CLOICH FOREST WIND FARM

EIA Report – Volume 1 – EIA Report Text

Chapter 12

Access, Traffic and Transportation

ARCUS

12 ACCESS, TRAFFIC AND TRANSPORTATION

12.1 INTRODUCTION

1. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of the Cloich Forest Wind Farm ('the Development') on the Access, Traffic & Transport resource. Vehicle movements to the Site will likely consist of abnormal load vehicles (for the delivery of turbine components), heavy goods vehicles, light goods vehicles and cars.

2. This assessment was undertaken by Arcus Consultancy Services Limited (Arcus).

3. This Chapter of the EIA Report is supported by the following Technical Appendix documents provided in Volume 3 Technical Appendices:

   - Technical Appendix A12.1: Abnormal Load Route Assessment; and
   - Technical Appendix A12.2: Construction Development Programme.

4. This Chapter of the EIA Report is also supported by the following figures provided in Volume 2a Figures excluding LVIA:

   - Figure 12.1: Abnormal Load Route to Site;
   - Figure 12.2: General Construction Traffic Route to Site;
   - Figure 12.3: Traffic Count Locations; and
   - Figure 12.4: Road Traffic Collision (RTC) Assessment.

5. This Chapter includes the following elements:

   - Legislation, Policy and Guidance;
   - Assessment Methodology and Significance Criteria;
   - Baseline Conditions;
   - Assessment of Potential Effects;
   - Cumulative Effect Assessment;
   - Mitigation and Residual Effects;
   - Summary of Effects;
   - Statement of Significance; and
   - Glossary.

12.2 LEGISLATION, POLICY AND GUIDANCE

6. The following guidance, legislation and information sources have been considered in carrying out this assessment:

Table 12.1: Legislation, Policy and Guidance

Author	Title	Policy
The Scottish Government	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[1] ('the EIA Regulations')	These regulations establish in broad terms what is to be considered when determining the effects of development proposals on the transport network.
The Scottish Government	Scottish Planning Policy (2020)[2]	This provides a statement of the Scottish Government's policy on nationally important land use planning matters including renewable energy and indicates that proposals for onshore wind should consider the impact on road traffic and on adjacent trunk roads.
The Scottish Government	National Transport Strategy[3]	This document provides an overview of the Scottish National Transport Strategy 2, which discusses sustainable freight movements.
The Scottish Government	Planning Advice Note 75 (PAN 75) – Planning for Transport[4]	Provides guidance on sustainable transport planning in the context of new and existing development. The document also indicates that all planning applications that involve the generation of person trips should provide information which covers the transport implications of the development. The level of detail is to be proportionate to the complexity and scale of impact of the development.
Institute of Environmental Management and Assessment (IEMA, 1993)	Guidelines for the Environmental Assessment of Road Traffic[5]	Sets out guidelines for determining the appropriate and significance of traffic effects as a result of a proposed development. The document focuses on the assessment of potential environmental effects associated with road traffic.

[1] The Scottish Government (2017) The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 20/05/2021)
[2] The Scottish Government (2020) Scottish Planning Policy [Online] Available at: https://www.gov.scot/publications/scottish-planning-policy/pages/2/ (Accessed 20/05/2021)
[3] The Scottish Government (2020) – Scottish National Transport Strategy 2 [Online] Available at: https://www.transport.gov.scot/publication/national-transport-strategy-2/ (Accessed 20/05/2021)
[4] The Scottish Executive (2005). Planning Advice Note, PAN 75, Planning for Transport. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/publication/2005/08/planning-advice-note-pan-75-planning-transport/documents/0016795-pdf/0016795-pdf/govscot%3Adocument. Accessed on 10/04/2021
[5] Institute of Environmental Assessment – Guidelines for the Environmental Assessment of Road Traffic

12.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

12.3.1 Scoping Responses and Consultations

7. Consultation for this EIA Report topic was undertaken with the organisations shown in Table 12.2.

Table 12.2: Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Scottish Borders Council ('the Council') Road Planning Service Office	Scoping Response 15/11/2019	The Council are content with the methodology proposed in the Scoping Report which will be used to consider the effects of vehicle movements to and from the Site during the construction, operation, and decommissioning phases of the Development. More formal comments on the Environmental Impact Assessment (EIA) will be provided once submitted as part of any detailed planning application.	No further action required.
Transport Scotland Transport Scotland	Scoping Response 22/10/2019	Transport Scotland is satisfied with the approach being adopted in assessing the potential environmental impacts associated with construction traffic, and would add that potential trunk road related environmental impacts will require to be considered and assessed where appropriate.	This Chapter of the EIA Report considers any potential effects of increased traffic on council-maintained roads and is accompanied by an Abnormal Load Risk Assessment (ALRA) which considers the suitability of roads for the transport of larger wind turbine components.
		While the number of turbines has been reduced from the Consented Scheme, it is noted that their size has increased from 115 m to 145 m. Transport Scotland will, therefore, require to be satisfied that the larger turbine components can negotiate the selected abnormal loads route, and that their transportation will not have any detrimental effect on structures within the trunk road route path.	An (ALRA) has been undertaken and is included in Technical Appendix A12.1 This assessment considers effects on Trunk Roads on the Delivery Routes throughout this Chapter.

12.3.2 Scope of Assessment

8. This assessment considers access, traffic, and transportation effects of the Development during the construction, operational, and decommissioning phases for the following:

- Traffic generation;
- Accidents and safety;
- Driver delay;
- Pedestrian amenity;
- Severance;
- Noise and vibration;
- Hazardous loads;
- Pedestrian delay;
- Visual effects; and
- Air quality.

12.3.3 Elements Scoped Out of Assessment

9. Operational traffic is expected to be minimal and negligible in terms of existing traffic flow levels on routes within the vicinity of the Development, with one weekly maintenance visit to the Site expected. Assessment of operational traffic has therefore been scoped out of this assessment.

10. Traffic associated with decommissioning of the Development will be less than that experienced during construction, this is due to all below ground infrastructure being left in-situ. It is not possible to accurately forecast baseline traffic flow levels 30 years into the future. For the above reasons, prior to decommissioning of the Development, a traffic assessment would be undertaken and appropriate traffic management procedures agreed with the relevant authorities at the time.

12.3.4 Study Area

11. The Site is located within Cloich Forest approximately 5.5 kilometres (km) north-west of Peebles, and is centred on National Grid Reference (NGR) 320648, 647881 ('the Site'). The Site and the Development are wholly located within the administrative boundary of Scottish Borders Council ('the Council').

12. The Study Area has been defined by the public road network in the vicinity of the Development and potential delivery corridors to be used during construction by Abnormal Load Vehicles (ALVs) and by general construction traffic, including staff. These take into account the local strategic / trunk road network, sources of labour and the potential sources of construction materials, specifically stone and concrete from local quarries. The Site contains two public roads which form the Site access from the A703 namely D17 Whim – Shiplaw Road and D18 Cloich Road.

13. The proposed Port of Entry (PoE) for turbine components is the Grangemouth Harbour and they will then be transported to the Site via the M9 and A720 trunk roads. This port is frequently used for renewables deliveries because it has a sufficient quay and is well located for the trunk road network.

14. Whilst all ALVs will originate from the Grangemouth Harbour, the origin of general construction traffic is not currently known and is likely to be distributed throughout the region.

15. Two approach corridors are considered in this assessment:

- Firstly, wind turbine components will be transported as abnormal loads from Grangemouth Harbour; and
- The second assumes the general approach route for all other construction vehicles associated with construction of the Development.

16. The routes are outlined in the following sections.

12.3.4.1 Abnormal Load Route

- Loads will exit the port and proceed towards Earl's Gate Roundabout via the A904 Earl's Road;
- At the roundabout, turn left onto the A905 and travel southbound towards Cadger Brae Roundabout and merge onto the M9 via the M9 Junction 5 Slip Road;
- Continue along the M9 southeast bound and merge onto the M8 via the M8 Junction 2 Slip Road;
- Continue along the M8 westbound towards Hermiston Gait Roundabout and at the roundabout, take the 3rd exit onto the A720 City of Edinburgh Bypass and travel toward Sheriffhall Roundabout;
- At the roundabout take the 5th exit onto the A7 and travel southbound toward Hardengreen Roundabout;
- At the roundabout, take the 3rd exit onto the B6392 and travel southbound towards Rosewell;
- At the B6392 / A6094 Roundabout, take the 1st exit onto the A6094;
- Continue on the A6094 southbound and turn right onto the B6372 northbound at its junction with the B6372;
- Continue on the B6372 northbound and turn left onto the B7026 southbound at its junction with the B7026;
- Continue on the B7026 southbound towards the B7026 / A6094 roundabout and take the 2nd exit back onto the A6094;
- Continue on the A6094 southbound towards the A6094 / A703 / A701 junction and turn left onto the A703;
- Continue on the A703 southbound for approximately 7.2 km and turn right onto the D17 Road towards Cloich Farm;
- Continue on the D17 Road for approximately 1.6 km and merge onto the D18 Cloich Road;
- Continue on the D18 Cloich Road for approximately 1.6 km and turn left onto Cloich Farm Road to reach the Secondary Entrance; and
- The Site Entrance is reached continuing along the D18 onto Cloich Forest forestry track and taking the next available left turn.

17. This route is illustrated on Figure 12.1.

12.3.4.2 General Approach for Construction Vehicles

- Traffic is assumed to be approaching from the A703 northbound and/or southbound;
- Turn onto the D17 Road towards Cloich Farm;
- Continue on the D17 Road for approximately 1.6 km and merge onto the D18 Cloich Road;
- Continue on the D18 Cloich Road for approximately 1.6 km and turn left onto Cloich Farm Road to reach the Secondary Entrance; and
- The Site Entrance is reached continuing along the D18 onto Cloich Forest forestry track and taking the next available left turn.

18. This route is illustrated on Figure 12.2.

12.3.5 Baseline Survey Methodology

19. Baseline traffic flow conditions were gathered from publicly available traffic counts published by the Department for Transport (DfT) at four locations along the route as shown in Figure 12.2. The baseline traffic flows would inform the analysis to determine the impact of the Development proposals on the road network.

20. Traffic growth between the latest published DfT counts (2019), and the anticipated commencement of construction of the Development (2027) was estimated by applying traffic growth factors from the National Trip End Model (NTEM) forecasts using the Trip End Model Presentation Program (TEMPRO[6]). NTEM and TEMPRO are designed by the DfT, and provide forecasts of traffic growth over time for use in local and regional transport models. NTEM and TEMPRO are the industry standard tool for estimating traffic growth.

21. Baseline traffic conditions were established via desk study and review of online mapping resources. Traffic flow capacity was estimated using information contained in the Design Manual for Roads and Bridges (DMRB) – Volume 15[7]. It is acknowledged that this document has been withdrawn, however the quoted traffic flow capacities remain the most up to date available reference source and are useful within the framework of this assessment.

12.3.6 Methodology for the Assessment of Effects

22. The magnitude of the effect of increase in traffic flow is a function of the existing traffic volumes on routes and the percentage increase in flow as a result of the Development.

23. An initial screening exercise was undertaken to identify routes where an adverse effect could potentially occur. The Institute of Environmental Management and Assessment (IEMA 1993) Guidelines[8] suggest two broad principles:

- Rule 1 – include road 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.

24. Where the predicted increase in traffic flow is lower than these thresholds, the significance of the effects can be considered to be low or not significant with no further detailed assessments warranted. Consequently, where the predicted increase in traffic flow is greater than these thresholds, the potential effects are considered to be significant and are assessed in greater detail.

25. The IEMA (1993) guidelines are intended for the assessment of environmental effects of road traffic associated with major new developments giving rise to traffic generation, as opposed to short-term construction. In the absence of alternative guidance and as the traffic generation during the operational phase is very low, these guidelines have been applied to assess the short-term construction phase of the Development.

26. Where existing traffic levels are generally low (e.g., rural roads and some unclassified roads), any increase in traffic flow may result in a predicted increase that would be higher than the IEMA (1993) guideline thresholds. In these situations, it is important to consider any increase in terms of overall traffic flow in relation to the capacity of the road, before

[6] UK Government, Department for Transport (2013). Trip End Model Presentation Program (TEMPro). Available at: https://www.gov.uk/government/publications/tempro-downloads. Accessed on 22/04/2021.
[7] Standards for Highways (2013) Volume 15, Economic Assessment of Road Schemes in Scotland, DMRB. Available at: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol15/index.htm. Accessed 22/04/2021.
[8] Institute of Environmental Management and Assessment (1993). Guidelines for the Environmental Assessment of Road Traffic. Institute of Environmental Management and Assessment.

making a conclusion on whether the effect is significant as defined under the EIA Regulations.

27. Any change in traffic flow which is greater than the thresholds set out in the IEMA (1993) guidelines would be subject to further analysis. The magnitude of potential impacts will be identified through consideration of receptor sensitivity against the degree of predicted change to baseline conditions, the duration and reversibility of this change and professional judgement.

12.3.6.1 Sensitivity of Receptors

28. The sensitivity of the baseline conditions, including the importance of environmental features on or near to the Site or the sensitivity of potentially affected receptors, will be assessed in line with best practice guidance, legislation, statutory designations and / or professional judgement. Table 12.3 details the framework for determining the sensitivity of receptors.

Table 12.3: Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	Definition
Very High	The receptor has no ability to absorb change without profoundly altering its present character, is of high strategic value, or of national importance, would include, receptors such as populated urban areas where existing traffic levels are high and there is no capacity to absorb additional traffic flow on adjacent routes; and strategic nationally important routes with no capacity to absorb additional traffic flow.
High	Receptors of substantial sensitivity, would include: People whose livelihood depends upon unrestricted movement within their environment including commercial drivers and companies who employ them, local residents, schools and colleges. Accident hotspots would also be considered.
Medium	Receptors with sensitivity, would include: People who pass through the area habitually, but whose livelihood is not wholly dependent on free access. Would also typically include: congested junctions, community services, parks, businesses with roadside frontage, and recreation facilities.
Low	Receptors with some sensitivity, would include: People who occasionally use the road network. Would also typically include: public open spaces, nature conservation areas, listed buildings, tourist attractions, residential roads with adequate footway provision and places of worship.
Negligible	Receptors with very low sensitivity, would include: People not sensitive to transport effects. Would also refer to receptors that are sufficiently distant from the affected roads and junctions.

12.3.6.2 Magnitude of Effect

29. The magnitude of potential effects will be identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

30. The criteria for assessing the magnitude of an effect on those receptors described above are presented in Table 12.4.

Table 12.4: Framework for Determining Magnitude of Effects

Magnitude	Description
High	The proposals could result in an appreciable change in terms of length and/or duration to the present traffic routes or schedules or activities, which may result in hardship.
Medium	The proposals could result in changes to the existing traffic routes or activities such that some delays or rescheduling could be required, which cause inconvenience.
Low	The proposals could occasionally cause a minor modification to routes, or a very slight delay in present schedules, or on activities in the short-term.
Negligible	No effect on movement of road traffic above normal level.

12.3.6.3 Significance of Effect

31. The sensitivity of the receptor and the magnitude of the predicted effects will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 12.5 summarises guideline criteria for assessing the significance of effects.

Table 12.5: Framework for Assessment of the Significance of Effects

Magnitude of Effect	Sensitivity of Resource or Receptor				
	Very High	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

32. Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations, and are shaded in light grey in the above table.

12.3.7 Assumptions

12.3.7.1 Baseline Traffic

33. Baseline traffic flow conditions was gathered from publicly available traffic counts published by the DfT at several locations along both routes. Figure 12.3 shows the traffic count locations along the abnormal load and general construction traffic routes respectively.

34. Some of the traffic count locations along both routes provide an estimated flow based upon the last manual or automatic traffic counts and the application of traffic growth factors by the DfT, as detailed in Table 12.6.

Table 12.6: Traffic Count Data

Traffic Count Methods			
Location Ref.	**Year**	**Count Type**	**Last Manual Count**
1 - South of Sheriffhall Roundabout DfT Point ID: 80134	2019	Projected	2018
2 - North of Hardengreen Roundabout DfT Point ID: 80129	2019	ATC	2019
3 - A6094 near Leadburn DfT Point ID: 1200	2019	Projected	2011
4 - A703 Leadburn DfT Point ID: 74344	2019	Projected	2018 Manual

35. It is possible that due to traffic values being estimated, there are minor differences between the assessed and actual baseline traffic flows at these locations. This should not have any material change to the outcome of the assessment.

12.3.7.2 Material Import Requirements

36. To present a worst-case scenario it will be assumed that concrete will be transported along the entirety of the route specified in Section 12.3.4, however this is unlikely to be the case as there is an existing quarry (Breedon Cowieslinn Quarry) located just north of the Site (Figure 12.1), and are capable of producing all aggregate and concrete required for the Development, details of which would be agreed at a later date.

37. It is expected that material required for the formation of the internal access tracks will be sourced from on-site borrow pits with the exception of a quantity of fine surface material which will be imported. This would reduce the overall impact along this route, particularly close to the more populated areas such as Dalkeith and Rosewell.

12.3.7.3 Construction Vehicle Routes

38. The routes to Site for construction traffic are shown on Figures 12.1 and 2.2. The port of delivery for wind turbine components will be Grangemouth Harbour which has been proven to be able to handle deliveries of this nature. General construction traffic is assumed to be approaching from the north and/or south on the A703. This assessment considers routes which are to be used by all construction traffic between the Site and Grangemouth Harbour.

39. Wind turbine components, which include blades, tower sections and nacelles, will be transported by ALVs between the port of delivery and the Site. Typical ALVs are able to retract to the size of a standard Heavy Goods Vehicle (HGV) following delivery. An Abnormal Road Route Assessment (ALRA) was undertaken in January 2021 in order to assess the suitability of the proposed route and detail any upgrade works required to be undertaken on the Abnormal Load Route, this is included in Appendix A12.1.

40. In addition to wind turbine components, deliveries will be required for plant and equipment, concrete for turbine foundations, balance of plant electrical equipment and aggregate. Such deliveries are likely to be made by HGVs.

12.4 BASELINE CONDITIONS

12.4.1 Baseline Traffic Flow

41. Table 12.7 summarises the data collected from the traffic count data at a number of locations on the proposed transport routes detailed in Section 12.3.4. Traffic count locations are shown on Figure 12.3.

Table 12.7: Existing Average Daily Traffic (ADT) 2019

Traffic Count Location	Road	Route	Location	Total ADT	HGV ADT	HGV% of Total ADT
1	A7	ALR /	South of Sheriffhall Roundabout DfT Point ID: 80134	12789	805	6.3%
2	A7	ALR /	North of Hardengreen Roundabout DfT Point ID: 80129	21303	1032	4.8%
3	A6094	ALR /	A6094 near Leadburn DfT Point ID: 1200	5595	282	5.0%
4	A703	ALR / General	A703 Leadburn DfT Point ID: 74344	6951	213	3.1%

42. No traffic count data is available for the D17 and D18 roads at the time of writing this report because due to the COVID-19 global pandemic; local authorities have advised that they would not accept traffic count data if undertaken, as traffic movements in most areas have still not returned to normal levels.

12.4.2 Road Capacity

43. Typical capacity values for a variety of road types are provided within the Design Manual for Roads and Bridges (DMRB) – Volume 15[9]. It is acknowledged that this document has been withdrawn, however the quoted traffic flow capacities remain the most up to date available reference source and are useful within the framework of this assessment. Capacity is defined as the maximum sustainable flow of traffic passing in one hour under favourable road and traffic conditions and depends on the road type, speed limit and width. Table 12.8 gives the estimated capacity of each of the roads within the Study Area.

Table 12.8: Theoretical Road Capacities

Road	Type	Speed Limit (kph)	Capacity (veh/hour/direction)	Two-Way Hourly Flow (veh/hour)	Two – Way Daily Flow (veh/day)
A7	Rural – Typical Single 7.3 m	96	1,200	2,400	57,600
A6094	Rural – Typical Single 6.0 m	96	900	1,800	43,200
A703	Rural – Typical Single 7.3 m	96	1,200	2,400	57,600
D17	Rural – Poor Single 4.0 m	96	140	280	6,720

[9] Standards for Highways (2013) Volume 15, Economic Assessment of Road Schemes in Scotland, DMRB. Available at: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol15/index.htm. Accessed 15/04/2021.

Road	Type	Speed Limit (kph)	Capacity (veh/hour/direction)	Two-Way Hourly Flow (veh/hour)	Two – Way Daily Flow (veh/day)
D18	Rural – Poor Single 4.0 m	96	140	280	6,720

12.4.3 Road Traffic Collision Assessment

44. Analysis of all 'slight' 'serious' and 'fatal' Road Traffic Collisions (RTCs) within the last five years was carried out utilizing CrashMap[10] for key junctions along the route within the Study Area.

45. 'Slight' RTCs are defined as a collision in which nobody is fatally or seriously injured, but at least one person is slightly injured. 'Serious' RTCs are defined as those which result in hospitalisation of one or more of the parties involved. 'Fatal' RTCs are defined as those in which one or more parties dies within 30 days as a result of injuries sustained during the RTC.

46. A cluster of RTCs was noted at the A6094 / B6372 crossroad junction. At this location, 4 'slight' RTCs and 2 'serious' RTC were noted. While a review of the available RTC reports did not identify a common cause of the RTCs at this location, it was noted that a number of the 4 'slight' RTCs recorded were rear end impact type accidents. One 'serious' RTC included a car colliding with a motorcyclist, while the other serious RTC was also a rear end impact type accident. Another cluster of RTCs was noted at the A6094 / A703 / A701 and this generally explained by drivers misjudging speed, shunting, lane changing causing side collisions at the junction as a prevalent reason for accidents. Three 'fatal' RTCs were also recorded near the A6094 / A703 / A701 junction and a review of the RTC report indicates a head-on collision between two cars with excessive speed being the likely cause.

47. Figure 12.4 indicates the location of each of the identified RTCs within the Study Area.

48. No 'serious' or 'fatal' RTCs involving HGVs occurred within the Study Area.

12.4.4 Sensitive Receptors

49. As per (IEMA 1993) Guidelines, particular groups of locations which may be sensitive to changes in traffic conditions should be identified. The Guidelines suggest, for example, that people, home, schools and the elderly may be sensitive to changes in traffic conditions. A desktop search was undertaken for the route to site within the Study Area.

50. A number of receptors of medium or high sensitivity to changes in traffic have been identified within the Study Area and are detailed in Table 12.9. These receptors are either located on proposed delivery routes or located within close proximity and require access through the proposed delivery routes.

Table 12.9: Sensitive Receptors

Route	Receptor	Sensitivity	Justification
A7	Midlothian Community Hospital	High	Midlothian Community Hospital is located near to the A7 and staff and patients may use the route for part of their journey to and from the facility. This receptor may be highly sensitive to changes in HGV traffic.

[10] AGILYSIS (2019) CrashMap. UK Road Safety Map. Available at: www.crashmap.co.uk. Accessed 15/04/2021

Route	Receptor	Sensitivity	Justification
B6392 and A6094	Residential and Commercial Properties on or near the delivery route	High	There are a number of residential properties located directly on the proposed delivery route who require unrestricted use of the route in order to access their property. No alternative routes exist in most cases.
A6094	Howgate Kirk	High	This Church is located on the A6094, Howgate. Worshipers and visitors will cross or walk alongside parts of the access route on their journey to / from the church
D17 & D18	Residential properties on or near the delivery route	High	There are a number of residential properties located directly on the proposed delivery route who require unrestricted use of the route in order to access their property. No alternative routes exist in most cases

51. Residential and commercial properties which front directly on to the general delivery routes and ALR are considered to be of high sensitivity. Individual properties are not listed in this assessment.

12.5 FUTURE BASELINE SCENARIOS

12.5.1 Traffic Flow

52. Background traffic growth will occur on the local road network irrespective of whether or not the Development is constructed.

53. A traffic growth factor of 1.0697 was calculated for the relevant geographic area as from TEMPRO and applied to the baseline traffic flow information collected for each route to give the estimated traffic flow for the year of construction (2027). Table 12.10 indicates the projected baseline traffic flow at each of the locations for the anticipated year of construction.

Table 12.10: Projected Baseline Traffic Flow

Ref	Road	Location	Growth Factor	Project ADT	HGV ADT	% HGV
1	A7	South of Sheriffhall Roundabout	1.0697	13,680	861	6%
2	A7	North of Hardengreen Roundabout	1.0697	22,788	1,104	5%
3	A6094	A6094 near Leadburn	1.0697	5,985	302	5%
4	A703	A703 Leadburn	1.0697	7,435	228	3%

12.6 ANTICIPATED CONSTRUCTION DEVELOPMENT TRAFFIC

54. An indicative programme of anticipated construction traffic associated with the Development is provided in Appendix A12.2 and is expected to run for a total of 18 months. The following sub-sections provide detail for each element of work and it should be read in conjunction with Appendix 12.2. A summary of all predicted construction traffic is provided at the end of this section.

12.6.1 Forestry

55. Pre-commencement forestry operations (primarily felling) are required in order to prepare the Site for construction. It is assessed that forestry works will take place over a 12 month period, commencing approximately six months in advance of the main construction programme and continuing in parallel within the first six months of the construction activities. The total volume of timber extraction will require an estimated 3,175 HGV loads or 6,350 HGV movements over the 12 month period. As described within **Chapter 13: Forestry**, ongoing forestry operations including felling associated with the normal operation of Cloich Forest will take place between 2022 and the anticipated construction commencement date of 2027. This would reduce the area and volumes of timber to be extracted for the Development and therefore reduce the overall number of vehicle movements relating to timber extraction for the wind farm, although at this stage this cannot be quantified and the worst case scenario described above has been considered.

56. Anticipated vehicle movements associated with the forestry operations undertaken in parallel with construction activities, are set out in Table 12.11. Timber extraction will require a total of an estimated 1,588 HGV loads resulting in 3,176 HGV movements over the remaining 6 months duration of this phase of works.

57. Fuel deliveries to support forestry operations can be expected throughout the remaining 6 month duration of this phase of works at a rate of approximately two deliveries per week, resulting in 4 vehicle movements per week or 16 vehicle movements per month.

Table 12.11: Forestry Extraction

Operation	Vehicle Type	Construction Months	Total	Max Monthly
Forestry Plant Delivery	HGV	N/A as this will occur at least six months prior to the start of construction	N/A	N/A
Timber Extraction	HGV	1-6	3,176	529
Fuel Delivery	HGV Tanker	1-6	96	16
Sub-Total			**3,272**	**545**

12.6.2 Site Mobilisation and Demobilisation

58. HGV and other vehicle movements will be required during Site mobilisation. This will comprise the erection of welfare facilities, delivery of construction site vehicles and importation of plant and equipment. The majority of these movements will be as HGVs and low loaders which will deliver and then depart the Site empty.

59. During site demobilisation, the majority of this equipment will be removed from Site. Vehicle movements for demobilisation will result from empty HGVs and low loaders travelling to Site and then departing loaded. Table 12.12 indicates the anticipated number of vehicle movements associated with site mobilisation and demobilisation.

Table 12.12: Anticipated Vehicle Movements - Site Mobilisation / Demobilisation

Operation	Vehicle Type	Construction Months	Total Movements	Maximum Monthly Movements
On-site vehicles	Car/LGV**	1,18	32	16
Construction Compound	HGV Low Loader	1,18	120*	60*
Overall			**152**	**76**

*Includes transporter vehicle leaving and then returning to site during demobilisation

**Self-propelled vehicles which arrive in one month and depart in another

12.6.3 Access Track and Hardstanding Construction

60. The volume of material required for the access tracks and hardstanding areas is estimated to be approximately 14,888 m^3. Assuming each dump truck has a volumetric capacity of 9 m^3, this will result in approximately 1,655 loads or 3,310 vehicle movements over the duration (5 months) of this phase of works.

61. It is assumed that the excavators and rollers will be delivered to the Site via low loaders at the commencement of construction and will generate two vehicle trips each for delivery and another two trips during removal, the dumper trucks will be self-propelled to and from the Site.

62. Other materials will require to be imported regularly throughout construction of the access tracks such as geo-membrane, drainage pipes and culvert sections.

63. Table 12.13 sets out the anticipated number of vehicle movements associated with access track and hardstanding construction.

Table 12.13: Anticipated Vehicle Movements - Access Track and Hardstanding Construction

Operation	Vehicle Type	Construction Months	Total Movements	Maximum Monthly Movements
Plant	HGV Dump Truck	3,7	4	4
	HGV Low Loader (Excavators/Rollers)	3,7	2	2
Material Deliveries	HGV	3-7	3,310	662
Overall			**3,316**	**668**

12.6.4 Turbine Foundation Construction

64. The concrete for each turbine foundation will be formed from imported ready-mix concrete which presents the worst-case traffic scenario.

65. Each foundation will comprise around 570 m^3 of concrete. Assuming a volumetric capacity of 8 m^3 per concrete wagon, approximately 72 ready-mix HGV loads would be required to supply the required concrete for each foundation, resulting in 144 vehicle movements per foundation or 1,728 movements in total for foundation pouring. Assuming a 10 month period for this phase of works, an average of 144 vehicle movements per month are expected typically. It is acknowledged that potentially two pours may occur in the same month as detailed in Appendix 12.2. However, these will be programmed not to occur on consecutive days during any monthly period.

66. Each foundation is required to be poured over a continuous (approximately) 10-hour period. Foundations would be poured on non-consecutive days during this period of works with 12 days of foundation pouring required to deliver concrete for the 12 turbines. Therefore, on concrete pouring days, an additional 144 HGV vehicle movements will be experienced in addition to the deliveries experienced for other concurrent elements of work.

67. In addition to concrete, steel rebar will require to be imported. It is assumed that up to 4 HGV loads per turbine will be required, therefore 48 loads will be required for the 12 turbines resulting in 96 vehicle movements. Rebar will be delivered prior to the commencement of foundation pouring and would be spread throughout the concrete delivery period

68. Additional miscellaneous items will be required to be delivered to support the foundation construction phase. These include shuttering, geotextiles and equipment. It is assumed that the majority of these deliveries would occur in months 4 to 7, and the further deliveries that are required during the pouring phase would be timed to avoid pouring days so as to lower the peak traffic flow. An allowance for 40 miscellaneous deliveries during this phase of works has been made, this would result in up to 80 two-way HGV movements. Table 12.14 indicates the anticipated number of two-way vehicle movements associated with turbine foundation construction.

Table 12.14: Anticipated Vehicle Movements - Turbine Foundation Construction

Operation	Vehicle Type	Construction Months	Total Movements	Maximum Monthly Movements
Concrete Delivery	Ready Mix HGV	5-14	1,728	288
Rebar Delivery	HGV	4-7	96	36
Miscellaneous	HGV	4-7	80	30
Overall			**1,904**	**288**

12.6.5 Control Building and Substation Construction

69. Material for construction of the substation and battery compound hardstanding has been accounted for in Section 12.6.3. This section will therefore consider above ground material only.

70. Concrete will be required to be imported for construction of the substation building. This is assumed to require 10 HGV concrete wagon loads, resulting in 20 movements. An additional 35 HGV loads have been assumed for the delivery of the control building electrical components and switchgear battery energy storage system (BESS) containers and inverters, resulting in a further 70 HGV movements.

71. Two transformers will require to be delivered by ALV due to their weight. Following delivery of components, the ALVs will retract to the size of an HGV for the return journey. This will result in four vehicle movements, 2 ALV movements and 2 HGV movements. Two escort vehicles are assumed to accompany each ALV resulting in eight vehicle movements.

72. Table 12.15 indicates the number of vehicles associated with substation construction.

Table 12.15: Anticipated Vehicle Movements - Substation Construction

Operation	Vehicle Type	Construction Months	Total Movements	Maximum Monthly Movements
Electrical Components and Switchgear Delivery, BESS Delivery	HGV	4-6	70	24
Transformer Delivery	ALV	4	2	2
	HGV	4	2	2
	Escort Car/Van	4	8	8
Concrete for Control Building	HGV Concrete Wagon	4-6	20	7
Overall			**102**	**43**

12.6.6 Electrical Cabling Delivery

73. Electrical cabling for wind farm power distribution will require to be delivered and will constitute 36 HGV movements over the period of delivery. Table 12.16 indicates the number of vehicle movements associated with electrical cabling delivery.

Table 12.16 – Anticipated Vehicle Movements - Electrical Cabling Delivery

Operation	Vehicle Type	Construction Months	Total Movements	Maximum Monthly Movements
Electrical Cabling Delivery	HGV	11-14	36	9

12.6.7 Crane Delivery

74. A large crawler or track mounted crane of approximately 1,000 tonne capacity will be required for turbine erection along with an additional 160 tonne pilot crane. The crawler crane will be transported in component form and assembled on the Site. This will require approximately 52 HGV movements to be undertaken prior to the commencement of

turbine delivery. The pilot crane will be self-propelled although will constitute an ALV due to its weight.

75. The crane will remain on-site for the duration of the turbine assembly phase. Table 12.17 indicates the number of vehicle movements associated with crane delivery.

Table 12.17: Anticipated Vehicle Movements - Crane Delivery

Operation	Vehicle Type	Construction Months	Total Movements	Maximum Monthly Movements
Crawler Crane	HGV	12,17	52	26
	Abnormal Load Vehicle**	12,17	2	1
	Escort Car/Van	12,17	8	4
Overall			**62**	**31**

**Self-propelled vehicles which arrive in one month and depart in another

12.6.8 Turbine Delivery

76. Turbines will be delivered as separate components, the majority of which will require transportation via ALV. The towers will be transported in three separate sections and each blade will be transported individually. Five further abnormal load vehicles will be required to transport the nacelle and hub. For 12 turbines, it is assumed 132 ALV deliveries will be required equalling 264 vehicle movements.

77. Following delivery of components, the ALVs will retract to the size of a standard HGV for the return journey. Two escort vehicles are likely to be required to accompany each ALV which will result in a worst-case of 528 additional vehicle movements. In practice, this figure may be reduced where ALVs approach the Site in convoy and fewer escort vehicles per ALV are required.

78. 24 HGV vehicle movements will be required for the delivery of turbine accessories and ancillary equipment. Table 12.18 indicates the number of vehicle movements that are expected for turbine delivery.

Table 12.18: Anticipated Vehicle Movements - Turbine Delivery

Operation	Vehicle Type	Construction Months	Total Movements	Maximum Monthly Movements
Turbine Components	ALV	15-18	132	33
	Escort Car or Van	15-18	528	132
	HGV	15-18	132	33
Ancillary Equipment	HGV	15-18	24	6
Overall			**816**	**204**

12.6.9 Fuel Delivery

79. Fuel will require regular delivery to the Site regularly throughout the construction period and is expected to total 1 HGV fuel tanker delivery per week, resulting in 2 vehicle movements per week or 8 vehicle movements per month from site mobilisation; totalling

160 vehicle movements over the duration of construction. Table 12.19 indicates the number of vehicle movements associated with fuel delivery.

Table 12.19: Anticipated Vehicle Movements – Fuel Delivery

Operation	Vehicle Type	Construction Months	Total Movements	Maximum Monthly Movements
Fuel Delivery	HGV Fuel Tanker	1–18	144	8

12.6.10 Construction Personnel and Staff

80. It is anticipated that an average of 75 staff will be required onsite per day throughout the construction period. For the purposes of this assessment, the most recent available Scottish private vehicle occupancy rate of 1.57 people per vehicle was used, equating to 48 vehicles or 96 movements per day during the construction period.

81. Assuming 26 workdays per month, this will result in 2,496 movements per month and total of 44,928 vehicle trips for staff over the course of the Development's construction.

82. Staff will be encouraged to car share, so it is anticipated that the figure for car or van movements is likely to be considerably lower than the above estimates in practice.

83. Table 12.20 indicates the number of vehicle movements associated with staff.

Table 12.20: Anticipated Vehicle Movements – Staff

Operation	Vehicle Type	Construction Months	Total Movements	Maximum Monthly Movements
Staff	Car or Minibus	1-18	44,928	2,496

12.6.11 Summary

84. Table 12.21 provides a summary of all deliveries expected throughout duration of construction excluding the pre-commencement felling. The values calculated in Section 12.6.11 may differ from those generated in Appendix A12.1 due to both rounding and assuming the worst-case scenario, which has led to an artificial inflation of the values in the Construction Development Programme.

Table 12.21: Anticipated Vehicle Movements – Summary

Operation	Vehicle Type	Construction Months	Total	Max Monthly
Forestry				
Forestry Plant Delivery	HGV	N/A	N/A	N/A
Timber Extraction	HGV	1-6	3,176	529
Fuel Delivery	HGV Tanker	1-6	96	16
Sub-Total			**3,272**	**545**
Site Mobilisation/Demobilisation				
Site Mobilisation/ Demobilisation	Car or Minibus	1,18	32	16
Site Mobilisation/ Demobilisation	HGV	1,18	120	60

Operation	Vehicle Type	Construction Months	Total	Max Monthly
Subtotal			**152**	**76**
Access Track and Hardstanding Construction				
Plant	HGV Dump Truck	3-7	4	4
	HGV Low Loader (Excavators/Rollers)	3-7	2	2
Material Deliveries	HGV	3-7	3,310	662
Subtotal			**3,316**	**668**
Turbine Foundation Construction				
Concrete Delivery	HGV Concrete Wagon	5-14	1,728	288
Rebar	HGV Low-Loader	4-7	96	36
Miscellaneous	HGV	4-7	80	30
Subtotal			**1,904**	**288**
Control Building Substation and Battery Storage				
Electrical Components and Switchgear Delivery, BESS Delivery	HGV	4-6	70	24
Transformer Delivery	ALV	4	2	2
	HGV	4	2	2
	Escort Car/Van	4	8	8
Concrete for Control Building	HGV Concrete Wagon	4-6	20	7
Subtotal			**102**	**43**
Electrical Cabling Delivery				
Electrical Cabling Delivery	HGV	11-14	**36**	**9**
Subtotal			**36**	**9**
Crane Delivery				
Crawler Crane	HGV	12,17	52	26
	Abnormal Load Vehicle**	12,17	2	1
	Escort Car/Van	12,17	8	4
Subtotal			**62**	**31**
Turbine Delivery				
Turbine Components	ALV	13-16	132	33
	Escort Car or Van	13-16	528	132
	HGV	13-16	132	33
Ancillary Equipment	HGV	13-16	24	6
Subtotal			**816**	**204**
Fuel Delivery				
Fuel Delivery	HGV Fuel Tanker	1-18	**144**	**8**
Subtotal			**144**	**8**

Operation	Vehicle Type	Construction Months	Total	Max Monthly
Staff				
Staff	Car or Minibus	1-18	**44,298**	**2,496**
Subtotal			**44,298**	**2,496**
Totals			**Total**	**Max Monthly**
Total HGV and Abnormal Load Movements			9,228	1,601
Total Car and Van Movements			45,504	2,632
Overall Total			**54,732**	**3,953*****

* Includes transporter vehicle leaving and then returning to site during demobilisation

**Self-propelled vehicles which arrive in one month and depart in another

***Total flow in peak month

12.7 ASSESSMENT OF POTENTIAL EFFECTS

12.7.1 Traffic Generation

85. A detailed breakdown of the distribution of vehicle movements in each month and by element of work, throughout the construction period of the Development, is included in Appendix A12.2. The peak month from a traffic perspective was identified and used to predict the traffic increase along the construction traffic route. A worst-case scenario was assumed in which all predicted traffic passes each location within the study.

86. Due to the nature of foundation pouring, i.e., all concrete for one pour will be delivered within a single day, it is not appropriate to distribute this traffic across the month. Instead, a calculation of the traffic flow increases on the 12 non-consecutive days of concrete pouring, and on days during the peak month with no concrete pouring, has been made.

87. From inspection, the peak month for vehicle flow is expected to be Month 6 where 3,953 vehicle movements (excluding concrete delivery) per month are predicted. Assuming a 26 day working month, 147 vehicle movements per day are predicted on non-concrete pouring days while 291 vehicle movements per day are expected on concrete pouring days.

88. The values calculated in this Section refer to the general construction traffic route only. This is appropriate as in practice the maximum number of ALV movements per day is not likely to exceed 2-3 vehicles, which will travel in convoy with two escort vehicles. In the worst-case scenario this would be three ALV movements with a total of six escort vehicles which would cause minimal impact in baseline traffic receptors. These increases are considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on this route is considered minor and **not significant** in the terms of the EIA Regulations.

89. Table 12.22 details the anticipated vehicle flow in the peak month on days with no concrete deliveries and the percentage increase above the predicted baseline at each point within the Study Area. For the purposes of this assessment, 26 working days per month has been assumed for all daily traffic calculations.

Table 12.22: Predicted Peak Month Average Daily Traffic – Non- Concrete Delivery – General Construction Traffic Route

Traffic Count Location	Total Vehicle Movements			HGV Movements Only*		
	2027 Baseline	Baseline + Development	Increase (%)	2027 Baseline	Baseline + Development	Increase (%)
1	13,680	13,780	1%	861	908	6%
2	22,788	22,887	1%	1104	1151	5%
3	5,985	6,084	2%	302	349	17%
4	7,435	7,535	2%	228	275	22%

*For the purposes of this estimation abnormal load vehicles are included in HGV.

90. Table 12.23 details the anticipated vehicle flow in the peak month on days where concrete deliveries will take place; this will occur on a maximum of 12 non-consecutive days in the month.

Table 12.23: Predicted Peak Month Average Daily Traffic – During Concrete Delivery – General Construction Traffic Route

Traffic Count Location	Total Vehicle Movements			HGV Movements Only*		
	2027 Baseline	Baseline + Development	Increase (%)	2027 Baseline	Baseline + Development	Increase (%)
1	13,680	13,906	2%	861	1052	23%
2	22,788	23,013	1%	1104	1295	18%
3	5,985	6,210	5%	302	493	64%
4	7,435	7,661	4%	228	419	85%

*For the purposes of this estimation abnormal load vehicles are included in HGV.

91. As detailed in the assessment methodology, a screening exercise was undertaken in order to determine which locations warrant detailed assessment.

92. The lower threshold of significance was considered appropriate for those locations with identified sensitive receptors, i.e. location references 2, and 3.

93. The upper threshold of significance was considered appropriate for other locations within the study, which applies to location references 1 and 4.

94. Using the assessment methodology and assessing the estimated percentage increases in overall traffic and HGV traffic, further detailed assessment will be considered in the following locations/ cases:

1. On the A7 and A6094 (Location Reference 2 and 3) throughout construction of the Development and on concrete delivery days as a result of HGV traffic increase; and
2. On the A7 and A703 (Location Reference 1 and 4) throughout construction of the Development as a result of HGV increase.

95. The following subsections detail considerations for each of the above cases.

12.7.1.1 1-A7 and A6094 (Location References 2 and 3) HGV Increase in Construction and During Concrete Delivery

96. At location reference 2 and 3 which are located on the A7 and A6094, HGV traffic is predicted to increase by a maximum of 64% during concrete delivery days, exceeding the lower 10% threshold. Overall traffic is predicted to increase by a maximum of 5% which does not exceed the lower threshold of significance.

97. As detailed in the assessment methodology, where considering increases in traffic on roads with a low baseline traffic flow, it is important to consider the overall and residual capacity of the road in question.

98. As detailed in Table 12.8, the theoretical road capacity for this section of road is 900 vehicles per hour per direction or 43,200 vehicle movements per day (VMPD). The total number of vehicle movements, including baseline and predicted construction traffic, per day predicted during this phase is 291 vehicles per day during concrete delivery and 147 vehicles per day out with concrete delivery.

99. It can be seen that there is significant residual capacity on this route to accommodate the temporary increase in HGV traffic, in addition to this concrete delivery vehicles are expected to arrive from the nearby quarries and would not pass through this section of the general construction traffic route effectively negating the HGV impact on concrete pour days. These increases are considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on this route is considered minor and **not significant** in EIA terms.

12.7.1.2 2-A7 and A703 (Location References 1 and 4) HGV Increase throughout Construction

100. Location reference 1 is located on the A7 just south of Sheriffhall Roundabout and Location Reference 4 on the A703 near Leadburn. At location 4, the predicted increase in overall traffic is 4% and for HGV traffic is 85% during concrete delivery days, exceeding the 30% threshold for this location. However, at location 1, the predicted increase in overall traffic is 2% and for HGV traffic is 23% during concrete delivery days, which is below the 30% threshold.

101. As detailed in the assessment methodology, where considering increases in traffic on roads with a low baseline traffic flow, it is important to consider the overall and residual capacity of the road in question.

102. Table 12.8 highlights the theoretical capacities of the A703 at 57,600 vehicles per day. The maximum number of vehicle movements, including baseline and predicted construction traffic, per day is calculated at 7,662 at this location (4) showing significant residual capacity to accommodate the temporary increase in HGV traffic.

103. In addition to the above, the predicted increase is temporary and would be reversed following completion of construction of the Development. The effect of construction on traffic generation at reference Location 1 and 4 is considered to result in a negligible magnitude of change on a receptor of medium sensitivity. Thus, the effect of increased traffic on this route is considered negligible and **not significant** in EIA terms.

12.7.1.3 D17 Whim – Shiplaw Road and D18 Cloich Road

104. For the D17 Road, it is assumed that the maximum movement of 246 HGVs per day on concrete pouring days during Month 6 exceeds the EIA significance thresholds due to the nature of the road. Although there is no traffic count information for the D17, existing levels are expected to be lower than that on the A703, and therefore the effect of the development will be below the predicted capacity of 6,720 vehicles (Table 12.8). Similarly, for the D18, the existing levels of HGVs are expected to be lower than that on the D17, and therefore the effect of the development will be below the predicted capacity of 6,720 vehicles. Therefore, the effect of construction traffic (though temporary in nature) on traffic generation on the D17 and D18 is considered to result in a medium magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on this route is considered moderate and **significant** in EIA terms.

105. In accordance with the EIA Regulations, Section 12.9 of this Chapter details mitigation measures which are to be adopted to reduce this effect.

12.7.2 Accidents and Safety

106. As detailed in Section 12.4.3, no 'serious' or 'fatal' RTCs involving HGVs occurred within the Study Area.

107. A cluster of RTCs was noted at the A6094 / B6372 crossroad junction. At this location, 4 'slight' RTCs and 2 'serious' RTC were noted. While a review of the available RTC reports did not identify a common cause of the RTCs at this location, it was noted that a number of the 4 'slight' RTCs recorded were rear end impact type accidents. One 'serious' RTC included a car colliding with a motorcyclist, while the other serious RTC was also a rear end impact type accident. Another cluster of RTCs was noted at the A6094 / A703 / A701 and this was generally explained by drivers misjudging speed, shunting, and lane changing causing side collisions at the junction as a prevalent reason for accidents. Three 'fatal' RTCs were also recorded near the A6094 / A703 / A701 junction and a review of the RTC report indicates a head-on collision between two cars with over speeding being the likely cause. Figure 12.4 indicates the location of each of the identified RTCs within the Study Area.

108. It has been concluded that these roads are operating within acceptable safety parameters at present and in the absence of identifiable trends in RTCs or known accident hotspots, an increase in overall traffic flow or HGV composition is not sufficient to affect a change in safe operation of the road network. It was also determined that as any ALV movements will be carried out under escort and outside of peak hours, therefore, the risk of RTCs during these movements would be negligible.

109. The temporary increase in overall traffic and HGVs for the duration of the construction of the Development will not result in an adverse effect in respect to accidents and safety. Therefore, the effect of construction on accidents and safety is considered to result in a negligible magnitude of change on a receptor of negligible sensitivity. Thus, the effect of increased traffic on accidents and safety is considered negligible and **not significant** in terms of the EIA Regulations.

12.7.3 Pedestrian Amenity

110. Pedestrian amenity, fear and intimidation can be affected by changes to traffic flow and composition. All the roads which make up the delivery route do not have pedestrian footways, except where they pass through settlements or built up areas.

111. HGV traffic levels are predicted to increase above the relevant thresholds of significance throughout construction on sensitive receptors along the proposed construction route.

112. A number of the identified sensitive receptors are located at the affected points of this route including Midlothian Community Hospital and Howgate Kirk located on the A7 and A6094. A number of residential properties are located on the D17, D18 and the B6392. It is likely that staff and visitors to these facilities as well as residents will walk on, and may cross the delivery route. As discussed in **Chapter 15: Socio-Economics, Land-Use, Recreation and Tourism** temporary closures of Promoted Path 63 (D17) may be required with diversions in place.

113. Therefore, the effect of construction on pedestrian amenity and residents is considered to result in a low magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on pedestrian amenity is considered moderate and **significant** in EIA terms.

114. In accordance with the EIA Regulations, Section 12.9 of this Chapter details mitigation measures which are to be adopted to reduce this effect.

12.7.4 Driver Delay

115. All roads within the Study Area are operating below capacity and are predicted to continue to do so during construction of the Development. The effect of general increase in traffic on driver delay is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on driver delay is considered minor and **not significant** in terms of the EIA Regulations.

116. Some driver delay can be expected to occur on routes due to the slow movement of ALVs between the port of delivery (Grangemouth Port) and the Site. Where safe to do so ALVs will occasionally stop to allow traffic to pass if necessary. A total of 132 ALVs associated with turbine delivery, two associated with the crane delivery and two associated with transformer delivery for the substation are anticipated. These will be distributed throughout the duration of specific elements of works.

117. Due to the overall limited number of loads across the construction programme and the short-term nature of this phase of works, the anticipated effect of abnormal loads on driver delay is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of abnormal loads on driver delay is considered minor and **not significant** in EIA terms.

12.7.5 Severance

118. Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The A6094 is the only route within the Study Area which passes through settlements which have the potential to be affected by severance, and is covered by Reference Location 3.

119. During construction of the Development, HGV traffic at Reference Location 3 is predicted to increase by a maximum of 63% throughout the duration of the Development. In this case the temporary change in traffic falls above the thresholds of significance (10%) for this effect, however, with the A6094 being the major road route serving these settlements, we assume that temporary increases in HGV traffic are not uncommon. Although the HGV traffic increase is above the 10% threshold, the total vehicle increase will only result in a maximum of 4% increase in the traffic passing through this area. The change in traffic is temporary, fully reversible and would only occur during construction hours.

120. Therefore, the effect of construction on severance is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on severance is considered minor and **not significant** in terms of the EIA Regulations.

12.7.6 Noise and Vibration

121. Assessment of noise and vibration effects as a result of offsite construction vehicle movements has been considered using the guidance contained in DMRB – LA 111[11]. In accordance with the guidance, the following points have been noted when considering the need for a quantitative assessment of offsite construction traffic noise and vibration:

- The level of detail of a noise and vibration assessment shall be proportionate to the quality of data available and the risk of likely significant effects occurring; and
- Are there any noise sensitive receptors where there would be a reasonable stakeholder expectation that a construction noise/vibration assessment would be undertaken?

[11] Department for Transport (May 2020). Design Manual for Roads and Bridges – LA 111 Noise and Vibration. Available at: https://www.standardsforhighways.co.uk/dmrb/search?q=noise&pageNumber=1. Accessed on 20/5/2021

122. It should be noted that all onsite construction noise and vibration effects and operational noise effects are considered in **Chapter 11: Noise** of the EIA Report.

123. Considering off-site transport related noise/vibration effects against the above bullet points, there are a number of sensitive receptors located close to the proposed general construction traffic route. However, this route is an established transport corridor (including the D17 Road and D18 Road which are timber haulage roads), and there should be an expectation that it is used by HGV traffic. Therefore, there is no 'reasonable stakeholder expectation' that a quantitative noise/vibration assessment be undertaken for a temporary and fully reversible change in traffic flow as a result of the Development.

124. Furthermore, ground-borne vibration resulting from HGV and ALV movements is generally only likely to be significant where vehicles traverse discontinuities, such as rough surfaces (including potholes) or speed-humps. Effects from the temporary increase in traffic are therefore only likely to be experienced at receptors located next to such road defects, in which case the maintaining authority (i.e., the Council, or Transport Scotland) would be responsible for enacting repairs.

125. Airborne vibrations resulting from low frequency sound emitted by vehicle engines and exhausts can result in detectable vibrations in building elements such as windows and doors and cause disturbance to local people. Due to the short-term and temporary nature of these increase in traffic movements, the effect of noise and vibration upon receptors along the route considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of increased in traffic movement on noise and vibration is considered minor and **not significant** in terms of the EIA Regulations.

12.7.7 Hazardous Loads

126. Fuel will be regularly transported to the Site over the duration of construction of the Development. All fuel will be transported by suitably qualified contractors, and all regulations for the transportation and storage of hazardous substances will be observed. No other hazardous substances in significant quantities are expected to be transported to Site. Therefore, the effect of the transportation of hazardous substances is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of hazardous load is considered minor and **not significant** in terms of the EIA Regulations.

12.7.8 Visual Effects

127. The movements of ALVs could be considered visually intrusive. This effect would be short-term and would only occur during the movement of abnormal loads. Therefore, the visual effect upon receptors along the routes as a result of the ALVs is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of ALVs on severance is considered minor and **not significant** in terms of the EIA Regulations.

12.7.9 Air Quality

128. Maintaining good local air quality is essential for the human health and overall quality of life for people living in the area. Road transport accounts for a significant proportion of emissions of a number of pollutants including carbon dioxide (CO_2), nitrogen dioxide (NO_2), and particulate matter (PM10). Nitrogen oxide emissions are also of concern for nearby vegetation and ecosystems.

129. Current guidance[12] on matters relating to air quality in Volume 11 Section 3 and advises that significant impacts to local air quality may be found in the following cases:

- Where the road alignment will change by 5 m or more; or
- Daily traffic flows will change by 1,000 AADT flow or more; or
- Heavy Duty Vehicle flows will increase by 200 AADT or more; or
- Daily average speed will change by 10 km/hr or more; or
- Peak hour speed will change by 20 km/hr or more.

130. Given the assessment of the expected volume of construction traffic, none of the above criteria have been met or exceeded. In addition, due to the temporary nature of the increase in vehicles using the proposed access route, any effects on local air quality will be short term and reversible.

131. Therefore, the effect of the increase in traffic on local air quality is considered to result in a negligible magnitude of change on a receptor of high sensitivity. Thus, the effect of increased traffic on air quality is considered minor and **not significant** in terms of the EIA Regulations.

12.8 CUMULATIVE EFFECT ASSESSMENT

132. Following a review of proposed developments which have the potential to result in cumulative traffic and transport effects, no new wind farm developments, or applications with similar construction timescales, for which construction traffic will utilise the same road network as the proposed development have been identified in the area.

133. On that basis, and given that any developments would be subject to appropriate planning conditions, no cumulative assessment of traffic effects has been undertaken.

12.9 MITIGATION AND RESIDUAL EFFECTS

12.9.1 Mitigation Measures

134. Significant effects were identified in Sections 12.7.1 and 12.7.3 relating to:

- Traffic generation of the D17 Road and D18; road
- Pedestrian amenity at several sensitive receptors, including Midlothian Community Hospital, Howgate Kirk, and residential properties located on the D17, D18 and the B6392.

135. Due to the nature of the sensitive receptors in this location, a number of mitigation measures are proposed which are recommended for adoption in a Construction Traffic Management Plan (CTMP) which would be agreed in consultation with Transport Scotland and the Council as follows:

- As far as reasonably possible, deliveries should be scheduled outside of church service times;
- Drivers of all delivery vehicles to be made aware during induction of the presence of schools, hospital and other amenities within these settlements;
- Delivery times will be scheduled to ensure that deliveries do not arrive in a convoy;
- Timing of the deliveries will be outlined within the CTMP to ensure construction vehicles avoid potentially congested networks at peak hours; and
- Communications with local communities should be undertaken for planned activities such as turbine deliveries and concrete delivery days (if onsite batching is not possible).

[12] Design Manual for Road and Bridges – LA 105 Air Quality [Online] Available at: https://www.standardsforhighways.co.uk/prod/attachments/10191621-07df-44a3-892e-c1d5c7a28d90?inline=true. (Accessed on 20/05/2021)

136. The above measures are recommended; however, the CTMP will detail the exact measures to be implemented during construction of the Development.

12.9.2 Residual Effects

137. It is considered that if the above mitigation measures are implemented through the CTMP for the duration of construction, the effect on increased traffic on pedestrian amenity at the sensitive receptors identified will be reduced to minor and therefore considered as **not significant** in terms of the EIA Regulations.

12.10 SUMMARY OF EFFECTS

138. Table 12.24 provides a summary of the effects detailed within this chapter.

Table 12.24: Summary of Effects

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Construction Phase				
Road network	Traffic Generation	Moderate	Deliveries should be scheduled outside of church service times; Drivers of all delivery vehicles to be made aware of the presence of schools, hospital and other amenities along delivery route; Delivery times will be scheduled to ensure that deliveries do not arrive in a convoy; Timing of the deliveries will be outlined within the CTMP to ensure construction vehicles avoid potentially congested networks at peak hours Communications with local communities should be undertaken for planned activities such as turbine deliveries and concrete delivery days (if onsite batching is not possible).	Minor, Not Significant
Road network	Accidents and Safety	Negligible	N/A	Negligible, Not Significant
Midlothian Community Hospital; and Howgate Kirk; Residential properties on the D17, D18 & B6392	Pedestrian Amenity	Moderate	Deliveries should be scheduled outside of church service times; Drivers of all delivery vehicles to be made aware during induction of the presence of schools and hospitals and other facilities along the delivery route; Delivery times will be scheduled to ensure that deliveries do not arrive in a convoy; Communications with local communities should be undertaken for planned activities such as turbine deliveries and concrete delivery days	Minor, Not Significant

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Construction Phase				
			These measures will be implemented through a CTMP	
Road network	Driver Delay	Minor	N/A	Minor, Not Significant
Settlements along route	Severance	Minor	N/A	Minor, Not Significant
Road network and Settlements along route	Noise and Vibration	Minor	N/A	Minor, Not Significant
Road users and local residents	Hazardous Loads	Minor	N/A	Minor, Not Significant
Road users and local residents	Visual Effects	Minor	N/A	Minor, Not Significant
Locals along route	Air Quality	Minor	N/A	Minor, Not Significant

12.11 STATEMENT OF SIGNIFICANCE

139. Effects are considered to be significant for the purposes of the EIA Regulations where the effect is classified as being of 'major' or 'moderate' significance. A moderate effect was identified for traffic generation and pedestrian amenity at a number of sensitive locations including Midlothian Hospital, Howgate Kirk, D17 road, D18 road and B6392 road. Mitigation measures were identified in Section 12.9 of this EIA Chapter and the residual effects following implementation of these mitigation measures are predicted to be minor and thus **not significant** in terms of the EIA regulations.