CONTENTS

INTRODUCTION

12.1 This Chapter considers the environmental impacts that are potentially significant where the Ben Sca Wind Farm (the proposed development) is likely to result in increased traffic flows. 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.

12.2 Potentially significant traffic related environmental effects may result from two forms of potential impacts:

- the transport configurations made for the movement of turbine components (including blade, tower sections and nacelle), 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); and
- the import of general construction materials transported via *'conventional'* heavy goods vehicles (HGVs) and low loaders.

12.3 The assessment detailed within this Chapter is based around worst case assumptions made for the purpose of forming a robust assessment of the proposed development within the parameters identified in **Chapter 3: Description of the Development**.

12.4 This Chapter does not focus on the transport configurations made for the movement of wind turbine components. The routes have been considered in the separate Abnormal Loads Route Assessment (ALRA) document prepared by White Young Green Environment Planning Transport Ltd (WYG) (dated May 2019) which includes swept path analysis and a detailed review of the preferred routes for access; the findings from the WYG report have been reviewed to inform this Chapter. The WYG report is included as Technical Appendix 12.1.

12.5 During operation, the proposed development would generate regular maintenance trips, which are not anticipated to lead to any variation in the baseline traffic flows beyond that of every day fluctuation. Given that there is a thirty year lifetime for the proposed development, the focus of the assessment within this Chapter is the construction phase.

12.6 Planning policies of relevance to this assessment are provided in **Technical Appendix 4.1: Legislation, Planning Policy and Guidance**.

12.7 The traffic impact assessment and the reporting required for the preparation of this Chapter has been undertaken by SLR Consulting Ltd.

SCOPE AND CONSULTATION

12.8 A scoping report (SLR, 2018) was submitted to THC in November 2018. Scoping responses containing comments relating to traffic and transport were obtained from the following organisations:

- The Highland Council (Transport Planning Team and Access Officer); and
- Transport Scotland.

Consultation

12.9 A summary of the key points from the relevant scoping responses and details of how comments have been addressed in the EIA Report are provided in **Table 12-1**.

Table 12-1
Key Issues

Consultee	Summary of Key Issues	Where Addressed in Chapter
THC (Transport Planning Team)	Identify all Council maintained roads likely to be affected by the various stages of the development and consider in detail the impact of development traffic on these roads.	From paragraphs 12.19 to 12.25
	Cumulative impact with any other developments in progress or committed, including other renewable energy projects, should be considered.	From paragraphs 12.62 to 12.67
	Justification of the chosen Port of Entry and the preferred route for AIL's shall be clearly demonstrated. (Including details of alternative routes that have been considered and an explanation as to why these were discounted in favour of the preferred route. Detailed review of the preferred route, to include swept path assessment and consideration of any structures along the route, shall be undertaken.	**Technical Appendix 12.1: Abnormal Loads Route Assessment** prepared by WYG
	The proposed route for general construction traffic should be identified and reviewed.	Paragraphs 12.46 – 12.48 and 12.85 – 12.100
	Construction Traffic Management Plan (CTMP).	**Technical Appendix 12.2: Outline CTMP**
	The proposed access onto the A850 should be clearly detailed on dimensioned drawings related to OS data; and include confirmation of geometry, construction and drainage as well as junction visibility splays.	Detail provided on Drawing 001 prepared by WYG.
THC (Access Officer)	Ensure appropriate pedestrian gates are included with site access proposals where the tracks link. Easy opening pedestrian gates to BS5709 for gaps and barriers should be installed to the side of vehicular access gates and be no less than 1.5 metres wide with access and egress to the same standard as that of the existing wind farm track.	Paragraph 12.46 – 12.48.
Transport Scotland	ALRA including swept path analysis and potential mitigation measures required including the temporary removal of street furniture, and proposed junction widening, traffic management etc. to ensure that transportation will not have any detrimental effect on structures within the trunk road route path.	**Technical Appendix 12.1: Abnormal Loads Route Assessment** prepared by WYG.

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

Effects Scoped Out

Operational Effects

12.11 It is estimated that the operational phase of the proposed development would generate no more than five vehicular trips in any one average day. 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 construction.

12.12 The trips generated by the operational activities onsite would be no greater than those expected and accounted for in the background variations to the existing traffic flows. As such negligible traffic flows would be indistinguishable from normal daily traffic flows and therefore assessment of operational effects has been scoped out of this assessment.

Decommissioning Effects

12.13 The proposed development has been designed with an operational life of 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 comprise the following elements which would lead to future traffic movements:

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

12.14 Trip generation associated with these activities would not exceed the average level of trip generation assessed for the construction phase and it is likely to be considerably lower. Therefore, the decommissioning phase of the proposed development has been scoped out of this assessment.

APPROACH AND METHODS

12.15 This Chapter takes an appropriate and topic specific approach to assessment of the proposed development as described within **Chapter 3: Description of the Development**. The approach for the assessment of site access, 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.

12.16 The effects of the construction phase traffic have then been assessed against the measured baseline in terms of existing traffic levels and then compared to standard practice criteria within paragraphs 12.102 to 12.151.

12.17 The assessment is detailed against two worst case assumptions:

- all construction materials are assumed to be sourced from offsite locations (i.e. outside of

the application boundary), including all aggregate required for track construction, thus ensuring that the estimated level of trip generation has been considered as a worst case. This is an unlikely situation but has been included to ensure a robust assessment; 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.

12.18 A second scenario has been assessed where it is assumed that a realistic proportion of aggregate would be won from the onsite borrow pit with all additional construction materials assumed to be sourced offsite. The borrow pit assessment (Technical Appendix 10.3) does confirm that the majority of aggregate required for the construction of the wind farm could be won onsite.

Study Area

12.19 The site (as defined by the application boundary) is located within the administrative boundary of THC, approximately 2km to the south west of Edinbane and approximately 7km to the east of Dunvegan and is accessed via a purpose built track from the A850 which is situated approximately 365 metres east and opposite the road to Greshornish.

12.20 The study area defined for this assessment is shown on **Figure 12.1**; it comprises the A850 to the east of the site access junction, past Edinbane to the junction with the A87.

12.21 The study area has been defined based on the sections of road network likely to see the greatest effects associated with traffic generated by the proposed development. The study area includes the sections of road nearest to the proposed development site access junction. As vehicles travel away from the proposed development, they would be distributed across the wider highway network. Beyond the study area, professional judgement suggests that effects relating to site access, traffic and transport would be unlikely to be significant.

A850

12.22 The A850 extends in an east/west direction between Knott and Dunvegan, connecting with the A87 to the east and the A863 at Dunvegan. It is a rural road which provides access to a number of settlements with the presence of some scattered properties directly on the A850, including residential dwellings, B&Bs and a church fronting the road to the east. The A850 is subject to the national speed limit of 60mph throughout its length within the site access, traffic and transport study area. Road markings are present, although worn in places, and the road supports a single carriageway of approximately 5.5m in width. There are also numerous laybys and passing areas throughout its length.

Information and Data Sources

12.23 To determine the baseline conditions against which the effects of the proposed development have been assessed, open data from the Department for Transport (DfT) website has been obtained. The annual traffic statistics are accrued via 12 hour manual traffic counts (MTCs), continuous data from automatic traffic counters (ATCs), data on road lengths as well as robust estimation based upon previous data. The location of this counter is shown on **Figure 12.2**.

12.24 Additionally, road traffic collision (RTC) data for the most recent five year period from 2014 to 2018

has been obtained from Transport Scotland. The locations of the recorded injury accidents are shown on **Figure 12.3**.

12.25 An understanding of the existing situation and baseline conditions within the study area has been established through a visual inspection of the road network via a desktop study using tools available on the Internet.

Assessment Methods

12.26 The likely significance of the potential effects from the proposed development that relate to site access, traffic and transport have been determined by considering the magnitude of change in traffic movements and the sensitivity of the 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.

12.27 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 below 10% are considered insignificant.

12.28 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 potential effects which may arise from changes in traffic flows resulting from the proposed development:

- driver severance and delay – the potential delays to existing drivers and their potential severance from other areas;
- community severance and delay – the potential severance to communities and the delays to movements between communities;
- noise and vibration – the potential effect caused by additional traffic on sensitive receptors, which in this case relate to residential properties near to the road (see also **Chapter 13: Noise**);
- 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.

12.29 In addition to the effects listed above, human health effects are considered in transport terms in reference to pedestrians within the vulnerable road user and road safety effects.

12.30 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 Receptor

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

12.32 The IEMA guidelines provide two thresholds when considering predicted increase 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).

12.33 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. Each receptor has been assessed individually to determine its sensitivity and the assessment criteria chosen are shown in **Table 12-2**.

Table 12-2
Receptor Sensitivity

Impact	Low Sensitivity	Medium Sensitivity	High Sensitivity
Driver severance & delay	Road network not affected	Road network not experiencing congestion at peak times	Road network experiencing congestion at peak times
Road Safety		High sensitivity receptor	
Community severance & delay	No presence of existing communities severed by road	Presence of existing communities with a moderate level of existing severance (subjective assessment)	Presence of existing communities with existing severance (subjective assessment)
Noise	No sensitive receptors	Presence of sensitive receptors near to the road	Presence of sensitive receptors adjacent to the road
Vulnerable road users		High sensitivity receptor	
Wider disruption due to dangerous loads	No hazardous or dangerous loads on the road network	Some hazardous or dangerous loads on the road network. Loads are legally permitted on UK roads	Abnormal and oversized loads to use road network
Dust and 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

12.34 The magnitude of impact or change has been considered according to the criteria defined in **Table 12-3**.

Table 12-3
Magnitude Criteria

	Negligible	Minor	Moderate	Major
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
Noise	<25% increase in traffic	>25% increase in traffic. Quantitative assessment based on predicted increase in traffic against measured baseline (see **Chapter 13: Noise**)		
Vulnerable road users	<10% increase in traffic	Qualitative assessment of existing accident records and predicted increases in traffic		
Dangerous loads	0% increase in traffic	<30% increase in traffic	<60% increase in traffic	>60% increase in traffic
Dust and dirt	<10% increase in traffic	<30% increase in traffic	<60% increase in traffic	>60% increase in traffic

Significance of Effect (Potential Effects)

12.35 Sensitivity and magnitude of change as assessed under the detailed criteria have then been considered collectively to determine the potential effects and their significance. 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.

Potential Cumulative Effects

12.36 An assessment of the cumulative effect on the study area of all relevant developments, including local wind farms, within a 40km radius of the site (either in the planning system or under construction) which may utilise the same access routes as the proposed development has been undertaken.

Operational Cumulative Effects

12.37 As the operational impact of the proposed development on the study area is indiscernible, the operational cumulative effects have not been assessed.

Mitigation

12.38 Mitigation measures would be considered as part of construction good practice and would seek to offset any effects which have been assessed as significant.

Residual Effects

12.39 Following consideration of mitigation measures, an assessment of the residual effects has been made. Residual impacts are those likely to occur after mitigation measures have been incorporated

into the scheme. Potential residual impacts include general wear and tear to roads and verges as a result of increased traffic, and temporary road closures caused by abnormal load deliveries.

Statement of Significance

12.40 A statement of significance is provided at the end of the Chapter which provides a summary of the complete assessment for each receptor, taking into consideration any proposed mitigation measures, and it reports the significance of the residual effects in compliance with the EIA Regulations.

Assumptions, Limitations and Confidence

12.41 The assessment of the potential impacts to the baseline traffic relies on the accuracy of the traffic flow data. The DfT data are considered to be reliable.

12.42 The potential effects of seasonality has not been included as part of this Chapter's assessment. The CTMP would take the matter of seasonal traffic into account as discussed in paragraph 12.140.

12.43 The development trip generation has been based on the quantity of materials as confirmed at this stage. While there is a possibility that these may alter, assumptions have been made to ensure that the figures are robust.

12.44 The route review and assessment of abnormal load delivery has been completed by a different consultant. It is assumed that the information reported in the ALRA document is accurate and that the findings and recommendations are relevant and suitable.

BASELINE CONDITIONS

12.45 This section details the baseline conditions that exist in the study area in relation to the existing road network, existing traffic flows and the current safety of the study area.

Current Baseline

Existing Road Network

12.46 The study area for this assessment has been defined as the A850 extending east from the site access junction to the A87, approximately 11 miles to the east. A full description of this road has been provided in paragraph 12.22.

12.47 The existing site access comprises a small gated junction from the A850 approximately 365 metres east and opposite the road to Greshornish. This access and track were previously constructed and utilised for the construction and operational phases of the adjacent Ben Aketil Wind Farm.

12.48 Internal access tracks will link to the previously constructed access track for the adjacent Ben Aketil Wind Farm which will provide both vehicular and pedestrian access.

Existing Traffic Flows

12.49 Baseline traffic flows have been obtained from up-to-date data on the DfT website. The traffic count location (number 10944) is on the A850 approximately 700 metres north from the boundary of

Edinbane village and is shown on **Figure 12.2**. Data from this count is provided for 2018 where the flows are estimated using the previous year's average annual traffic flow (AADF). This is considered to be relevant and acceptable for use.

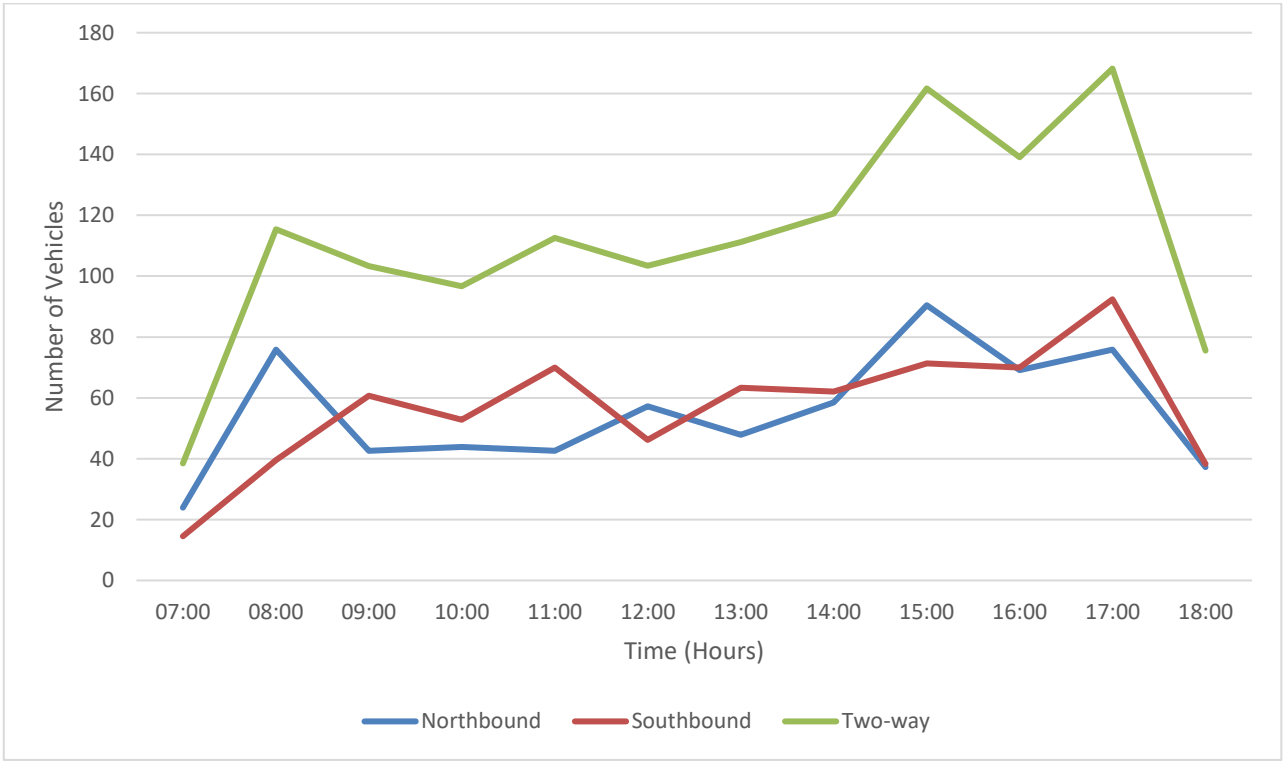
12.50 The data from the DfT website are provided in Technical Appendix 12.3 and a summary of the average weekday (07:00 to 19:00) traffic is provided in **Table 12-4**. The data includes directional and two-way flows.

Table 12-4
Average Weekday 12 Hour Traffic Flows

Northbound			Southbound			Two-Way		
Total	HGV	%HGV	Total	HGV	%HGV	Total	HGV	%HGV
665	21	3%	681	29	4%	1,346	50	4%

12.51 **Table 12-4** shows that the A850 east of the site access supports approximately 2% more vehicles in the southbound carriageway than the northbound and a slightly higher percentage of HGVs.

12.52 Traffic flow profiles showing the northbound, southbound and two-way traffic flows over a 12 hour period (07:00 to 19:00) have been plotted on **Graph 12-1**. The data plotted have been obtained from an average of weekday vehicle numbers recorded at the traffic count location described in paragraph 12.49.



Graph 12-1
12 Hour Average Traffic Profile (All Vehicles)

12.53 **Graph 12-1** shows that traffic flows along the A850 east of the site access junction near to Edinbane

village tend to fluctuate between above 10 and below 80 vehicles per hour (each direction) throughout the 12 hour period with a slight afternoon peak in northbound traffic of 90 vehicles around 15:00 and with above 90 vehicles southbound at approximately 17:00.

Seasonality Traffic Flows

12.54 It is recognised that The Isle of Skye experiences a significant traffic associated with visitor numbers, in particular during the summer months. The DfT traffic flow data does not provide monthly flows, only an averaged yearly figure, and so it has not been possible to discuss the impact of tourism, seasonal or otherwise, on the base situation on the highway network within the study area.

Accident Records

12.55 Personal Injury Accident (PIA) data covering the study area of the A850 from the site access junction to the A87 in the east have been obtained for the five year period between 2014 and 2018, which comprises the most recent period of available data. This data was provided for by Transport Scotland on 05 August 2019. The locations of recorded accidents are shown on **Figure 12.3.**

12.56 The raw data are included in **Technical Appendix 12.4: Accident Data** and includes the location, severity and number of vehicles and casualties involved in each accident; additional details including the vehicle type, weather/road conditions and the potential reasoning for cause of accident have not been provided.

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

12.58 For clarification, those accidents recorded which result 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.

12.59 A total of 2 injury accidents were recorded across the study area during the five year period both resulting in slight injury. There were no serious injury accidents or any fatalities recorded within the data period.

12.60 The first accident was recorded on 10 June 2014 and occurred on the old A850 to the east of Carbost, resulting in slight injury to one casualty. The second recorded accident occurred on 29 January 2015 close to the junction with the turning towards Tote. This accident resulted in slight injury to one casualty. It is not possible to determine the cause of the two accidents, however two accidents in a five year period from 2014 does not imply that there is an existing issue with road safety.

Existing Road Network Performance

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

- the existing road network has a low percentage of HGVs and would be expected to support an increase;
- the study area has a low accident record; and
- there are no further improvement works that have been proposed to the roads within the

study area.

Cumulative Situation

12.62 **Chapter 5: EIA** provides further information on the cumulative sites.

Construction Period Baseline Changes Considered

12.63 The following cumulative wind farm sites have been agreed with THC and SNH (May 2019) and have been reviewed to determine whether the construction periods coincide with the proposed development construction timetable.

12.64 The cumulative sites which have been considered as part of this assessment are:

- Glen Ullinish Wind Farm (consented): This wind farm would see 14 turbines constructed with access to the site obtained via the A863. The location of this site is likely to see development generated vehicles, including AILs, travel via the A87 to Sliglachan then the A863 to the site entrance. It is anticipated that there will be no impact to the upper A87 or to the A850, however due to potentially conflicting construction programmes it is possible that vehicles from both Glen Ullinish Wind Farm and the proposed Ben Sca Wind Farm would see some overlap on the wider highway network. This is considered to be an insignificant increase to the highway baseline as vehicles will dissipate the further from the sites they travel, therefore these vehicles would be considered a part of normal every day traffic flow fluctuations and needs no further assessment. The delivery AILs has the potential to result in significant impacts to the wider highway network, should the deliveries for the two sites occur at the same time. This is unlikely to happen as the deliveries would be coordinated with THC and each would be scheduled separately.

- Ben Aketil Wind Farm (and Extension) (operational) which sits to the south of the proposed development, approximately 1,124m from the nearest turbine: The route used for the delivery of AILs and construction associated vehicles follow the same route as per the proposed. This development is operational so only maintenance trips would potentially conflict with the construction phase. As previously discussed, maintenance trips are regular but of a low quantity and so is anticipated to cause no effect to the construction baseline.

- Edinbane Wind Farm (operational) approximately 1,057m to the east: The site access road for this wind farm is off the A863 near to Balmeanach. For this reason, it is expected that vehicles follow the same route as Glen Ullinish and therefore no associated trips will come into conflict with the proposed on the upper A7 or A850.

- Beinn Mheadhonach (consented): The proposal at Beinn Mheadhonach would see four wind turbines constructed on land to the east of the A863, north of Drynoch. Access would be via the A863. It is anticipated that there will be no impact to the upper A87 or to the A850.

12.65 The review of the permitted and pending wind farms likely to impact on the Ben Sca Wind Farm study area has identified that there will be no cumulative effects anticipated as a result of the combined construction impacts.

Operational Period Baseline Changes Considered

12.66 The operational period of the proposed development has been scoped out of this Chapter as stated in paragraphs 12.11 and 12.12.

Decommissioning Period Baseline Changes

12.67 The decommissioning period of the proposed development has been scoped out of this Chapter as stated in paragraphs 12.13 and 12.14.

THE PROPOSED DEVELOPMENT (FUTURE BASELINE)

Introduction

12.68 The proposed development is described fully in **Chapter 3: Description of the Development**.

Grid Connection

12.69 The grid connection point for the proposed development is subject to confirmation by the network operator. The precise route of the grid connection cabling has not yet been determined and the assessment of its effects are not identifiable because it has yet to be designed and applied for.

Site Access and Onsite Tracks

12.70 An existing access track and bellmouth junction, which previously served the construction of the neighbouring Ben Aketil Wind Farm, is to be upgraded as required to provide access directly from the A850. This is shown in **Drawing 001** in Technical Appendix 12.1. Approximately 3.63km of new onsite access tracks spurring from the existing Ben Aketil Wind Farm track would be constructed to provide links between each individual turbine.

Turbines & Turbine Foundations

Foundations

12.71 Turbine foundations would be constructed in reinforced concrete, with concrete batched on site using imported cement and aggregates either imported or sourced from the onsite borrow pits.

Turbine Components

12.72 Wind turbines would be delivered in component parts (7 per turbine) and are treated as abnormal loads.

12.73 The proposed abnormal load route to the site is shown on **Figure 12.4** and is assessed within **Technical Appendix 12.1: Abnormal Loads Route Assessment**. In summary the route would begin at the Port Kyle of Lochalsh and end on the A850 (at the site entrance). The approach to the site would be taken via the A87 trunk road and the A850-Dunvegan Road. A similar route has previously been employed for construction of the neighbouring Edinbane and Ben Aketil Wind Farms.

Construction Programme

12.74 An indicative 12 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**. For the purposes of this assessment it is assumed that construction is likely to begin in 2024. The main construction works will be undertaken during months 6 to 12. The final four months of the construction programme would comprise a wind turbine (WTG) delivery and erection, with road and site restoration.

Proposed Development – Construction Materials

12.75 The proposed development would require the transportation of a range of construction materials to the site. The key elements of construction work which would result in trip generation have been summarised in **Table 12-5**.

Table 12-5
Construction Activities Requiring Vehicle Trips

Key Work Element	Details and Assumptions	Conventional HGVs	Abnormal Loads
Site Establishment	Delivery of site cabins and plant for construction activities at commencement of construction and later removal from site.	Yes	No
Borrow Pit	Delivery of plant associated with establishing the borrow pit.	Yes	No
Access track upgrade and Construction	3.65km of new onsite track, together with floating tracks, passing places and turning heads.	Yes	No
Turbine foundations and Crane Hardstandings,	Delivery of plant associated with construction of crane hardstandings. Delivery of plant and materials including concrete, aggregate and reinforcement materials for turbine foundations.	Yes	No
Control Building and substation	Delivery of material for construction of building foundations, structure and finishings. Delivery of electrical equipment.	Yes	Yes
Electrical Installation	Delivery of sand and cables to connect turbines to substation.	Yes	No
Wind Turbine Delivery	Delivery of turbine components to site. Bringing in of crane equipment to erect turbines. Includes escort vehicles associated with movement of abnormal loads.	Yes	Yes

12.76 The precise quantities of construction materials required for the proposed development will depend on the presence and productivity of onsite borrow pits.

12.77 While there are proposed borrow pits on site, THC have requested a robust assessment of a worst case scenario where a greater volume of material is imported to site. Therefore, to accurately assess

the potential impact of the transportation of construction materials to the site, two scenarios have been modelled, these are:

- **Scenario 1:** All construction materials are assumed to be sourced from offsite locations, including all aggregate required for concrete and track construction and upgrade, thus ensuring that the estimated level of trip generation is considered as a worst case (quarry locations are shown within **Figure 12.5** and due to the locations all construction vehicles would utilise the same route as AILs); and
- **Scenario 2:** All aggregate is assumed to be sourced from the proposed three onsite borrow pits with all remaining construction materials assumed to be sourced from offsite locations.

12.78 An estimation of the material quantities for all elements of the proposed development has been made. **Table 12-6** provides a summary of the material quantities (aggregates only) required to be imported when referring to scenario 1; a worst case scenario.

Table 12-6
Estimated Aggregate Material Quantities – Scenario 1: Worst Case

Proposed Infrastructure	Volume of Aggregate Required	Approximate Tonnages of Aggregate Required
Access Tracks	25,843 m^3	51,686t
Turbine Bases – formation only	1,800 m^3	3,600t
Fill Above Turbine Bases	10,062 m^3	20,124t
Crane Pads	25,200 m^3	50,400t
Substation	900 m^3	1,800t
Additional Laydown	2,250 m^3	4,500t
Construction Compound	2,500 m^3	5,000t
Total	**68,555m^3**	**137,110t**

12.79 **Figure 3.1** provides the site layout and infrastructure. The borrow pits are numbered 1-3 and their locations within the development are shown.

12.80 Borrow pit no.1 will be approximately 40m x 65m with an excavation area of approximately 2,600m^2 and an excavation height of approximately 12m. The extent of aggregate extraction from this borrow pit is assumed to be 13,520m^3.

12.81 Borrow pit no.2 will be approximately 75m x 75m (at maximum extent) with an excavation area of approximately 3,580m2 and an excavation height of approximately 6m. The extent of aggregate extraction from this borrow pit is assumed to be 6,720m^3.

12.82 Borrow pit no.3 will be approximately 125m x 75m with an excavation area of approximately 9,375m^2 and an excavation height of approximately 12m. The extent of aggregate extraction from this borrow pit is assumed to be 48,750m^3.

12.83 Scenario 2 is the more realistic scenario whereby onsite borrow pits are taken into account with

aggregate extraction. The borrow pits are expected to extract a total amount of material which exceeds the amount required for importation in the worst case scenario (Scenario 1); therefore no additional importation of aggregates would be required for Scenario 2.

12.84 **Table 12-7** provides material quantities for all other non-aggregate materials.

Table 12-7
Estimated Material Quantities Excluding Aggregate (Both Scenarios)

	Infrastructure	Material Quantities	
Turbine Foundations	Installation 6N Structural Fill	1,776m^3	3,552t
	Blinding	255m^3	510t
	Installation of Can/Bolts	9no	
	Reinforcement	737t	
	Plinth Shutter	16.8m^3	33.6t
	Base Slab Perimeter Shutter	39.3m^3	78.6t
	Ducts (200mm diameter)	54no	
	Ducts (75mm diameter)	54no	
	Transformer Plinths	9no	
	Step Plinth	9no	
Electrical Connection	Sand Layer – 6m x 3m x 3,400m	612m^3	1,224t
	Cable – Drums hold 500m	3,400m	7 drums
Cement	Cement required for 450m^3 of concrete	158t	
Control Building	Reinforcement	39t	
Substation Compound	Imported type 1 running surface	513.8m^3	1,027.6t
	Imported 6F2 Capping	1,029m^3	2,058t
	Class 1C1 Roadbox bulk fill	2,571m^3	5,142t
	Class 1 general fill	6,884m^3	13,768t

Trip Generation

HGV Trip Generation

12.85 The total number of HGV trips predicted to arise during the construction phase of the proposed development has been calculated based on the estimated material quantities provided in **Table 12-7**. These have then been doubled to provide the two-way movements that would occur from delivery and then returning vehicles, as shown by **Table 12-8**.

Table 12-8
Total Number of HGV Trips

Item		Load Size	Scenario 1		Scenario 2	
			No. of loads	Two-way Movements	No. of loads	Two-Way Movements
Aggregates						
Access Tracks		20t	2,584	5,168	-	-
Turbine Bases – formation only		20t	180	360	-	-
Fill Above Turbine Bases		20t	1,006	2,012	-	-
Crane Pads		20t	2,520	5,040	-	-
Substation		20t	90	180	-	-
Additional Laydown		20t	225	450	-	-
Construction Compound		20t	250	500	-	-
Non-Aggregate Items						
Turbine Foundations	Installation 6N Structural Fill	20t	178	356	178	356
	Blinding	20t	26	52	26	52
	Installation of Can/Bolts	-	1	2	1	2
	Reinforcement	20t	37	74	37	74
	Plinth Shutter	-	1	2	1	2
	Base Slab Perimeter Shutter	-	1	2	1	2
	Ducts (200mm diameter)	-	1	2	1	2
	Ducts (75mm diameter)	-	1	2	1	2
	Transformer Plinths	-	9	18	9	18
	Step plinth	-	9	18	9	18
Electrical Connection	Sand layer – 6m x 3m x 3,400m	20t	66	132	66	132
	Cable – drums hold 500m	-	7	14	7	14
Cement		9t	18	36	18	36
Control Building	Reinforcement	20t	2	4	2	4
Substation Compound	Imported Type 1 running surface	20t	52	104	52	104
	Imported 6F2 capping	20t	103	206	103	206

Item		Load Size	Scenario 1		Scenario 2	
			No. of loads	Two-way Movements	No. of loads	Two-Way Movements
	Class 1C1 Roadbox bulk fill	20t	258	516	258	516
	Class 1 General Fill	20t	689	1,378	689	1,378
Total Loads/Two-way Movements			**8,314**	**16,628**	**1,459**	**2,918**

12.86 The two-way movements for HGVs have then been spread over the construction programme according to the relevant activity, for both Scenario 1 and Scenario 2. Additional HGV trips associated with the construction of the control building has then been added. The total two-way trip generation has been divided by the number of operational days in each month to provide daily two-way trip generation as shown in **Tables 12-9** and **12-10** for the two Scenarios.

12.87 For ease of phasing the construction period, the following categories have been used which state the materials use:

- **Site Establishment** – Additional Laydown and Construction Compound;
- **Access track construction** – All associated materials (aggregates) for access tracks;
- **Substation construction** - Substation (aggregates) and all materials associated with the substation compound;
- **Cement** – Materials for cement;
- **Cabling** – Electrical connection materials; and
- **Erection of turbines** - Turbine bases and fill above turbine bases (aggregates) and all associated materials for turbine foundations; and

Table 12-9
Scenario 1 Daily Two-Way HGV Trip Generation by Construction Month

Activity	1	2	3	4	5	6	7	8	9	10	11	12
Site Establishment	13	13	13									
Access track construction	35	35	35	35	35	35						
Substation construction		16	16	16	16	16	16					
Cement (for all concrete)		1	1	1	1	1	1	1	1			
Cabling			2	2	2	2						
Erection of turbines						29	29	29	29			
TOTAL	**48**	**65**	**67**	**54**	**54**	**83**	**36**	**30**	**30**	**0**	**0**	**0**

Table 12-10
Scenario 2 Daily Two-Way HGV Trip Generation by Construction Month

Activity	1	2	3	4	5	6	7	8	9	10	11	12
Site Establishment	-	-	-									
Access track construction	-	-	-	-	-	-						
Substation construction		15	15	15	15	15	15					
Cement (for all concrete)		1	1	1	1	1	1	1	1			
Cabling			2	2	2	2						
Erection of turbines						5	5	5	5			
TOTAL	**-**	**16**	**18**	**18**	**18**	**23**	**21**	**6**	**6**	**0**	**0**	**0**

HGV Trip Generation Summary

12.88 The majority of construction activities would incur HGV trip generation which would be spread over the first 6 month period defined in the construction programme, with the final two months predominantly comprising light vehicle trips for snagging and restoration activities, followed by takeover (month 12).

12.89 The maximum level of two-way trip generation for Scenario 1 would occur in months 4 to 6 when material would be imported for access track construction, the construction compound, turbine foundation and hardstandings and materials for the control building.

12.90 The maximum level of two-way trip generation for Scenario 2 would occur in months 6 to 7 when material would be imported for turbine foundations and hardstandings and materials for the control building and substation.

12.91 **Table 12-11** provides a summary of the two-way trip generation for the worst case day (maximum trip generation) and an average case day for both scenarios.

Abnormal Loads Trip Generation

12.92 Each wind turbine consists of seven abnormal load deliveries: 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 to be AILs, these however would be delivered at a similar time. These movements would be on articulated low loaders and would be moved under suitable traffic management procedures.

12.93 If the 63 components were to be delivered in convoys of 3, the deliveries could be completed over 21 days. Over the three month period allocated for the erection of the turbines (final 3 months of 'Erection of Turbines', this would equate to 2 delivery days on most weeks.

12.94 Both Scenarios 1 and 2 include the AILs.

Light Vehicle Trip Generation

12.95 Light vehicles trips (those of which consist of smaller vehicles such as cars and vans, which would typically be associated with the workforce) have also been calculated to provide total two-way vehicle movements predicted to arise from the proposed development.

12.96 Light vehicle trips would be generated by the approximately 30 to 33 staff members who will be working on the site during the construction phase. In total there would be a maximum of 60 to 66 two-way movements daily. As a worst case (Scenario 1) all employees would drive to work as single car users, however it is more likely that only 75% of the predicted workforce will be on site at any one time with a tentative 20% of employees car sharing (Scenario 2).

Accumulative Trip Generation

12.97 **Table 12-11** provides the calculated daily and hourly two-way movements for both Scenarios 1 and 2.

Table 12-11
Trip Generation Summary (Two-way)

	Scenario 1		Scenario 2	
	HGV/AIL	Total	HGV/AIL	Total
Daily	85	151	25	65
Average hour	7	13	2	5

Trip Distribution

12.98 All construction vehicles would enter the site from the east having travelled the length of the A850 from the junction with the A87. Should all of the aggregates be sourced from outside of the site, the material would be transported from one or both of two existing quarries; these are shown on **Figure 12.5**. The quarries are both located to the south of Ben Sca Wind Farm, and would be accessed via the A850 and via the A87.

12.99 Other construction and delivery vehicles will travel via the A87 to the A850, where they will head west to the site access.

12.100 Light vehicle trip generation would see a maximum of 66 two way trips each day during the worst case months for each Scenario. It is assumed that the majority of light vehicles will travel to site via the A87 and the A850, however a small number may travel along the A863 from more local locations. As such it has been assumed that 80% of light vehicles will travel to and from the A850 east and 20% will travel via the A850 west.

ASSESSMENT OF EFFECTS

12.101 The proposed development has been designed to include a range of measures to mitigate potential effects. Included within this are the design of the site entrance to include radii and width suitable for ease of abnormal indivisible load access. All such measures are described fully in **Chapter 3: Description of the Development**.

Construction Effects

Assumptions of the Assessment – Proposed Development

12.102 The assessment has been undertaken under the assumption that good construction practice would be deployed, including the following:

- all vehicles delivering plant and materials to the site would be roadworthy, maintained and sheeted as required;
- suitable traffic management would be deployed for the movement of HGVs and other site traffic;
- suitable traffic management. Banksmen and police escort would be deployed for the movement of abnormal loads as required; and
- HGV loads would be managed to ensure that part load deliveries would be minimised where possible, to limit the overall number of loads.

12.103 The predicted increases in traffic levels against the baseline levels have been calculated in this section, and then an assessment of the significance of the effect has been made against the criteria described in **Tables 12-2** and **12-3**.

12.104 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).

12.105 Although sensitive receptors, e.g. residential properties, are present within the study area, the study area in its entirety is not considered to be sensitive, and therefore the threshold of 30% has been applied.

12.106 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 other than in exceptional circumstances. It should be noted that out of necessity some activity, for example abnormal load deliveries and the lifting of the turbine rotors, may need to occur outside the specified hours stated, although they would not be undertaken without prior approval from THC. The impact of the proposed development has been assessed over the 12 hour weekday period, which considered the natural peak usage of the road network.

12.107 The increase in traffic flow along the A850 has been calculated for both Scenario 1 and 2, 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.

12.108 **Table 12-12** shows the predicted daily total and HGV traffic increases for the two cases above. The baseline traffic flows are those observed on an average weekday over a 12 hour period between 07:00 and 19:00.

Table 12-12
Predicted Daily Increases in Traffic Along the A850 – 12 Hour Flows

	Road Link	Trip Case	Baseline		Development		Baseline + Development		Increase %	
			Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
Scenario 1	A850 East	Maximum day	1,346	50	151	85	1,497	135	11	170
		Average day			110	57	1,456	107	8	114
Scenario 2	A850 East	Maximum day	1,346	50	65	25	1,411	115	5	50
		Average day			52	12	1,398	62	4	24

Scenario 1: Traffic Increase Summary

12.109 The results above show that all percentage increases in total traffic volumes are below the IEMA thresholds (i.e. an increase of 30%); however the increase in HGV traffic along the A850 are in exceedance of the IEMA thresholds.

12.110 The largest increase would be where the total traffic flows increase by 11% (170% HGV increase) for a worst case day.

12.111 The average day during the construction period would see only an 8% increase to total traffic flows but a significant 114% increase to HGVs.

12.112 In summary, while total traffic levels are within the IEMA thresholds of a 30% increase to traffic flows along the A850 east of the site access point, HGV trip generation is significantly increased for both the worst case scenario and the average day.

Scenario 2

12.113 Total traffic flow increases on the A850 would be below the IEMA thresholds for both the worst case day and the average day scenarios.

12.114 The largest increase would be where the total traffic flows increase by 5% during the worst case; in addition this is when the largest increase in HGVs would be seen, with a 50% increase above the baseline.

12.115 The average day during the construction period would see a minimal increase of 4% to all traffic with a 24% increase to HGVs; both of which are within the IEMA parameters.

Potential Effects

Effect on Driver Severance and Delay

12.116 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.

Effect on Road Safety

12.117 **Table 12-2** and **12-3** define road safety as a high sensitivity receptor with an increase of traffic levels greater than 10% requiring a quantitative assessment of existing accident records.

12.118 The accidents recorded within the study area are discussed in paragraphs 12.55 to 12.60. A total of two injury accidents were recorded within the study area, both resulting in slight injury and none resulting in serious injury.

12.119 Deliveries of abnormal loads will be delivered to site under police escort as per paragraph 12.102. Other large components would be moved in accordance with the agreed Traffic Management Plan.

12.120 The predicted number of HGV movements would be significantly greater than the 10% threshold set out in **Table 12-3** for both Scenario 1 and Scenario 2, however this route has previously been used for the transportation of materials associated with another windfarm development nearby.

12.121 The movement of abnormal loads has the potential to create a general hazard on the highway. Abnormal loads would be moved from the Port Kyle of Lochalsh along the A87 and A850 to the site as detailed in the ALRA dated May 2019 (Technical Appendix 12.1). 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, THC and Police Scotland in advance and would be planned to ensure road safety is not compromised.

12.122 In summary, the proposed development would create a significant increase to HGV traffic levels within the study area but these levels would remain well within the design capacity of the local road network. The accident records for the study area are good, with only 2 accidents occurring over the five year study period. Therefore, the level of effect is considered to be minor adverse and not significant.

Effect on Community Severance

12.123 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.

12.124 There are residential properties dispersed within the study area with few small clusters of property. Aside from various bed and breakfast hotels and a single church, there are no amenities fronting or in close proximity to the road.

12.125 In accordance with the significance criteria in **Tables 12-2** and **12-3**, community severance has been classified as a low sensitivity receptor and the effects of the proposed development on community severance would be minor (<30% increase in total traffic) and not significant for both Scenarios 1 and 2.

Effects on Noise and Vibration

12.126 The effects from noise can be high in relation to sensitive receptors such as those residential

properties which are sparsely present within the study area.

12.127 As discussed in **Table 12-3**, the IEMA Guidelines state that an increase in noise due to an increase in traffic of less than 25% is deemed negligible noise impact to receptors, with anything greater than 25% requiring a quantitative assessment.

12.128 The maximum traffic increase predicted for the proposed development is 151 vehicle movements per day for Scenario 1 and 65 vehicle movements per day for Scenario 2. This is less than 25% of the current number of daily (12 hour, 07:00 to 19:00) vehicle movements along the A850 for both scenarios and hence, the traffic noise effects are considered to be negligible and not significant.

12.129 The full environmental effects of noise and vibration are assessed in **Chapter 13: Noise**.

Effects on Vulnerable Road Users

12.130 Vulnerable road users are considered to be a high sensitive receptor according to the assessment criteria detailed in **Table 12-2**.

12.131 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.

12.132 The percentage increase in traffic would be >10% for both scenarios with exception to the maximum day for Scenario 1 which exceeds this by 1%. The majority of trip generation from the proposed development would arise from 20 tonne HGVs. Consequently, there would be a potential increase to vulnerable road users during the construction period. The effect on vulnerable road users for both Scenario 1 and 2 is therefore considered to be moderate over the life of the construction period and significant in terms of the EIA Regulations.

Impact Caused by Movement of Abnormal Loads

12.133 The access route report for abnormal loads is provided in Technical Appendix 12.1. The assessments undertaken for the transportation of the AILs has demonstrated a feasible route coming direct from the Port Kyle of Lochalsh along the A87 and onto the A850 to the site entrance. The route 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.

12.134 It should be noted that storage of such AILs is not suitable in the Port Kyle of Lochalsh harbour, and therefore will be transported to a suitable storage location, such as Broadford Airfield, which is to be confirmed. This means that more AILs are expected between the Port Kyle of Lochalsh and the storage location which would allow preferential timings for AILs travelling North to the site.

12.135 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 property and infrastructure.

12.136 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 may 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. Residential properties/sensitive receptors within the study area include sparsely scattered properties along the A850 east of the site access junction.

12.137 It is also important to note that the abnormal load movements would occur over a short period of time.

12.138 Turbine deliveries would be undertaken in consultation with the relevant roads authorities, including THC, Transport Scotland and Police Scotland and could include movements during the night which would reduce effects on road users at busier daytime periods. Deliveries would be scheduled where possible to avoid peak times of the day and school opening/closing times.

12.139 There would be an unavoidable impact associated with the delivery of turbine components, however with suitable public awareness the significance of effect would be moderate adverse on turbine delivery days (significant). The CTMP will ensure that the timing of every abnormal load delivery is communicated to all parties to raise public awareness.

12.140 The CTMP will also take into account the changes to highway network use during peaks associated with the tourist season, working to minimise disruption associated with deliveries. For this reason, in the event that planning consent is forthcoming the Construction Traffic Management Plan (CTMP) would be prepared to include reference to the tourist season and would take into account the seasonal tourist traffic. Measures to mitigate any impacts during the busier peak season would include the transport of abnormal loads during the night, coordination with the police to ensure optimum management of deliveries and the use of a lay-down area or lay down areas.

Effects due to Dust and Dirt

12.141 The movements of construction traffic to and from the site would have the potential to bring dust and dirt and other detritus onto the highway. Sensitive receptors within the study area include residential properties along the A850, many amongst B&Bs and also a small church; therefore, residential receptors which may experience dust and dirt have been classified as medium sensitivity receptors.

12.142 HGVs are likely to create the greatest impact in terms of impact of dust and dirt and HGV traffic is anticipated to considerably increase on the A850 for the worst case day for both scenarios with a predicated average day increase of 114% (Scenario 1) and 24% (Scenario 2). Despite this, the site is relatively remote from the public highway, and would be accessed via an approximately 5.42km length access track, reducing the risk of dust and dirt being transported onto the highway.

12.143 Given that the above impacts due to dust and dirt have been classified as major and would affect low sensitivity receptors, the potential effect would be moderate and not significant.

Mitigation

12.144 The assessment has been undertaken under the assumption that general good construction practice would be deployed, as detailed in paragraph 12.102.

12.145 A CTMP would be in place to actively mitigate the effects as discussed above and a Framework CTMP has been prepared at this stage and submitted as part of the planning application to outline the mitigation measures recommended during the construction stage. This is provided as Technical Appendix 12.2.

12.146 The purpose of the Framework CTMP is to provide preliminary details of proposed traffic management measures and associated interventions that would be implemented during the construction phase of the proposed development in order to minimise disruption and ensure safety. The Framework CTMP will be supplemented with additional information as appropriate by the applicant's appointed contractor(s), prior to commencement of construction activities. Should consent be granted, the Framework CTMP would be updated to a CTMP, the content of which would be agreed with THC through consultation and enforced via a planning condition. The CTMP would be used during the construction phase of the proposed development to ensure traffic to, from and on the site is properly managed. It is possible that a collaborative approach with the assessed cumulative sites may be incorporated as part of the CTMP at a later date.

12.147 In addition to the use of general good practice an Abnormal Load Traffic Management Plan (ATMP) 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 TMP would be a trial run, which would be undertaken through a special licence, with the Roads Authority and Police Scotland in attendance.

12.148 Information, with regards to abnormal loads, would be provided to local residents and users of amenities to alleviate stress and anxiety.

12.149 Mitigation measures to reduce the potential for dust and dirt to make its way on to the local highway network would be undertaken including the cleaning of vehicle wheels during wet periods and the sheeting of aggregate lorries.

Residual Construction Effects

12.150 Residual effects are those that would still occur after mitigation measures have been incorporated into the scheme. Potential residual effects are likely to be those associated with delivery if the abnormal loads and resultant temporary road closures. On minor roads this may be more apparent as traffic flows are usually likely to be limited to private vehicles.

12.151 Significant residual effects in relation to the proposed development are unlikely as although the increase in HGV traffic along the A850 east of the site access to the A87 will see a percentage increase greater than the 30% threshold for both Scenario 1 and Scenario 2, the road would operate within its expected capacity.

Operational Effects

12.152 The operational effects have been scoped of this Chapter as discussed in paragraphs 12.11 to 12.12.

Decommissioning Effects

12.153 The decommissioning effects have been scoped out of this Chapter as discussed in paragraphs 12.13 to 12.14.

SUMMARY OF PREDICTED EFFECTS

Proposed Development

12.154 The effects associated with the proposed development are summarised in **Table 12-13**.

Table 12-13
Summary of Predicted Effects (Pre Mitigation)

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

12.155 Following the assessment of traffic impacts, the significance of potential effects that could occur during construction both before and after proposed mitigation measured are presented in **Table 12-14**.

Table 12-14
Summary of Predicted Effects (Pre and Post Mitigation)

Potential Impact	Pre-Mitigation		Proposed Mitigation/Enhancement	Post-Mitigation Residual Effects	
	Magnitude	Significance		Magnitude	Significance
Noise & vibration	Negligible	Not significant	Traffic Management Plan for the movement of abnormal loads. Trial Run for abnormal loads prior to commencement of construction. Road condition survey (including	Negligible	Not significant
Driver severance & delay	Minor	Not significant		Minor	Not significant
Community	Minor	Not		Minor	Not

Potential Impact	Pre-Mitigation		Proposed Mitigation/Enhancement	Post-Mitigation Residual Effects	
	Magnitude	Significance		Magnitude	Significance
severance & delay		significant	assessment of existing structures as appropriate) prior to the commencement of construction and a similar assessment following completion of the works. Provision of information to local residents and users of amenities, to involve the community in the safe operation of the Traffic Management Plan and to alleviate stress and anxiety. Good construction practices including wheel wash and careful loading.		significant
Vulnerable road users	Moderate	Significant		Minor	Not significant
Road safety	Minor	Not significant		Minor	Not significant
Hazardous & dangerous loads	Minor	Not significant		Minor	Not significant
Dust & dirt	Moderate	Significant		Negligible	Not significant

STATEMENT OF SIGNIFICANCE

12.156 Taking account of all the potential effects that are likely to arise, it is considered that the proposed development would lead to an insignificant adverse effect in terms of site access, traffic and transportation for both Scenario 1 and Scenario 2. As Scenario 1 has been included to test the very worst case scenario expected, it can also be confirmed that a more realistic Scenario 2 would result in a lesser effect on the road network. The onsite borrow pits have been identified to be able to supply the site with the majority of material required to construct the access tracks which would greatly reduce the amount of HGV movements required to build the wind farm.

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