the operational phase of the proposed development will be one or two vehicles per week for maintenance purposes. Traffic levels during the decommissioning phase are expected to be lower than during the construction phase as some elements may be left in situ and others broken up on site.

12.100 The movement of abnormal loads will require minor physical works at a limited number of locations and will require a police escort.

12.101 With the implementation of appropriate mitigation, no residual effects of



significance are anticipated in respect of traffic and access issues, except on the amenity of pedestrians. Pedestrian flows are low in the area so the number of people that could be affected is likely to be minimal.

Chapter thirteen

CULTURAL HERITAGE

INTRODUCTION

13.1 This chapter assesses the potential significant effects of the proposed development upon the historic environment. It examines the heritage significance (sensitivity) and value of those heritage assets which are within the vicinity of the proposed development and it assesses the effect of the proposed development on the setting of those heritage assets, concluding with effects on each asset. In addition it assesses the archaeological potential of the site, the likely significance of that potential and the effects of the proposed development upon archaeology.

13.2 This chapter should be read in conjunction with Chapter 6: Landscape and Visual of this ES. Designated heritage asset mapping is enclosed at Figures 13.1-13.2. Appendix 13.1, contains the archaeological desk based assessment, Appendix 13.2, a list of designated heritage assets, and Appendix 13.3 includes assessment tables for all designated heritage assets where the effect of the proposals is considered to be greater than 'small'. Heritage visualisations to support this chapter are contained in ES Volume 2 (Figures 13.3.1 – 13.3.4).

13.3 More specifically, this chapter assesses the effect of the proposed development on archaeology and on heritage significance through effects on the setting of designated heritage assets (both forms of direct effect). The potential effects arising from the construction, operation and decommissioning of the proposed development are considered.

13.4 There will be no direct physical intervention into any designated heritage assets, only effects on setting as defined in the publication 'Setting' produced by Historic Scotland (Oct 2010). No part of the proposed development requires listed building consent, or falls within a designated area of heritage significance. Therefore, the potential direct effects involve visual change, not physical change.

13.5 The aim of this assessment is to consider:

- The physical effect on non-designated heritage assets, including buried archaeological remains and other historic structures, within the footprint of the proposed development (as defined in Chapter 3 of this ES); and
- The effect on the significance of designated heritage assets through an effect on their setting, including listed buildings, conservation areas, scheduled monuments and registered battlefields, within the Zone of Theoretical Visibility (ZTV) to a distance of 5km from the proposed turbines. Highly graded or particularly sensitive designated assets, namely Category A Buildings, scheduled monuments and inventory battlefields and designed landscapes within 10km are also considered.

13.6 The assessment has considered the effect on heritage assets within the following areas:

- On-site – effect on archaeological potential and any non-designated heritage assets within the site;
- Up to 1.5km – undesignated heritage assets;