ScottishPower Renewables

Hare Hill Windfarm Repowering and Extension

Environmental Impact Assessment Report

Volume 1

Chapter 11: Access, Traffic and Transport

November 2025

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Figures

Abbreviations

Abbreviation	Description
AADT	Annual Average Daily Traffic
ADF	Average Daily Flow (Equivalent to ADT)
ADT	Average Daily Traffic
AIL	Abnormal Indivisible Load
ALVs	Abnormal Load Vehicles
CTMP	Construction Traffic Management Plan
DAS	Design and Advisory Services
DfT	Department for Transport
DGC	Dumfries and Galloway Council
DMRB	Design Manual for Roads and Bridges
EAC	East Ayrshire Council
EIA	Environmental Impact Assessment
EIA Report	Environmental Impact Assessment Report
HGVs	Heavy Goods Vehicles
HH	Hare Hill Windfarm
HHE	Hare Hill Extension Windfarm
HHR1	Hare Hill Repowering and Extension Phase 1
HHR2	Hare Hill Repowering and Extension Phase 2
ISEP	Institute of Sustainability and Environmental Professionals
kph	Kilometres per hour
LGVs	Light Goods Vehicles
m	metres
mph	Miles per hour
NMU	Non-Motorised User
NRTF	National Road Traffic Forecast
RTC	Road Traffic Collision
TMP	Traffic Management Plan

11. Access, Traffic and Transport

11.1. Statement of Competence

1. Natural Power's Design and Advisory Services (DAS) team have over 20 years' experience in undertaking access assessments, traffic impact assessments, transport studies and traffic management plans for the renewable industry. As well as undertaking these assessments, the DAS team regularly undertake due diligence reviews of third-party access studies for project financial closure. The team works closely with developers, turbine suppliers and haulage contractors to keep abreast of the latest developments in turbine component transport.

2. The DAS team is involved in all stages of wind farm developments from conception, through planning, planning condition discharge, construction, asset management/maintenance and decommissioning. This range provides the team with detailed experience of the various stages and how the traffic related issues follow and influence these stages. This experience is particularly valuable in ensuring that a comprehensive consideration of the traffic and transport impacts of the Hare Hill Windfarm Repowering and Extension (the 'proposed Development') is provided in this chapter of the EIA Report.

11.2. Introduction

3. This Chapter of the EIA Report considers the impacts and potential effects on traffic and transport as a result of the construction of the proposed Development.

4. The proposed Development is located south east of New Cumnock, East Ayrshire and straddles the administrative boundaries of East Ayrshire Council (EAC) and Dumfries and Galloway Council (DGC). The proposed Development will be accessed through the existing Hare Hill Windfarm site entrance off the A76. The majority of construction traffic is expected to approach from the west via the A76 through East Ayrshire, although a small number of vehicles may approach from the east via the A76, as described in **Section 11.7.12**.

5. The proposed Development will comprise two phases:

    a. Hare Hill Repowering and Extension Phase 1 (HHR1); and

    b. Hare Hill Repowering and Extension Phase 2 (HHR2).

6. HHR1 consists of 15 wind turbines, plus associated infrastructure.

7. HHR2 consists of 8 wind turbines plus associated infrastructure.

8. HHR1 is anticipated to start construction in 2029, while HHR2 is anticipated to start construction in 2036.

9. The 20 existing turbines which comprise the original Hare Hill (HH) Windfarm are to be decommissioned before the commencement of the construction phase of HHR1.

10. The 35 existing turbines which comprise Hare Hill Extension (HHE) Windfarm are to be decommissioned before the commencement of the construction phase of HHR2.

11. Whilst separate decommissioning plans for each of these activities will be prepared and submitted to the planning authority the traffic impact of these activities have been considered throughout this assessment. This approach is in line with the scoping response received from Transport Scotland presented in **Table 11-2 in Section 11.4**.

12. The following appendices and figures accompany this chapter of the EIA Report:

- Appendices:
  - **Technical Appendix 11.1: Baseline Traffic Data**;
  - **Technical Appendix 11.2: Abnormal Indivisible Loads (AIL) Assessment;**
  - **Technical Appendix 11.3: Outline Construction Traffic Management Plan (CTMP)**;
  - **Technical Appendix 11.4: Fear and Intimidation Assessment**; and
  - **Technical Appendix 11.5: Estimated Vehicle Movements**
- Figures:
  - **Figure 11.1: Traffic Count Location Plan;**
  - **Figure 11.2: RTC Location Plan;**
  - **Figure 11.2.1: Pinch Point Overview Plan.**

13. This chapter will include the following elements:

- legislation, policy and guidance;
- consultation;
- traffic and transport methodology;
- baseline conditions;
- quantification of impact;
- assessment of potential effects;
- mitigation; and
- conclusion.

11.3. Legislation, Policy and Guidance

14. This section outlines the legislation, policy and guidance that has been reviewed. The traffic and transport issues described in the following planning advice and guidance documents have been considered in this assessment.

Table 11-1: Legislation, Policy and Guidance

Author	Title	Legislation, Policy and Guidance
The Scottish Government	The Electricity Works (Environmental Impact	These regulations set out in broad terms what is to be considered when evaluating the

Author	Title	Legislation, Policy and Guidance
	Assessment) (Scotland) Regulations 2017	effects of a development on the transport network.
The Scottish Government	National Planning Framework 4 (updated 2024)	This document provides a statement of the Scottish Government's policy on nationally important land use planning including renewable energy and indicates that proposals for onshore wind should assess the impact on road traffic and on adjacent roads.
The Scottish Government	Planning Advice Note 75 (PAN 75) – Planning for Transport (2005)	This note provides advice on sustainable transport planning in the context of new and existing development. The note also indicates that all applications which involve the generation of person trips should provide information which assesses the transport implications of the development. The level of detail is to be proportionate to the complexity and scale of impact of the development.
Transport Scotland	National Transport Strategy (2020)	This document provides details of Scotland's national transport strategy and in particular strategies for achieving sustainable transportation of goods and freight.
Institute of Sustainability and Environmental Professionals (ISEP)	Environmental Assessment of Traffic and Movement (2023) (hereafter referred to as the 'ISEP Guidelines')	Sets out guidelines for assessing the significance of traffic effects because of a development. The document focuses on the assessment of potential environmental effects associated with road traffic.
Department for Transport (DfT)	Design Manual for Roads and Bridges (DMRB) – Volume 15	This guidance has been used to assist in the technical review of existing roads. Volume 15 – Economic Assessment of Road Schemes in Scotland has been used to derive the theoretical capacities of roads within the study.
DfT	DMRB LA112	This guidance has been used for the categorisation of sensitivity in relation to severance. Specifically, the criteria contained

Author	Title	Legislation, Policy and Guidance
		within Table 3.11 of the guidance has been used within this assessment.
Transport Scotland	Transport Assessment Guidance (2012)	This guidance is used for the preparation of Transport Assessments in Scotland.
Department for Communities and Local Government	Environmental Impact Assessment: A guide to good practice and procedures (2006)	This guide has been consulted during the preparation of this Chapter and has been referred to within the assessment.

15. This Chapter has been prepared based on the 2023 ISEP Guidelines but also takes cognisance of the Transport Assessment Guidance (2012), Transport Scotland.

16. Much of the above legislation, policy and guidance deals principally with developments which generate significant increases in travel as a direct consequence of their function (e.g. retail parks, housing) and measures to implement a more sustainable transport solution.

17. The traffic generated by the proposed Development will almost entirely be limited to vehicle movements during the construction phase. As such, the effects of traffic from the proposed Development will be temporary and of a short-term duration as opposed to developments such as retail parks where the traffic effects can be permanent and for a long duration of typically a 60-year design span. In addition, given the nature of the construction phase traffic there is little or no scope for changing to alternative modes of transport.

11.4. Consultation

18. A Scoping Report was prepared and submitted to consultees in March 2023. **Table 11-2** summarises the scoping opinions which were received in relation to Traffic and Transport. Note that comments specifically related to the Abnormal Indivisible Loads (AIL) Assessment and Traffic Management Plan (TMP) have not been addressed below, or in this chapter of the EIA Report. These will be specifically addressed within the AIL Report which is included in **Technical Appendix A11.2** and in the Outline Construction Traffic Management Plan (CTMP) which is included in **Technical Appendix A11.3**.

Table 11-2: Scoping Responses

Consultee	Ref.	Comment	Response to Consultee
Transport Scotland	Scoping Opinion	Satisfied with the proposed baseline traffic data. Traffic data should be factored using National Road Traffic Forecast (NRTF) Low Growth	NRTF Low Growth factors have been applied to the baseline traffic data

Consultee	Ref.	Comment	Response to Consultee
		Worst case assessment should be provided ISEP 2023 guidelines should be considered Rule 1 and Rule 2 screening thresholds should be applied as per guidance Accepted that operational and decommissioning phases are scoped out of the assessment A full abnormal loads assessment report should be provided within the EIA Report	Worst case and 'realistic' worst case scenarios have been considered ISEP 2023 guidelines have been used throughout this assessment The screening thresholds have been applied in accordance with the guidance Noted An AIL report is provided in **Technical Appendix A11.2**
Transport Scotland	Email response to Phasing Technical Appendix	Satisfied with proposed phasing approach. Decommissioning of the existing turbines should be considered in the assessment	Noted Decommissioning of existing turbines has been considered in the assessment
DGC - Roads	Scoping Opinion	Future applications should identify construction routes in Dumfries and Galloway Worst case scenario should consider 100% import of aggregate	Construction traffic routes have been identified in **Section 11.7.12** The worst case scenario assessment has considered 100% import of aggregates

11.5. Traffic and Transport Methodology

11.5.1. Potential Effects

19. The impact of the construction phase of the proposed Development considered in this Chapter will be an increase in traffic movements on roads (hereafter referred to as links) within the vicinity of the area within the application boundary within which the proposed Development lies (Site).

20. Potential effects considered within this assessment are those defined within **Section 3.1** of the ISEP Guidelines and are listed as follows:

- severance of communities;
- road vehicle driver and passenger delay;
- non-motorised user (NMU) delay;
- NMU amenity;
- fear and intimidation on and by road users;
- road user and pedestrian safety; and
- hazardous and large loads.

21. As described in the ISEP Guidelines the impact of traffic has linkages to other disciplines. Information established in the preparation of this Chapter has been shared with other relevant disciplines to enable them to consider the impact of increased traffic during the construction phase of the proposed Development.

11.5.2. Approach to Significance

22. As described in the EIA Good Practice Guide (referred to in **Table 11-1**) broadly speaking, significance is a function of the following:

- the value of the resource (i.e. its international, national, regional and local importance);
- the magnitude of the effects;
- the duration of effects;
- the reversibility of effects; and
- the number and sensitivity of receptors.

23. The methodology used in the preparation of this Chapter has considered the above criteria to arrive at an assessment of the significance of road traffic during construction of the proposed Development on human and other receptors.

11.5.3. Approach to Mitigation

24. This assessment has considered the effect of the proposed Development with primary, secondary and tertiary mitigation in place.

25. Primary mitigation in relation to the proposed Development is primarily due to the proposed on-site borrow pits which will significantly reduce delivery vehicle traffic. However, as a result of consultation responses the assessment has considered two scenarios; with and without primary mitigation in place. This is further described in the section 'Assessment Scenarios' below.

26. Secondary mitigation consists of mitigation which will require further actions to be taken, in this case during the planning or construction phases of the proposed Development, in order to achieve the desired outcome. Specifically, secondary mitigation measures are those which may be identified within this assessment, or further assessments of traffic and transportation (e.g. the CTMP), which are required to mitigate potentially significant effects which have been identified.

27. Tertiary mitigation consists of mitigation which will occur with or without input from the EIA process. For example, all construction vehicles will comply with the relevant road traffic regulations and that a detailed CTMP will be developed by the Principal Contractor prior to the commencement of construction.

11.5.4. Items Scoped Out of Assessment

28. In alignment with the methodology set out in **Section 14.6** of the Scoping Report the following items have been scoped out of this assessment:

- operational traffic; and
- decommissioning traffic associated with HHR1 and HHR2 (traffic associated with decommissioning HH and HHE is included in the assessment).

29. This approach was agreed with Transport Scotland in their scoping response, as detailed in **Table 11-2**.

30. Consideration of 'large loads' is made in **Technical Appendix A11.2** and is not considered further within this chapter.

Note on Scoped Out Items

31. When considering the magnitude of the impact it should be recognised that the traffic generated by the proposed Development would be short term, due primarily to vehicle movements during the construction phases. Following completion of each construction phase, traffic levels will return very close to the existing baseline conditions. The impact of vehicle movements during the operational phase, largely light good vehicles (LGVs), is negligible.

32. The final method of decommissioning the proposed Development will be agreed with DGC, EAC and Transport Scotland prior to decommissioning being undertaken. It is anticipated that, in line with current practice, all turbine components, including blades, nacelles, and towers will be removed from the Site. If they are not to be re-used, turbine components will likely be cut to manageable sizes and transported off site in heavy goods vehicles (HGVs), as opposed to abnormal load vehicles (ALVs) which will be required during construction phase.

33. Above ground infrastructure will be removed with foundations generally removed to around 1 m below ground level, with the remainder left in-situ. There will be no requirement

for concrete pours, and minimal aggregate would need to be imported. Therefore, the HGV movements would be considerably less than during the construction period.

34. Baseline traffic flows on all the affected roads may have altered by the end of the up to 50-year lifetime of the proposed Development leading to the possibility of a different effect on the roads for HGV traffic. Decommissioning would be managed in accordance with a decommissioning plan to be agreed with relevant authorities at the time. It is envisaged that the decommissioning would result in lesser effects than those identified for this assessment and no further assessment has been undertaken.

11.5.5. Study Area

35. The Traffic and Transport study area (study area) consists of links which may be affected by construction traffic and considers routes which are used in both scenarios (scenarios are detailed in the following sub-section). The precise origin of all equipment and materials is not currently known, however assumptions have been made as to the approach routes.

36. A review of nearby quarries was made for the supply of aggregates in the worst-case scenario, this review identified that Sorn Quarry would be the most likely supplier of such aggregates. Thus, the study area encompasses the approach route from Sorn Quarry to the Site as detailed below. It should be noted that links within the immediate vicinity of the quarry have not been assessed. The quarry will have undertaken a Transport Assessment as part of its extraction licence and as such only routes which are on the approach to the proposed Development and would not typically be used by quarry traffic (the A76 through New Cumnock) have been assessed.

37. There are several quarries near Kilmarnock that can supply ready-mix concrete in the worst-case scenario as well as sand. All quarry routes would take the A76 from the direction of Kilmarnock.

38. The worst-case scenario route for aggregates and sand is presented in **Figure 11.1**.

39. The 'realistic worst-case scenario' route will see sand and cement come from Kilmarnock via the A76, with aggregates extracted from borrow pits. For the remaining materials (i.e. those other than sand) the source is not currently known, however due to the relative location of the nearest centres of population (North-West) it is reasonable to assume that such materials will predominantly be transported via the A76 from the direction of Kilmarnock. Therefore, in both scenarios it has been assumed that all remaining materials (i.e. those other than aggregate) will approach directly via the A76.

11.5.6. Assessment Scenarios

Realistic Worst-Case Scenario

40. The ISEP Guidelines (Paragraph 1.25) state that the 'realistic worst-case scenario' should be assessed. In relation to the proposed Development the principal consideration for scenario planning is the source of aggregates for the formation of access tracks and hardstands, and for on-site batching of concrete. As it is intended to source the majority of aggregates from on-site borrow pits, which will require no movements on the public road, the 'realistic worst-case scenario' would be represented by the following:

- Running surface aggregates for tracks are to be delivered from Sorn Quarry;

- Sub-base aggregates for tracks and hardstands sourced from on-site borrow pits;
- concrete batched on-site; and
- sand and cement for concrete imported from a quarry near Kilmarnock.

41. The above represents the intended approach for construction of the proposed Development. Nonetheless due to specific consultation feedback received from Transport Scotland and DGC (as described in **Table 11-2**) a 'worst-case' scenario has also been considered.

Worst Case Scenario

42. In the 'worst case scenario' the following assumptions have been made:

- all aggregates for tracks and hardstands will be imported via the A76;
- concrete will be imported as ready-mix from a quarry near Kilmarnock via the A76; and
- all other construction materials will approach using the A76.

11.5.7. Assessment Methodology

43. The methodology employed in this assessment is developed from the ISEP Guidelines. This has taken the steps detailed in the following sub-sections.

11.5.7.1. Baseline Assessment

44. Baseline conditions within the study area were established, including the following:

- baseline traffic flow (further detail provided in Paragraph 45);
- qualitative assessment of route(s) including identification of major junctions, crossing points and road width/classification and a resultant assessment of the 'value of the resource' in terms of the international, national, regional and local level importance of each link assessed;
- review of theoretical link capacity;
- road traffic collision (RTC) assessment; and
- identification of sensitive receptors and assignment of sensitivity to route(s). A detailed criteria for the assignment of sensitivity is given in **Table 11-4**.

11.5.7.1.1. Baseline Traffic Flow Data Collection

45. Baseline traffic flow data for the A76 was obtained from the DfT. Nine count locations were adopted as presented in **Table 11-3** below, all count data used is from 2023:

Table 11-3: DfT Traffic Count

Link	Count ID	Source	Road	Description
1	40748	Automatic	A76	Hurlford
2	20751	Automatic	A76	Crosshands
3	80239	Estimated	A76	Mauchline

Link	Count ID	Source	Road	Description
4	80238	Automatic	A76	Between Mauchline and Auchinleck
5	80522	Manual	A76	West of Cumnock
6	80521	Estimated	A76	Cumnock
7	80520	Estimated	A76	Between Cumnock and New Cumnock
8	30752	Automatic	A76	West of Site entrance
9	50747	Estimated	A76	East of Site entrance

46. The traffic data collected was 'classified', i.e. it counted vehicles according to their type as they passed the counter. The data has been presented within this assessment as the Annual Average Daily Traffic (AADT) on each link, meaning the average number of vehicles which pass the count location on any given day averaged across one year.

47. Some count information within the DfT dataset is estimated where a traffic count (manual or automatic) has not been undertaken within the previous year. Where such estimated data has been used this is noted within **Table 11-7.**

11.5.7.1.2. Future Baseline Scenarios

48. Future traffic has been estimated by applying traffic growth factors between the year in which traffic data was collected (2023) and the anticipated years of the commencement of construction of each phase (2029 and 2036). Traffic growth factors were determined using the TEMPro software published by the DfT. This software develops traffic growth factors using NRTF growth factors for specific regions over specific time periods. The 'low' growth factor has been applied in accordance with the requested methodology from Transport Scotland as detailed in **Table 11-2**. The region selected was Dumfries and Galloway.

49. The TEMPro low growth factor was calculated for each phase as follows:

- HHR1 - 0.9823, meaning 1.8% decrease in baseline traffic is predicted during the period 2023-2029. This growth factor was applied to 2023 baseline traffic flows.
- HHR2 – 0.9455, meaning 5.5% decrease in the baseline traffic is predicted during the period 2023 – 2036. This growth factor was applied to 2023 baseline traffic flows.

50. Whilst a decrease in baseline traffic may seem unlikely, it should be noted that this would result in a conservative assessment as traffic from the proposed Development would become a higher percentage of overall traffic when compared against decreasing baseline volumes.

11.5.7.1.3. Construction Traffic Estimate

51. An estimate of the construction traffic expected for each construction activity has been established. This estimate has been developed by quantifying the number of vehicle deliveries for each activity during construction. This traffic has been distributed across the predicted construction programme for both phases to establish the peak increase in traffic during each phase.

52. In line with scoping responses received from Transport Scotland and DGC (presented in **Table 11-2**) the 'worst case scenario' in which all aggregate is imported to the Site has been

presented. An additional assessment of the 'realistic worst-case scenario' has been made in which borrow pits are used to source the majority of on-site aggregates.

11.5.7.2. Screening Exercise

53. A screening exercise has been undertaken in line with Section 2 of the ISEP Guidelines. This was used to evaluate which links should be considered for further assessment. Links have been taken forward where:

- Traffic is predicted to increase by more than 30%, or HGVs by more than 30%; or
- On high sensitivity routes where traffic is predicted to increase by more than 10% or HGVs by more than 10%.

54. For links which exceed the thresholds, further assessment has been undertaken to establish the significance of the effect on each link.

55. In accordance with the ISEP Guidelines the thresholds in Paragraph 53 have not been applied to the following potential effects:

- road safety; and
- driver delay.

56. Further information on the proposed methodology for the assessment of these potential effects is provided in Paragraph 70 as this differs from the methodology set out in ISEP 2023 Guidance.

11.5.7.3. Assessment of Sensitivity

57. In relation to the impact of the proposed Development (an increase in traffic) the receptors are human; they are the people who live, work, play, travel on, or otherwise rely upon traffic and transport resources (in this case links) within the study area. The following criteria presented in **Table 11-4** define the level of sensitivity which receptors may have in relation to each of the potential effects which were defined in **Section 11.5.1**.

Table 11-4: Sensitivity Criteria

Sensitivity	Criteria
High	The receptor has little ability to absorb change without fundamentally altering its present character, is of high strategic value, or of national importance. For example: Where there is substantial severance between community assets, with limited accessibility provision, where alternative facilities are only available in the wider local planning authority area, where the level of use is frequent (weekly), where the land and assets are used by the majority (>=50%) of the community, where regional trails and walking routes used for recreation/commuting are bisected by a link with limited potential for substitution, rights of way for at grade pedestrian crossings with average daily traffic (ADT) >8,000.

Sensitivity	Criteria
	Links with existing high traffic levels which have little additional traffic flow capacity; Links for NMUs which have high traffic levels and have little residual capacity, or where changes in road traffic could result in significant delays to NMUs; A link with poor NMU facilities and a high traffic flow level where an increase in traffic is likely to significantly impact upon NMU amenity; A link which due to the nature of its design could experience a significant increase in fear and intimidation on/by road users due to increased traffic; At severe/fatal accident hotspots where an increase in traffic flow may increase the likelihood or severity of accidents; or At a location where pedestrian crossing facilities are informal and where a significant change in traffic flow level might induce significant safety impacts on pedestrians or where for example children/elderly people might regularly cross using an informal crossing.
Medium	Areas where the transport network has moderate capacity to change, without significantly altering its state. For example: Where there is severance between community assets, with existing accessibility provision, where alternative facilities are available at a local level, where the level of use is frequent (monthly), where the land and assets are used by the majority (>=50%) of the community, where public rights of way and walking routes used for recreation/commuting are bisected by a link where alternative routes can be taken, rights of way for at grade pedestrian crossings with ADT >4,000 – 8,000. Links with moderate traffic levels which have some additional traffic flow capacity; Links for NMUs which have moderate traffic levels and have some residual capacity or where changes in road traffic could result in some delays to NMUs; A link which due to the nature of its design could experience some increase in fear and intimidation on/by road users due to increased traffic; At a slight accident hotspot where an increase in traffic flow may increase the likelihood or severity of accidents; or At a location where pedestrian crossing facilities are informal or substandard and where a significant change in traffic flow level might induce a moderate pedestrian crossing delay.
Low	Areas where the transport network is tolerant to change without detriment to its state, for example: Where there is limited severance between community assets, with existing good quality accessibility provision, where alternative facilities are available at a local level, where the level of use is infrequent (monthly), where the land and

Sensitivity	Criteria
	assets are used by a minority (<50%) of the community, where public rights of way and walking routes which are scarcely used for recreation/commuting are bisected by a link or where alternative routes can be taken, rights of way for at grade pedestrian crossings with ADT <4,000. Links with low traffic levels which have significant additional traffic flow capacity; Links for NMUs which have low traffic levels and significant residual capacity of where changes to traffic flow are unlikely to result in NMU delay; A link which does not experience notable fear and intimidation effects or where an increase in traffic is unlikely to increase fear and intimidation; Where no trends or hotspots in accident data have been identified; At a location which has good pedestrian crossing facilities where a change in traffic flow is unlikely to increase pedestrian crossing delay.
Negligible	Areas where the transport network is highly tolerant to change without detriment to its state, for example: Where there is no severance between community assets, where alternative facilities are available within the same community, where the level of use is very infrequent (a few occasions yearly), where the land and assets are used by a minority (<50%) of the community; Links with very low traffic levels which have significant additional traffic flow capacity; Links for NMUs which have very low traffic levels and significant residual capacity of where changes to traffic flow are highly unlikely to result in NMU delay; A link which does not experience notable fear and intimidation effects or where an increase in traffic is highly unlikely to increase fear and intimidation; Where very few RTCs in accident data have been identified; At a location which has very good pedestrian crossing facilities where a change in traffic flow is highly unlikely to increase pedestrian crossing delay.

58. This assessment has identified individual sensitive receptors; however, categorisation has been applied to each individual link within the assessment. Each link thus has a sensitivity level defined for each of the potential effects. Generally, the sensitivity level which has been applied to each link is the most sensitive of all the individual receptors located on (or near) that link for the effect in question.

11.5.7.4. Magnitude of Change in Effect

59. The magnitude of traffic impact is a function of the existing traffic volumes, the percentage increase due to the proposed Development and changes in type of traffic. The magnitude of effects arising from the increase in traffic volumes (taken as being either the traffic flow

including all vehicles or the HGV traffic flow, whichever is higher) is categorised in **Table 11-5**.

Table 11-5: Magnitude of Effect Criteria

Sensitivity	Criteria
High	In relation to severance, a substantial increase in traffic flow (>90%); Change in traffic delay to drivers and passengers which may result in changes to existing traffic routes or activities such that delays or rescheduling are required which results in hardship; Change in delay to NMUs which may result in an appreciable change in terms of length and/or duration to present routes or the scheduling of activities which results in hardship; In relation to fear and intimidation, two step changes in level due to degree of hazard score; or High likelihood of increased RTCs or a large increase in the severity of possible RTCs.
Medium	In relation to severance, a moderate increase in traffic flow (60%-90%); Change in traffic delay to drivers and passengers which may result in changes to existing traffic routes or activities such that some delays or rescheduling could be required which results in inconvenience; Change in delay to NMUs which may result in a change to the length and/or duration of existing routes such that some delays or rescheduling could be required which results in inconvenience; In relation to fear and intimidation, one step change in level due to degree of hazard score with: >400 ADT increase; and/or >500 HGV ADT increase; Moderate likelihood of increased RTCs or a moderate increase in the severity of possible RTCs.
Low	In relation to severance, a slight increase in traffic flow (30%-60%); Change in traffic delay to drivers and passengers which may result in minor modification to routes or a minor delay; Change to delay to NMUs which may result in a minor modification to routes or minor delay; In relation to fear and intimidation, one step change in level due to degree of hazard score with: <400 ADT increase; and/or <500 HGV ADT increase; Low likelihood of increased RTCs or a low increase in the severity of possible RTCs.

Sensitivity	Criteria
Negligible	In relation to severance, a negligible increase in traffic flow (<30%); Barely perceptible change in traffic delay to drivers and passengers; In relation to fear and intimidation, no step change in level; or Negligible likelihood of increased RTCs or a negligible increase in the severity of possible RTCs.

60. It should be noted that in **Table 11-5** the traffic flow criteria given in relation to severance only apply to that possible effect and cannot necessarily be applied to others.

61. In relation to fear and intimidation a degree of hazard score for each link will be developed for baseline and with proposed Development scenarios, in accordance with the ISEP Guidelines Tables 3.1, 3.2 and 3.3, which is presented in **Technical Appendix A11.4**. This degree of hazard score will then be used to assign a magnitude level to each link and the step changes in level used to define the magnitude of change as defined in **Table 11-5** above.

62. The determination of the magnitude of the impacts is undertaken by reviewing the proposed Development, establishing the parameters of the additional road traffic that may cause an impact, and quantifying these impacts. In establishing the magnitude of change there is a need for interpretation and judgement on the part of the assessing engineer. This fact is recognised in Paragraph 3.12 of the ISEP Guidelines.

11.5.7.5. Significance of Effect

63. The significance of effect is a combination of the sensitivity of receptor and the magnitude of change in effect. For each effect the significance of effect will be determined using the matrix presented in **Table 11-6** below.

Table 11-6: Significance Matrix

Magnitude of Change	Sensitivity of Receptor			
	High	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

64. Effects predicted to be major or moderate are considered 'significant' in the context of the EIA regulations.

11.5.7.5.1. Secondary Mitigation

65. In the event that significant effects are predicted secondary mitigation measures will be implemented. Once secondary mitigation measures have been considered an assessment of residual effects has been undertaken and a statement of overall significance made.

66. As the assessment of Operational and Decommissioning traffic (associated with the proposed Development) has been scoped out of this assessment as described in Paragraph 28, this assessment has considered the effects during each of the construction phases only.

11.5.7.6. Cumulative Assessment

67. Cumulative traffic effects may occur where the construction phase of a nearby development, which shares a common route to Site for construction traffic, overlaps with that of the proposed Development.

68. A cumulative assessment has been undertaken to establish the possible traffic flow increase associated with other developments which could generate significant amounts of traffic on the links considered in this assessment whilst the proposed Development is being constructed.

69. Following the above steps an assessment of the significance of predicted cumulative effects has been undertaken and any necessary secondary mitigation measures have been identified.

11.5.7.7. Alternative Assessment Methods

70. As noted, in relation to the potential effects of 'Road Safety' and 'Driver Delay' alternative methods of assessment which differ from the 2023 ISEP Guidance have been applied. The following sub-sections detail the approach taken for each.

11.5.7.7.1. Road Safety

71. In relation to road safety, whilst the 2023 ISEP Guidance call for use of a 'safe system' approach, due to the temporary increase in traffic which will result from the proposed Development over a short duration, it is beyond the scope of this assessment to undertake safety modelling of existing links for a temporary traffic increase. Therefore a 'collision cluster' approach has been used in line with the established methodology for similar assessments.

72. The 'collision cluster' approach has sought to identify trends or 'clusters' in RTC data on the links and has assessed the statistical probability of adverse effects on safety as a result of the proposed Development. Additionally, engineering judgement has been used to assess the suitability of the existing road geometry for HGVs and AILs and this has informed the assessed significance in relation to safety.

11.5.7.7.2. Driver Delay

73. A review of the theoretical capacity of links has been presented and this has been compared with the predicted construction phase traffic levels. This review provides an

indication of the likely delay to drivers, however no traffic modelling or simulation has been undertaken and the assessment therefore does not quantify junction delays.

11.5.7.8. Assessment of Hazardous/Large Loads

74. In relation to hazardous/large loads, turbine components and transformers would represent large loads. Turbine components are transported under controlled conditions following significant planning in consultation with Transport Scotland, Police Scotland and the local authority. Due to the control measures in place such as police escort, permit systems and timed deliveries, it is considered that a 'catastrophe analysis' as described in Paragraph 3.50 of the IEMA Guidance is not required.

75. This assessment has quantified the number of large loads which are expected during construction of the proposed Development. **Technical Appendix A11.2** has assessed the suitability of the route to Site for the transportation of such loads and **Technical Appendix A11.3** has provided details of the control measures which will be applied to them.

11.6. Baseline Conditions

11.6.1. Baseline Traffic Flow

76. **Table 11-7** presents the baseline traffic flow data collected at each of the nine traffic count locations. The below data presents the AADT at each count location for total traffic and HGV traffic and the percentage (%) of HGVs within the total traffic.

77. All traffic count locations are located on the A76. For the purposes of this assessment, 'link' shall refer to the distinct sections of the A76 which have been assessed. **Figure 11.1** shows the location of each traffic count used in this assessment.

Table 11-7: Baseline Traffic Flow

Link	AADT	HGV AADT	% HGV
1	11,674	689	5.9
2	10,743	681	6.3
3	11,659	618	5.3
4	10,875	553	5.1
5	8,532	399	4.7
6	6,178	397	6.4
7	5,881	875	14.9
8	3,723	691	18.6
9	3,978	689	17.3

11.6.2. Future Baseline Scenario

78. Traffic growth factors have been applied to the baseline traffic flow for both HHR1 and HHR2 to forecast the traffic flow in the year of construction (2029 and 2036). **Table 11-8** presents the forecast traffic flow at each of the count locations in 2029 and 2036.

Table 11-8: Future Baseline Scenario

Link	AADT	HGV AADT	% HGV
HHR1 (2029 Baseline)			
1	11,467	677	5.9
2	10,553	669	6.3
3	11,453	608	5.3
4	10,683	544	5.1
5	8,381	392	4.7
6	6,069	390	6.4
7	5,777	860	14.9
8	3,657	679	18.6
9	3,908	677	17.3
HHR2 (2036 Baseline)			
1	11038	651	5.9
2	10158	644	6.3
3	11024	584	5.3
4	10282	523	5.1
5	8067	377	4.7
6	5841	375	6.4
7	5560	827	14.9
8	3520	653	18.6
9	3761	651	17.3

11.6.3. Qualitative Assessment of Links

79. The A76 is a nationally significant trunk road which links Kilmarnock with Dumfries. The A76 passes through both the Ayrshire and Dumfries & Galloway regions and is a critical link for a number of towns and villages on and near to the route.

80. The A76 is primarily a rural single-carriageway road under National Speed Limit, except where it passes through settlements (e.g. New Cumnock) where it is an urban single-carriageway road with reduced (e.g. 30 miles per hour (mph)) speed limit.

11.6.4. Theoretical Link Capacity

81. Typical capacity values for a variety of road types are provided within the DMRB – Volume 15. 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.

82. Capacity is defined as the maximum sustainable flow of traffic passing in one hour under favourable road and traffic conditions. The capacity of any road depends on the road type, speed limit and width. Where a given road has multiple sections with differing characteristics within the study area, the section with the lowest capacity has been used in this assessment. **Table 11-9** gives the estimated capacity of the section of the A76 with the lowest theoretical capacity. It should be noted that within Volume 15 of the DMRB speed limits are defined in kilometres per hour (kph). To avoid confusion within this report, the speed has been converted to miles per hour (mph).

Table 11-9: Theoretical Link Capacity

Link	Type	Speed Limit (mph)	Capacity (veh/hr/direction)	Two-Way Daily Capacity
A76	Urban – Typical Single-Carriageway (7.3m)	30	800	38,400

11.6.5. Road Traffic Collision Assessment

83. A 'collision cluster' analysis of all 'slight', 'serious' and 'fatal' RTCs on the A76 between Kilmarnock and the Site entrance within the last full five years of information (1st January 2019- 31st December 2023) was carried out using CrashMap. The study area for this analysis and the results are presented in **Figure 11.2**.

84. The RTC assessment identified six 'fatal' RTCs, 16 'serious' RTCs, and 27 'slight' RTCs within the study area. One 'cluster' was identified, which is discussed below. Additionally, two 'fatal' RTCs in New Cumnock have been considered in detail below.

11.6.5.1. Cluster 1 – A76/B713 Staggered Crossroad

85. The collision cluster identified is at the A76 / B713 junction where one fatal, one serious and one slight RTC were recorded.

86. RTCs at this location involved either a car, HGV, or motorcycle with one vehicle turning right onto the A76 and the other vehicle driving straight on the A76. One HGV was involved in the RTCs.

87. The junction is a staggered give way crossroads. The A76 is the major road, with the B713 and an unclassified access road forming the minor arms. There is approximately 65 metres (m) centre to centre separation between the minor arms. There are no pedestrian facilities along this section of the A76. Visibility from the B713 along the A76 is restricted to approximately 120 m to the north and 150 m to the south due to the vertical geometry of the road. A 60 mph speed limit is in force along both the carriageway and both minor arms.

88. In the context of this assessment, this location has been assessed as having a 'medium' sensitivity for safety. This is due to the high severity of RTCs at this location and the poor visibility from vehicles turning right onto the carriageway. However, it is important to note, that construction traffic will not be turning right at the A76 / B713 junction. The speed limit for HGVs on a single carriageway is 40 mph and therefore should not exceed this limit.

11.6.5.2. New Cumnock Fatal RTCs

89. There were two fatal RTCs during the assessed timeframe in New Cumnock, approximately 127 m south of the junction with Castle Place.

90. One of the RTCs involved a pedestrian being struck by a HGV. The other RTC involved a cyclist being struck by a vehicle.

91. This area of the A76 has a 30 mph speed limit. Pedestrian crossings facilities of this busy road are limited within New Cumnock. There is a pedestrian refuge approximately 20 m south of the first of these RTCs and approximately 100 m north of the second RTC. The nearest signalised crossing, which provides the only protected crossing of this road within the town, is located approximately 450 m south of Castle Place, outside the primary school.

92. This location is assessed as having a 'high' sensitivity to safety. Pedestrian crossings within the town are limited and the proposed Development will result in an increase in HGVs.

11.6.6. Sensitivity Assessment

93. Sensitive receptors which have the potential to be affected by construction traffic have been identified on each of the links considered within this study. **Table 11-10** below presents each of the sensitive receptors identified. The relevant traffic count locations which apply to each of the identified receptors has also been presented.

94. Identification of these specific receptors has been used in the following section to inform the assessment of the sensitivity of each route within the study against each of the assessment criteria.

Table 11-10 - Sensitive Receptors

Receptor	Route	Count Location
Torrance Lodge Care Home	A76	1
Riccarton Cemetery	A76	1

Receptor	Route	Count Location
HMP Kilmarnock	A76	1
New Cumnock Train Station	A76	7
Mauchline Primary School	A76	3
New Cumnock Primary School	A76	7
New Cumnock Evangelical Church	A76	7
New Cumnock Early Childhood Centre	A76	7
New Cumnock Outdoor Swimming Pool	A76	7
New Cumnock Town Hall	A76	7
New Cumnock Parish Church	A76	7
Commercial and Residential Properties within New Cumnock which front directly onto the delivery route	A76 and B741	7

95. The above list highlights the key sensitive receptors along the route. With these locations in mind, engineering judgement has been used to assign sensitivity levels to each link for each potential effect. The assignment of sensitivity is in line with the criteria defined in **Table 11-4**.

96. The sensitivity of each link in relation to road user and pedestrian safety has been categorised according to the worst classification assigned to each link in the RTC assessment, and according to engineering judgement where such a classification was not made.

97. Note that a sensitivity has not been assigned to the effect 'hazardous or large loads.' An AIL assessment has been undertaken and is presented in **Technical Appendix A11.2**, which considers the suitability of the proposed AIL route for the transportation of proposed components. In accordance with 2023 IEMA Guidance this assessment presents the estimated number and composition of large loads. **Technical Appendix A11.3** provides initial details of how large load movements will be safely managed and the control measures which will be in place throughout AIL deliveries.

98. **Table 11-11** below presents the link sensitivity assignment. It should be noted that Links 5 and 6 have been grouped for the purposes of sensitivity assignment as these share the same characteristics.

Table 11-11: Link Sensitivity Assignment

Link	Effect	Sensitivity	Rationale
1	Severance	Negligible	There are no communities which are divided by this link.
	Vehicle Delay	Medium	Baseline traffic flow is moderate on this link and there is some residual capacity.
	NMU Delay	Low	This link is a rural trunk road with poor NMU infrastructure, and which is unlikely to have significant NMU flows.
	NMU Amenity	High	There are narrow and broken pedestrian footways on sections of this link. The pedestrian environment is poor.
	Fear and Intimidation	High	High speed road with poor and broken pedestrian footways. Any pedestrians will be forced to walk in the grass verge after the footway ends.
	Safety	Low	No RTC clusters identified on this link.
2	Severance	Negligible	There are no communities which are divided by this link.
	Vehicle Delay	Medium	Baseline traffic flow is moderate on this link and there is some residual capacity.
	NMU Delay	Low	This link is a rural trunk road with poor NMU infrastructure, and which is unlikely to have significant NMU flows.
	NMU Amenity	High	There are narrow and broken pedestrian footways on sections of this link. The pedestrian environment is poor.
	Fear and Intimidation	High	High speed road with poor and broken pedestrian footways. Any pedestrians will be forced to walk in the grass verge after the footway ends.
	Safety	Low	No RTC clusters identified on this link.
3	Severance	High	Baseline AADT is 11,659. There are formal pedestrian crossings, however all of these are at grade.
	Vehicle Delay	Medium	Baseline traffic flow is moderate on this link and there is some residual capacity.
	NMU Delay	Medium	Whilst there are a number of signalised crossings where delay will not be affected by traffic flow there remain a number of uncontrolled crossings where delay may occur particularly given the high baseline AADT.
	NMU Amenity	Low	There are footpaths on both sides of the road and a wide enough separation between traffic and pedestrians.
	Fear and Intimidation	Medium	The speed limit in Mauchline is 30 mph. The majority of footpaths within the town are separated from the carriageway by a row of parked cars, however there are

			several areas where short lengths of narrow footpath are immediately adjacent to the carriageway.
	Safety	Low	No RTC clusters identified on this link.
4	Severance	Negligible	There are no communities which are divided by this link.
	Vehicle Delay	Medium	Baseline traffic flow is moderate on this link and there is some residual capacity.
	NMU Delay	Low	This link is a rural trunk road with poor NMU infrastructure, and which is unlikely to have significant NMU flows.
	NMU Amenity	Low	There are no footpaths on this link and as it is a high speed trunk road there are not anticipated to be any appreciable NMU flows.
	Fear and Intimidation	High	High speed road with poor and broken pedestrian footways. Any pedestrians will be forced to walk in the grass verge after the footway ends.
	Safety	High	An RTC cluster was identified on this route with one fatal, one serious and one slight RTC. This issue appears to be recognised due to the presence of vehicle actuated warning signage.
5 and 6	Severance	Negligible	There are no communities which are divided by this link, Cumnock and Auchinleck are bypassed.
	Vehicle Delay	Medium	Moderate level of residual capacity in relation to theoretical capacity.
	NMU Delay	Negligible	This link is partially grade separated particularly where close to residential areas.
	NMU Amenity	Negligible	This is a partially grade separated trunk road and it is not anticipated that there will be any NMUs on this link.
	Fear and Intimidation	Negligible	As above this is a grade separated trunk road. No NMUs anticipated.
	Safety	Low	There are few RTCs on this link and no clusters.
7	Severance	Medium	AADT of 5,881 with at grade pedestrian crossings.
	Vehicle Delay	Low	There is a low baseline traffic level on this route in comparison to theoretical capacity.
	NMU Delay	Medium	There is only one signalised crossing in New Cumnock therefore NMU delay could occur in the event of increased traffic however baseline traffic flow is moderate and pedestrian islands have been installed.

	NMU Amenity	Low	There are two pedestrian footpaths on both sides of the carriageway with large width separating pedestrians and traffic.
	Fear and Intimidation	Low	Speed limit is 30 mph in New Cumnock and footpaths on either side of the carriageway.
	Safety	High	Two fatal RTCs involving NMUs noted within New Cumnock.
8 and 9	Severance	Low	AADT is approximately 3,700-4,000. Kirkconnel has the potential to be affected by severance.
	Vehicle Delay	Low	There is a low baseline traffic level on this route in comparison to theoretical capacity.
	NMU Delay	Medium	There is a signalised pedestrian crossing in Kirkconnel, however this only serves the town centre.
	NMU Amenity	Moderate	Areas of Kirkconnel have narrow footways, however in general this is a rural link with a high speed trunk road where there are limited NMU flows.
	Fear and Intimidation	High	As above, poor pedestrian environment in Kirkconnel.
	Safety	Low	Few RTCs and no clusters.

11.6.7. Baseline Assessment of Fear and Intimidation Degree of Hazard Level

99. The baseline assessment of fear and intimidation can be seen in **Technical Appendix 11.4**. **Table 11-12** below summarises the findings of this assessment.

Table 11-12: Baseline Level of Fear and Intimidation

Link	Level of Fear and Intimidation Summary
1	Moderate
2	Moderate
3	Moderate
4	Moderate
5	Moderate
6	Moderate
7	Small
8	Small
9	Small

11.7. Quantification of Impact

100. The 'impact' in the case of the proposed Development is an increase in traffic, focusing on the construction traffic which is the principal impact. The following sub-sections provide an estimate of the traffic associated with each element of works. The estimated programme of works is provided in **Technical Appendix 11.5** and should be read in conjunction with the following subsections.

101. The design for the proposed Development, as summarised in Chapter 5, was undertaken by Kiloh Associates who provided Natural Power with associated material volume estimates used in the preparation of this Chapter. Natural Power holds no responsibility for the accuracy of the design and the associated material volumes.

102. Presented in the following sub-sections are the estimated vehicle movements for the construction of the proposed Development which represent a 'worst case scenario' as described in Paragraph 52 except where noted.

103. It should be noted that in the below sub-sections where months are referred to, these are the months of construction of the relevant phase of the proposed Development. For example, month 1 for HHR1 will be in 2029, whereas month 1 for HHR2 will be in 2036 and there will therefore be no overlap of the traffic in these periods.

104. Reference should be made to the tables in **Technical Appendix 11.5** to aid understanding. It should be noted that traffic associated with each activity is not necessarily distributed evenly across the months during which that activity takes place therefore the max monthly movement given in the below tables does not always reflect an even split across the months.

11.7.1. Decommissioning of HH and HHE

105. It is not currently known if existing access tracks and hardstands will be removed from HH and HHE prior to constructing HHR1 and HHR2 respectively. However, this will not affect the outcome of the assessment as the worst case scenario accounts for 100% import of aggregates and the realistic worst case scenario for 100% of aggregates sourced on-site. If existing access tracks and hardstands are removed it is assumed that all of the aggregate could be re-used for construction of the new tracks and hardstands. If they are not removed, new tracks and hardstands will be constructed from aggregate which is either won on-site or imported. The scenarios which have been considered within this assessment allow for each of these eventualities from a traffic perspective.

HHR1

106. The 20 turbines which comprise HH Windfarm are to be removed before the commencement of HHR1. These turbines will be dismantled and removed from the Site over approximately a two-month period (months two and three) before construction of HHR1 begins.

107. All components from existing turbines will be removed from Site by HGV. It is anticipated that 10 HGVs will be required per turbine. Each of the three blades will require one HGV load with an additional three loads for each of the tower sections (which may be broken up), hub, drive train and the nacelle. This will result in 400 HGV movements for HHR1. Each

HGV will travel to and from the Site, meaning that one HGV load equates to two HGV movements.

108. A further two HGV loads per turbine is anticipated for the removal of ancillary equipment, resulting in an additional 80 HGV movements for HHR1.

109. Additional traffic will be generated by the removal of other items such as the substation and control building equipment. These items are expected to result in 70 additional HGV movements over the duration of this phase of works for HHR1.

HHR2

110. The 35 turbines which compromise HHE Windfarm are to be removed before the commencement of HHR2. These turbines will be dismantled and removed from the Site over approximately a two-month period (months two and three) before construction of HHR2 begins.

111. The same assumptions in paragraph 107 above apply here. For turbine removal 700 HGV movements are estimated to be required for HHR2.

112. For ancillary equipment 140 HGV movements are estimated to be required for HHR2.

113. For other equipment 70 HGV movements are estimated to be required during this phase for HHR2.

114. Table 11-13 details the anticipated vehicle movements associated with turbine decommissioning. Decommissioning may take longer than anticipated, however the table below presents worst case in terms of traffic volume.

Table 11-13: Vehicle Movements - Decommissioning

Activity	Vehicle Type	Indicative Timeline	Total Movements	Max Monthly Movements
HHR1				
Turbine Removal	HGV – Low Loader	1-2	400	200
Ancillary Equipment Removal	HGV – Low Loader	1-2	80	40
Removal of Other Items	HGV – Low Loader	1-2	70	36
Overall			**550**	**276**
HHR2				
Turbine Removal	HGV – Low Loader	1-2	700	350
Ancillary Equipment Removal	HGV – Low Loader	1-2	140	70
Removal of Other Items	HGV – Low Loader	1-2	70	36
Overall			**910**	**456**

11.7.2. Mobilisation and Site Establishment Including Construction Compound Set Up

HHR1

115. HGV and other vehicle movements will be required during site mobilisation. This will compromise the delivery of construction site office and welfare facilities, on-site vehicles and delivery of plant and equipment. Most of these movements will be as HGVs and low loaders, which will deliver and then depart the site empty. It is estimated that 58 deliveries will be required, resulting in 116 HGV movements.

116. The 'worst-case' scenario considers a case where all aggregate required for construction compounds is imported to the proposed Development. In total, four construction compounds are proposed which includes an 'initial construction compound', 'construction compound' and two satellite compounds. It has been assumed that the 'initial construction compound' and 'construction compound' will be constructed early in the construction phase (month three) and the satellite compounds will be constructed later on once tracks have been established (months seven and ten).

117. The total volume of imported aggregate for the construction compounds is estimated to be 3,957 m^3. This will result in 436 HGV deliveries (872 HGV movements). In the 'realistic worst-case' scenario, the sub-base aggregate is won on-site and therefore requires no HGV movements on public roads, it is assumed that the running surface will be imported from off-site.

118. The construction compounds will be constructed during HHR1 and left in place for use during the construction of HHR2. Therefore, the movements for construction compounds have only been included as part of HHR1.

HHR2

119. HHR2 movements for mobilisation and site establishment are predicted to be the same as for HHR1 for the delivery of plant and equipment. However as discussed above no movements are anticipated for a construction compound as the HHR1 compound will be reused for HHR2.

120. Table 11-14 indicates the anticipated number of vehicle movements associated with site mobilisation and establishment.

Table 11-14: Vehicle Movements - Mobilisation and Site Establishment

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
HHR1				
Mobilisation	HGV - Low Loader	2	116	116
Construction Compound	HGV - Tipper	2 and 7	872	494
Overall			**988**	**610**
HHR2				
Mobilisation		2	116	116
Overall			**116**	**116**

11.7.3. Access Tracks and Hardstands

Worst Case

HHR1

121. The 'worst-case' scenario considers a case where all aggregate required for the formation of access tracks and hardstands is imported to the proposed Development. The below estimate presents the number of vehicle deliveries and movements estimated to be required for HHR1. Aggregate will be delivered by HGV tippers.

122. The net volume of aggregate required for access tracks including upgrades to existing access tracks and hardstands for HHR1 provided by Kiloh Associates and is estimated to be 170,532 m^3. This will result in 18,760 HGV deliveries (37,520 HGV movements).

123. In addition to the delivery of aggregates, geogrids, culverts, and other miscellaneous items relating to drainage will be delivered during this phase of works. During HHR1, approximately 107 HGV deliveries (214 HGV movements) are anticipated for these materials.

HHR2

124. The net volume of aggregate required for access tracks and hardstands during HHR2 is 35,653 m^3 including upgrading the existing access tracks. This will result in 3,923 HGV deliveries (7,846 HGV movements).

125. During HHR2, approximately 49 HGV deliveries (98 HGV movements) are anticipated for miscellaneous items.

126. Table 11-15 indicates the anticipated number of vehicle movements associated with 'worst-case' scenario of the access tracks and hardstands for both phases of the proposed Development.

Table 11-15: Vehicle Movements - Access Tracks and Hardstands - Worst-Case

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
HHR1				
Track Aggregates	HGV - Tipper	3-14	37,520	3,248
Geogrids and Culverts	HGV – Low Loader	3-14	214	18
Overall			**37,734**	**3,266**
HHR2				
Track Aggregates	HGV - Tipper	3-10	7,846	980

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
Geogrids and Culverts	HGV – Low Loader	3-10	98	14
Overall			**7,944**	**994**

Realistic Worst-Case

127. The 'realistic worst-case scenario' considers a case where aggregate for the running surface required for the formation of access tracks is imported to the proposed Development and a combination of on-site borrow pits and material won from areas of cut are used for the remainder of the aggregates required for the access tracks and hardstands. Aggregates will be delivered by an HGV Tipper.

HHR1

128. For HHR1, the net volume of running surface aggregate required is 34,647 m^3. This will result in 3,811 HGV deliveries (7,624 HGV movements) for the running surface.

129. The number of HGV movements for all other items will be the same as in the worst-case scenario.

HHR2

130. For HHR2, the net volume of running surface aggregate required for the access tracks is 8,495 m^3. This will involve 935 HGV deliveries (1,870 HGV movements).

131. The number of HGV movements for all other items will be the same as in the worst-case scenario.

132. Table 11-16 indicates the anticipated vehicle movements associated with the 'realistic worst-case' scenario of access tracks and hardstands.

Table 11-16: Vehicle Movements - Access Tracks and Hardstands - Realistic Worst-Case

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
HHR1				
Running Surface	HGV - Tipper	3-14	7,624	666
Geogrids and Culverts	HGV – Low Loader	3-14	214	18
Overall			**7,838**	**684**
HHR2				
Running Surface	HGV - Tipper	3-10	1,870	234
Geogrids and Culverts	HGV – Low Loader	3-10	98	14
Overall			**1,968**	**248**

11.7.4. Turbine Foundations

Worst Case

133. In the 'worst-case' scenario it is assumed that all concrete required for turbine foundations will be imported to the Site as ready-mix. Each turbine foundation will require approximately 800 m^3 of concrete. Assuming each mixer has a capacity for 6 m^3, this will result in 134 ready-mix deliveries per turbine. For HHR1, there will be 2,010 HGV deliveries (4,020 HGV movements) and 1,072 HGV deliveries (2,144 HGV movements) for HHR2.

134. Rebar will be required in addition to concrete. Each turbine foundation requires approximately 868 tonnes (T) of steel reinforcement. This will require 58 HGV deliveries per turbine resulting in 870 HGV deliveries (1,740 HGV movements) for HHR1 and 464 HGV deliveries (928 HGV movements) for HHR2.

135. **Table 11-17** summarises the number of vehicle movements associated with turbine foundations for worst-case.

Table 11-17: Vehicle Movements - Turbine Foundations - Worst-Case

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
		HHR1		
Concrete	HGV - Mixer	8-16	4,020	536
Rebar	HGV - Low Loader	8-16	1,740	194
Overall			**5,760**	**730**
		HHR2		
Concrete	HGV - Mixer	8-12	2,144	536
Rebar	HGV - Low Loader	8-12	928	186
Overall			**3,072**	**722**

136. Concrete for each foundation will be continuously poured over a single day. Therefore, there will be 134 HGV deliveries (268 HGV movements) over 15 non-consecutive days for HHR1 during months 8-16, and over 8 non-consecutive days for HHR2 during months 8-12.

Realistic Worst-Case

137. In the 'realistic worst-case' scenario concrete will be batched on Site. A batching plant will be delivered to the Site at the commencement of this phase of works and cement and sand will be delivered throughout foundation construction to form the concrete.

138. Delivery of the batching plant is anticipated to require six HGV deliveries (12 HGV movements) for each phase. A further 12 movements are then required following foundation pouring for the removal of the batching plant.

139. For the delivery of cement and sand for HHR1, there will be 900 deliveries (1,800 HGV movements). For HHR2, there will be 480 deliveries (960 movements).

140. The number of HGV movements for delivery of steel reinforcement will be the same as in the worst case scenario.

141. Table 11-18 summarises the number of vehicle movements associated with turbine foundations for 'realistic worst-case.'

Table 11-18: Vehicle Movements - Turbine Foundations - Realistic Worst-Case

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
HHR1				
Batching Plant	HGV - Low Loader	8 and 16	24	12
Cement/Sand	HGV - Tipper	8-16	1,800	200
Rebar	HGV - Low Loader	8-16	1,740	194
Overall			**3,564**	**408**
HHR2				
Batching Plant	HGV - Low Loader	8 and 12	24	12
Cement/Sand	HGV - Tipper	8-12	960	192
Rebar	HGV - Low Loader	8-12	928	186
Overall			**1,912**	**390**

11.7.5. Substation Compound, Control Building and Miscellaneous Electrical Equipment

142. The substation platform will be constructed from aggregate. In the 'worst-case' scenario this will all be imported to Site, however, in the 'realistic worst-case' this will be obtained from on-site borrow pits.

143. The substation platform has a surface area of 8,008 m^2. Kiloh Associates estimated that this will require a material volume of 5,606 m^3 to construct, of which 5,498 m^3 will be won during the creation of platforms for other elements on on-site infrastructure. This results in a net import volume of 108 m^3 of aggregate resulting in 12 HGV deliveries (24 HGV movements). The substation requires 360 m of perimeter fencing which would require 9 HGV deliveries (18 HGV movements).

144. Construction of the substation compound and metering building will require the import of materials to construct the control building, electrical equipment for the substation and control building, the transformer which constitutes an ALV, oil for the transformer and concrete which will be used to construct the transformer bund and security fencing for

around the perimeter. Additionally smaller turbine transformers will be delivered for each turbine with their associated housing.

145. Construction of the control building will require the delivery of a variety of materials, including concrete for foundations, stone for walls, timber or steel for roof trusses, and various materials/equipment for the internal fit-out. It is estimated that 60 HGV deliveries (120 HGV movements) will be required for this phase of works.

146. Delivery of electrical equipment will be undertaken by a variety of HGVs depending on the equipment, this will include low loaders and containerised deliveries. A total of 100 HGV deliveries (200 HGV movements) are expected to be required.

147. The 132 kilovolt (Kv) transformer will be delivered as an ALV. This will constitute a single delivery resulting in two ALV movements. In addition to the ALV up to two escort vans will accompany the delivery, resulting in four LGV movements.

148. The 132 Kv transformer will be delivered 'dry' and therefore the oil will be delivered separately. 80,000 litres (l) of oil is estimated to be required which will require 20 deliveries (40 HGV movements).

149. A concrete bund will be constructed around the transformer, this is estimated to require 300 m^3 of concrete which will be delivered as ready-mix. 50 deliveries (100 HGV movements) are estimated to be required. In the 'realistic worst-case' concrete will be mixed with an on-site batching plant and will require no movements on the public roads.

150. Additionally smaller turbine transformers will be delivered for each turbine with their associated housing. These smaller transformers will not require ALVs or escort vehicles.

151. Table 11-19 summaries the following vehicle movements anticipated for the substation compound and control building for both the 'worst-case' and 'realistic worst-case.'

Table 11-19: Vehicle Movements - Substation Compound and Control Building

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
		HHR1		
Substation Platform	HGV - Tipper	5	24	24
Substation Fencing	HGV – Low Loader	5-11	18	2
Control Building	HGV – Low Loader	5-11	120	10
Electrical Equipment	HGV – Low Loader and Containers	5-11	180	14
Turbine Transformers	HGV – Low Loaders	5-11	30	4

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
132 kV Transformer	ALV	7	2	2
Transformer Escort	Van	7	4	4
Transformer Oil	HGV	7	40	40
Concrete for Bund	HGV - Mixer	6	100	100
Overall (Worst Case)			**514**	**150**
Overall (Realistic Worst Case)			**390**	**92**

11.7.6. Cable Trenching, Installation, and Backfill

152. For both scenarios, electrical cabling for wind power distribution and SCADA will be installed. This will be delivered by HGV low loaders with 19 HGV loads (38 HGV movements) anticipated to be required during HHR1. During HHR2, 6 HGV loads (12 HGV movements) are anticipated to be required.

153. The cable trenches will be backfilled with sand, which will be imported. During HHR1, this will require approximately 1,036 HGV loads (2,072 HGV movements). During HHR2, this will require approximately 323 HGV loads (646 HGV movements).

154. Table 11-20 presents the anticipated vehicle movements associated with electrical cabling for both HHR1 and HHR2.

Table 11-20: Vehicle Movements - Cable Trenching, Installation, and Backfill

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
		HHR1		
Electrical Cabling - Cables	HGV – Low Loaders	8-17	38	8
Electrical Cabling - Sand	HGV – Low Loaders	8-17	2,072	208
Overall			**2,110**	**216**
		HHR2		
Electrical Cabling - Cables	HGV – Low Loaders	6-11	12	2

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
Electrical Cabling - Sand	HGV – Low Loaders	6-11	646	108
Overall			**658**	**110**

11.7.7. Crane

155. Two cranes will be required to erect the turbines, a main crane and a pilot crane. The main crane will be transported to Site in several loads which will include 3 ALVs (6 ALV movements).

156. In addition to the main crane, a smaller pilot crane will be required. This will be a mobile crane which will be self-propelled to site although would constitute 1 ALV (2 ALV movements) due to its weight.

157. Each of the 4 ALVs will require two LGV escort vehicles to accompany them on their journey to and from the Site. It has been assumed that the escort vehicles will depart the Site and return prior to the crane being removed. Therefore, there would be 16 LGV movements delivering the cranes to the Site and a further 16 LGV movements when the cranes leave the Site.

158. There would also be 10 HGVs for the delivery of ballast and ancillary equipment for the main crane. These HGVs will depart Site and return prior to the crane departing, resulting in a total of 20 HGV movements when the main crane is delivered to Site, and 20 HGV movements when it leaves the Site.

159. An additional HGV delivery will be required for the pilot crane to transport ballast. This will result in 2 HGV movements when the pilot crane is delivered to Site, and 2 HGV movements when it leaves the Site.

160. Table 11-21 indicates the number of vehicle movements associated with crane delivery.

Table 11-21: Vehicle Movements - Crane

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
		HHR1		
Main Crane	ALV	16 and 20	6	3
Main Crane	HGV	16 and 20	40	20
Pilot Crane	ALV	16 and 20	2	1
Pilot Crane Ballast	HGV	16 and 20	4	2
Escort Vehicles	LGV	16 and 20	32	16
Overall			**84**	**42**
		HHR2		

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
Main Crane	ALV	11 and 14	6	3
Main Crane	HGV	11 and 14	40	20
Pilot Crane	ALV	11 and 14	2	1
Pilot Crane Ballast	HGV	11 and 14	4	2
Escort Vehicles	Car/Van	11 and 14	32	16
Overall			**84**	**42**

11.7.8. Turbine Deliveries

161. Turbines will be delivered as separate components, the majority of which will require transportation via ALV. The towers will be transported in six separate sections and each blade will be transported individually. Three further ALVs will be required to transport the nacelle, hub and drive train. Each turbine will therefore require 12 ALV deliveries (24 ALV movements).

162. For HHR1, 15 turbines will be delivered, resulting in 180 ALV deliveries (360 ALV movements).

163. For HHR2, 8 turbines will be delivered, resulting in 96 ALV deliveries (192 ALV movements).

164. The blade vehicles are likely to retract to the size of a standard HGV after unloading, therefore they would constitute an HGV for departure. However, for the purposes of the below vehicle estimate it has been assumed that all ALVs which arrive at the site will depart as ALVs.

165. Each ALV is assumed to be accompanied by two escort vehicles, although it should be noted that some limited convoy running of ALVs is likely to be permitted which would result in fewer escort vehicles per ALV. The total number of escort vehicle movements is therefore up to 720 LGV movements for HHR1 and 384 LGV movements for HHR2.

166. In addition to the above, 40 HGV movements will be required for the delivery of turbine accessories and ancillary equipment for each turbine. Therefore, for HHR1, 600 HGV movements are expected for delivery of the above. 320 HGV movements will be required during HHR2.

167. Table 11-22 indicates the number of vehicles associated with delivery of the turbines.

Table 11-22: Vehicle Movements - Turbine Deliveries

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
		HHR1		
Turbine Components	ALV	17-19	360	120
Turbine Escort	LGV	17-19	720	240
Turbine Accessories	HGV	17-19	600	200

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
Overall			**1,680**	**560**
		HHR2		
Turbine Components	ALV	12-13	192	96
Turbine Escort	LGV	12-13	384	192
Turbine Accessories	HGV	12-13	320	160
Overall			**896**	**448**

11.7.9. Site Restoration and Demobilisation

168. Following construction, during site restoration and demobilisation all plant and construction equipment will be removed from the Site. Additionally, the site office and welfare facilities will be removed. Vehicle movements during this phase will result from empty HGVs travelling to the Site, loading plant and equipment, and then departing from the Site. It is assumed that the number of vehicle movements during this phase will be similar to that experienced during the mobilisation phase, meaning 58 HGVs (116 HGV movements) will be required.

169. Table 11-23 presents the number of vehicles associated with site restoration and demobilisation.

Table 11-23: Vehicle Movements - Site Restoration and Demobilisation

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
		HHR1		
Site Restoration and Demobilisation	HGV – Low Loader	21-23	116	40
		HHR2		
Site Restoration and Demobilisation	HGV – Low Loader	15	116	116

11.7.10. Construction Personnel

170. It is anticipated that during the peak period of construction, 30 staff will be required onsite per day. A worst-case assumption has been made that this number remains constant throughout construction.

171. For the purposes of this assessment a worst-case scenario has been assumed in which each member of staff travels to work in a sole occupancy vehicle, therefore up to 60 car/van movements per day are expected. Some level of car sharing is likely to reduce the traffic numbers below what is estimated below.

172. Assuming 22 workdays per month, the total number of staff movements per month is anticipated to be 1,320 per month. This will result in a total of 30,360 vehicle movements associated with staff over the construction phase of HHR1 and 19,800 movements during HHR2 construction phase.

173. **Table 11-24** presents the number of vehicle movements associated with construction personnel.

Table 11-24: Vehicle Movements - Construction Personnel

Activity	Vehicle Type	Month(s)	Total Movements	Max Monthly Movements
HHR1				
Construction Personnel	Car/Van	1-23	30,360	1,320
HHR2				
Construction Personnel	Car/Van	1-15	19,800	1,320

11.7.11. Estimated Construction Programme

174. The estimated construction programme for both HHR1 and HHR2 for both 'worst-case' and 'realistic worst-case' are presented in **Technical Appendix 11.5.**

11.7.12. Traffic Distribution

175. Not all traffic is expected to use the same route, as described in **Section 11.5.6** HGV traffic has been assumed to pass count points 1-8, except for aggregate HGVs which pass only count points 3-8. For LGV/car traffic distribution is assumed to be as follows:

- All escort cars/vans will pass through count points 1-8 as this is the AIL route;
- Construction personnel movements distributed as follows:
  - 90% from the direction west of the Site entrance
  - 10% from the direction east of the Site entrance

176. For aggregate deliveries, it is assumed that 100% of vehicles will pass count points 3-8 along the A76. For ready-mix deliveries (worst case) or sand and cement deliveries (realistic worst case), it is assumed that 100% of vehicles will pass count points 1-8.

177. **Table 11-25** shows the number of each vehicle type expected to pass each traffic count point in each scenario on the average peak day of construction for each scenario. The peak month for worst case for HHR1 is seven and HHR2 is eight. The peak month for realistic worst-case scenario for both HHR1 and HHR2 is eight. These volumes represent typical average peak day flows and therefore exclude ready-mix concrete deliveries as they will only occur as standalone events on a set number of non-consecutive days. The concrete delivery days do not reflect the typical average peak day flows.

Table 11-25: Traffic Distribution (Average Daily Development Traffic During Peak Month)

Count Point	Worst-Case		Realistic Worst-Case	
	Total	HGV	Total	HGV
HHR1				
1	58	4	90	34
2	58	4	90	34
3	228	174	120	64
4	228	174	120	64
5	228	174	120	64
6	228	174	120	64
7	228	174	120	64
8	228	174	120	64
9	6	0	6	0
HHR2				
1	68	14	78	24
2	68	14	78	24
3	114	60	88	34
4	114	60	88	34
5	114	60	88	34
6	114	60	88	34
7	114	60	88	34
8	114	60	88	34
9	6	0	6	0

11.7.13. Estimated Traffic Increase

Worst Case Scenario

178. Applying the above daily peak month increases to the 'future baseline traffic flow' at each count point, the percentage increase in traffic levels during the peak month can be estimated. This is presented for the worst case scenario in **Table 11-26**.

Table 11-26: Estimated Traffic Increase (ADF) - Worst-Case Excluding Concrete

Ref	Road	Future Baseline Traffic		With Development Traffic		% Increase	
		Total	HGV	Total	HGV	Total	HGV
HHR1							

Ref	Road	Future Baseline Traffic		With Development Traffic		% Increase	
		Total	HGV	Total	HGV	Total	HGV
1	A76	11,467	677	11,525	681	1	1
2	A76	10,553	669	10,611	673	1	1
3	A76	11,453	607	11,681	781	2	29
4	A76	10,683	543	10,911	717	2	32
5	A76	8,381	392	8,609	566	3	44
6	A76	6,069	390	6,297	564	4	45
7	A76	5,777	860	6,005	1,034	4	20
8	A76	3,657	679	3,885	853	6	26
9	A76	3,908	677	3,914	677	0	0
HHR2							
1	A76	11,038	651	11,106	665	1	2
2	A76	10,158	644	10,226	658	1	2
3	A76	11,024	584	11,138	644	1	10
4	A76	10,282	523	10,396	583	1	11
5	A76	8,067	377	8,181	437	1	16
6	A76	5,841	375	5,955	435	2	16
7	A76	5,560	827	5,674	887	2	7
8	A76	3,520	653	3,634	713	3	9
9	A76	3,761	651	3,767	651	0	0

179. In the 'worst-case' scenario there will be one full day of concrete pour per turbine which will require 268 HGV movements. During HHR1 there will be 15 non-consecutive days during months 8 to 16 when ready-mix concrete will be delivered for the turbine foundations. The concrete pours will occur in the peak month for HHR1 with total movements presented in **Table 11-27** below.

Table 11-27 -Estimated Traffic Increase (ADF) - Worst Case Including Concrete for HHR1

Ref	Road	Future Baseline Traffic		With Development Traffic		% Increase	
		Total	HGV	Total	HGV	Total	HGV
HHR1							
1	A76	11,467	677	11,793	949	3	40
2	A76	10,553	669	10,879	941	3	41
3	A76	11,453	607	11,949	1,049	4	73

Ref		Road	Future Baseline Traffic		With Development Traffic		% Increase	
			Total	HGV	Total	HGV	Total	HGV
4	A76	10,683	543	11,179	985		5	81
5	A76	8,381	392	8,877	834		6	113
6	A76	6,069	390	6,565	832		8	113
7	A76	5,777	860	6,273	1,302		9	51
8	A76	3,657	679	4,153	1,121		14	65
9	A76	3,908	677	3,914	677		0	0

180. During HHR2, there will be 8 non-consecutive concrete pour days between months 8 to 12. The concrete pours will occur in the peak month for HHR2 with total movements presented in **Table 11-28** below.

Table 11-28: Estimated Traffic Increase (ADF) - Worst-Case Including Concrete for HHR2

Ref	Road	Future Baseline Traffic		With Development Traffic		% Increase	
		Total	HGV	Total	HGV	Total	HGV
HHR2							
1	A76	11,038	651	11,374	933	3	43
2	A76	10,158	644	10,494	926	3	44
3	A76	11,024	584	11,406	912	3	56
4	A76	10,282	523	10,664	851	4	63
5	A76	8,067	377	8,449	705	5	87
6	A76	5,841	375	6,223	703	7	87
7	A76	5,560	827	5,942	1,155	7	40
8	A76	3,520	653	3,902	981	11	50
9	A76	3,761	651	3,767	651	0	0

Realistic Worst Case Scenario

181. The total traffic, HGV traffic, and associated percentage increase have been estimated for the ‘realistic worst-case’ scenario and are presented in **Table 11-29** below.

Table 11-29: Estimated Traffic Increase (ADF) - Realistic Worst-Case Scenario

Ref	Road	Future Baseline Traffic		With Development Traffic		% Increase	
		Total	HGV	Total	HGV	Total	HGV
HHR1							
1	A76	11,467	677	11,558	723	1	5
2	A76	10,553	669	10,643	715	1	5
3	A76	11,453	608	11,573	682	1	10
4	A76	10,683	544	10,803	617	1	12
5	A76	8,381	392	8,501	463	1	16
6	A76	6,069	390	6,189	461	2	16
7	A76	5,777	860	5,897	939	2	7
8	A76	3,657	679	3,778	755	3	9
9	A76	3,908	677	3,914	689	0	0
HHR2							
1	A76	11038	651	11,116	676	1	4
2	A76	10158	644	10,236	668	1	4
3	A76	11024	584	11,112	619	1	6
4	A76	10282	523	10,371	557	1	7
5	A76	8067	377	8,156	412	1	9
6	A76	5841	375	5,930	410	2	9
7	A76	5560	827	5,649	862	2	4
8	A76	3520	653	3,609	688	2	5
9	A76	3761	651	3,768	652	0	0

182. In the realistic worst case scenario there would be a batching plant on site, so no ready-mix deliveries would be required.

11.8. Assessment of Potential Effects

11.8.1. Initial Screening Exercise

183. An initial screening exercise was undertaken on the predicted traffic increases in accordance with the methodology described in Paragraph 94. Links 1, 2, 3, 4, 7, 8 and 9 within the assessment have been judged to contain high sensitivity receptors. At these links therefore, the lower (10%) threshold of significance was applied.

184. The threshold will be exceeded in the following cases:

- On links 3 to 8 in the 'worst case' scenario in relation to HGVs for HHR1 and HHR2;

- On links 1 to 8 in the 'worst-case' scenario on concrete delivery days in relation to HGVs for HHR1 and HHR2; and
- On link 4 in the 'realistic worst case' scenario in relation to HGVs for HHR1.

185. In relation to concrete delivery days for HHR1 this may occur on 15 non-consecutive days during months 8 to 16. For HHR 2 this may occur on 8 non-consecutive days during months 8 to 12. In the context of the overall construction programme this is a very short duration event. Advanced notification of these days will be provided to the local community and consultation with local stakeholders will be undertaken by the Principal Contractor in advance of these days to establish further secondary mitigation measures which could be implemented. This could include stopping all other work on the Site during the concrete pour days, which would significantly reduce the volume of traffic on those days. Therefore, the following assessment will focus on the non-concrete days.

186. Based on the above, in accordance with the IEMA Guidance, further assessment has been undertaken on links 3 to 8 in relation to HGVs for HHR1 and links 3 to 6 for HHR2 for the worst case scenario and on link 4 in the realistic worst case scenario in relation to HGVs for HHR1.

187. As noted in Paragraph 55 the screening thresholds have not been applied to driver delay and road safety. In both cases these effects will undergo further assessment below. In relation to all other effects, as the thresholds of significance have not been exceeded on links 1, 2 and 9 and have not been exceeded on any links in the 'realistic worst case' scenario for HHR2 these effects are considered negligible and not significant, therefore further assessment will not be undertaken on these links.

11.8.2. Further Assessment – Worst-Case Scenario

Fear and Intimidation Assessment

188. Further assessment for fear and intimidation can be found in **Technical Appendix 11.4** and should be read in conjunction with **Section 11.8.2**. **Table 11-30** below presents a summary of the fear and intimidation assessment. Average vehicle speeds are not predicted to increase as a result of the proposed Development. Therefore, the vehicle speed degree of hazard score remains as presented in **Technical Appendix 11.4**.

Table 11-30: Summary of Fear and Intimidation Assessment

Link	Total Hazard Score – Peak Month	Baseline Level of Fear and Intimidation	Peak Month Level of Fear and Intimidation
3	30	Moderate	Moderate
4	40	Moderate	Moderate
5	30	Moderate	Moderate
6	30	Moderate	Moderate
7	30	Small	Moderate
8	20	Small	Small

189. The fear and intimidation level has changed between the future baseline scenario and the worst-case scenario for link 7 resulting in a low magnitude of change. In all other cases the magnitude of change in effect is negligible.

11.8.3. Assessment of Links 3-8 – Worst Case Scenario HHR1 and HHR2

190. The magnitude of change in effect on links 3 to 8 for each potential effect in relation to HHR1 and links 3 to 6 for HHR2 has been categorised in **Table 11-31** in accordance with the criteria described in **Table 11-5** and using engineering judgement.

191. HHR1 and HHR2 have been combined within this part of the assessment as the same links have exceeded the threshold of significance and the predicted peak month percentage increases are very similar. The magnitude of change for each phase in this case was deemed to be the same.

Table 11-31: Magnitude of Change - Worst Case HHR1 and HHR2 Links 3-8

Link	Effect	Magnitude	Rationale
3	Severance	Negligible	Change in traffic flow is less than 30%. Change is temporary.
	Vehicle Delay	Low	Significant residual capacity on route even with Development traffic.
	NMU Delay	Low	Low change in traffic flow. Low baseline.
	NMU Amenity	Low	While there is a 29/10% (HHR1/HHR2) increase in HGV traffic, overall traffic will increase by only 2/1% at this location. High percentage increase in HGVs is primarily as a result of low baseline flow.
	Fear and Intimidation	Negligible	See assessment in **Appendix 11.4**.
	Safety	Low	2/1% (HHR1/HHR2) increase in traffic, HGV traffic increase is 29/10%. No severe historical RTC data on this link. In the absence of trends in RTC data an increase in traffic is not sufficient to predict an effect on safety.
4	Severance	Negligible	Change in total traffic flow is less than 30%. Change is temporary.
	Vehicle Delay	Low	Significant residual capacity on route even with Development traffic.
	NMU Delay	Low	Low change in traffic flow. Low baseline.
	NMU Amenity	Low	While there is a 32/11% (HHR1/HHR2) increase in HGV traffic, overall traffic will increase by only 2% at this location. High percentage increase in HGVs is primarily as a result of low baseline flow.
	Fear and Intimidation	Negligible	See assessment in **Appendix 11.4**.
	Safety	Low	2% increase in total traffic, HGV traffic increase is 32%.
5/6	Severance	Negligible	Change in traffic flow is less than 30%. Change is temporary.
	Vehicle Delay	Low	Significant residual capacity on route even with Development traffic.
	NMU Delay	Low	There are no formal crossings. However, there are alternative pathways for pedestrians therefore avoiding the carriageway.
	NMU Amenity	Low	While there is a 45/16% (HHR1/HHR2) increase in HGV traffic, overall traffic will increase by only 4/2% at this location. High percentage increase in HGVs is primarily as a result of low baseline flow.
	Fear and Intimidation	Negligible	See assessment in **Appendix 11.4**.

Link	Effect	Magnitude	Rationale
	Safety	Low	4/2% (HHR1/HHR2) increase in traffic, HGV traffic increase is 45/11%. No severe historical RTC data on this link. In the absence of trends in RTC data an increase in traffic is not sufficient to predict an effect on safety.
7	Severance	Negligible	Change in traffic flow is less than 30%. Change is temporary.
	Vehicle Delay	Low	Significant residual capacity on route even with Development traffic.
	NMU Delay	Negligible	Increase in overall traffic of 4% is negligible in relation to causing NMU delay
	NMU Amenity	Low	While there is a 20 (HHR1) increase in HGV traffic, overall traffic will increase by only 4% at this location. High percentage increase in HGVs is primarily as a result of low baseline flow.
	Fear and Intimidation	Low	See assessment in **Appendix 11.4**.
	Safety	Medium	Increase in HGV traffic on link with two fatalities.
8	Severance	Negligible	Change in traffic flow is less than 30%. Change is temporary.
	Vehicle Delay	Low	Significant residual capacity on route even with Development traffic.
	NMU Delay	Low	Low change in traffic flow. Low baseline.
	NMU Amenity	Low	While there is a 26% (HHR1) increase in HGV traffic, overall traffic will increase by only 6% at this location. High percentage increase in HGVs is primarily as a result of low baseline flow.
	Fear and Intimidation	Negligible	See assessment in **Appendix 11.4**.
	Safety	Low	6% (HHR1/HHR2) increase in traffic, HGV traffic increase is 26%. No severe historical RTC data on this link. In the absence of trends in RTC data an increase in traffic is not sufficient to predict an effect on safety.

192. The significance of effect for each potential effect was then determined using a combination of the sensitivity and magnitude of change in accordance with the matrix in Table 11-32 below.

Table 11-32: Significance of Effect – Worst Case Scenario HHR1 and HHR2 Links 3-8

Link	Effect	Sensitivity	Magnitude	Significance
3	Severance	High	Negligible	Minor
	Vehicle Delay	Medium	Low	Minor
	NMU Delay	Medium	Low	Minor
	NMU Amenity	Low	Low	Minor
	Fear and Intimidation	Medium	Negligible	Negligible
	Safety	Low	Low	Minor
4	Severance	Negligible	Negligible	Negligible
	Vehicle Delay	Medium	Low	Minor
	NMU Delay	Low	Low	Minor
	NMU Amenity	Low	Low	Minor
	Fear and Intimidation	High	Negligible	Minor
	Safety	High	Low	Moderate

Link	Effect	Sensitivity	Magnitude	Significance
5/6	Severance	Negligible	Negligible	Negligible
	Vehicle Delay	Medium	Low	Minor
	NMU Delay	Negligible	Low	Negligible
	NMU Amenity	Negligible	Low	Negligible
	Fear and Intimidation	Negligible	Negligible	Negligible
	Safety	Low	Low	Minor
7	Severance	Medium	Negligible	Negligible
	Vehicle Delay	Low	Low	Minor
	NMU Delay	Medium	Negligible	Negligible
	NMU Amenity	Low	Low	Minor
	Fear and Intimidation	Low	Low	Minor
	Safety	High	Medium	Major
8	Severance	Low	Negligible	Negligible
	Vehicle Delay	Low	Low	Minor
	NMU Delay	Medium	Low	Minor
	NMU Amenity	Medium	Low	Minor
	Fear and Intimidation	High	Negligible	Minor
	Safety	Low	Low	Minor

193. Two moderate and therefore **significant** effects have been identified on links 4 and 7 in relation to safety.

194. Mitigation measures will be implemented to mitigate the above significant effects. Further details of the mitigation measures are provided in **Section 11.10**.

11.8.4. Assessment of Link 4 – Realistic Worst-Case Scenario HHR1

195. The magnitude of change in effect for link for in the realistic worst case scenario for HHR1 was assessed, the results are presented in **Table 11-33**.

Table 11-33 - Magnitude of Change - Realistic Worst Case Scenario HHR1 Link 4

Link	Effect	Magnitude	Rationale
4	Severance	Negligible	Change in total traffic flow is 1%.
	Vehicle Delay	Negligible	Change in total traffic is 1% change in HGV flow not sufficient to induce significant delay.
	NMU Delay	Negligible	Change in total traffic flow is 1%.
	NMU Amenity	Low	While there is a 10% increase in HGV traffic, overall traffic will increase by only 1% at this location. High percentage increase in HGVs is primarily as a result of low baseline flow.

Link	Effect	Magnitude	Rationale
	Fear and Intimidation	Negligible	See assessment in **Appendix 14.4**.
	Safety	Low	1% increase in traffic, HGV traffic increase is 11%.

196. The significance of effect for each potential effect was then determined using a combination of the sensitivity and magnitude of change in accordance with the matrix in **Table 11-34** below.

Table 11-34: Significance of Effect – Realistic Worst Case Scenario HHR1 Link 4

Link	Effect	Sensitivity	Magnitude	Significance
4	Severance	Negligible	Negligible	Negligible
	Vehicle Delay	Medium	Negligible	Negligible
	NMU Delay	Low	Negligible	Negligible
	NMU Amenity	Low	Low	Minor
	Fear and Intimidation	High	Negligible	Minor
	Safety	High	Low	Moderate

197. A moderate and therefore **significant** effect has been identified on link 4 in relation to safety.

198. Mitigation measures will be implemented to mitigate the above significant effects. Further details of the mitigation measures are provided in **Section 11.10**.

11.9. Cumulative Assessment

199. Cumulative traffic effects may occur where the construction phase of a nearby development which shares a common route to site for construction traffic, overlaps with that of the proposed Development.

200. A review of the developments within the vicinity of the Site was undertaken. Developments were narrowed down to those which are proposed (scoping or planning submitted) and consented. Developments which are currently under construction or will finish construction before the proposed Development commences construction, have been excluded from the assessment.

201. The cumulative assessment has not considered the import of ready-mix concrete for the proposed Development as it is assumed that concrete pours for cumulative developments will not occur on the same day. The Principal Contractor will collaborate with other developments in the area to ensure these days do not coincide.

202. Cumulative projects that overlap with HHR2 have not been included in this assessment as construction commences in 2036. It is too early to confirm which projects will be under construction at that time.

203. **Table 11-35** below identifies which developments have the potential to cause cumulative effects.

Table 11-35: Cumulative Site Review

Development	Planning Status	Comments
The Drum Windfarm	Proposed (Submitted)	The developer is Wind Estate (UK) Ltd. This development is 8 turbines with construction occurring on links 1 – 6. Construction will start in 2028 for 18 months and will coincide with the construction of HHR1.

204. After completing a desk-based study of EIA Chapters for cumulative projects, only one project coincides with the construction phase of HHR1. Since the construction of The Drum will commence in 2028 and will run over a period of 18-months, it is expected that the peak month will not coincide with the peak month for HHR1, however for the purposes of this assessment it has been assumed that the peak months will coincide.

205. Presented below in **Table 11-36** is estimated increase in daily traffic during the peak month in the cumulative scenario.

Table 11-36: Peak Month Daily Traffic – Cumulative Scenario Worst Case

Ref	Road	Future Baseline		With Cumulative Development Traffic		% Increase	
		Total	HGV	Total	HGV	Total	HGV
1	A76	11,467	677	90	8	1	1
2	A76	10,553	669	90	8	1	1
3	A76	11,453	607	350	268	3	44
4	A76	10,683	543	350	268	3	49
5	A76	8,381	392	350	268	4	68
6	A76	6,069	390	350	268	6	69
7	A76	5,777	860	228	174	4	20
8	A76	3,657	679	228	174	6	26
9	A76	3,908	677	6	0	0	0

206. The outcome of the cumulative scenario worst case is similar to that of HHR1 and HHR2 worst case scenario as links 3-8 are above the threshold of significance for HGV traffic. The same mitigation measures would be applied in the cumulative scenario as would be applied for HHR1 and HHR2. Mitigation measures are provided in **Section 11.10**.

11.10. Mitigation

207. Mitigation measures may be required on link 4 and link 7 in relation to safety. Mitigation measures have been considered in the context of a typical risk reduction hierarchy, e.g. avoidance should be the first step. In this case avoidance means:

- Reducing the number of vehicle movements as far as practicable; and
- Removing the need for vehicles to travel on the most sensitive routes.

208. For the proposed Development the following primary mitigation measures are proposed:

- Use of on-site borrow pits to source the majority of aggregates required for construction; and
- Use of on-site batching for concrete.

209. By implementing the above mitigation measures there will be a significant reduction in HGV movements which would address the issues on links 1-3 and 5-8. In effect this implementation of the realistic worst case scenario.

210. For Link 7, whilst the lower threshold of significance is not predicted to be breached in the realistic worst case scenario, cognisance has been taken of the two recent fatalities in New Cumnock. The Applicant is prepared to implement potential additional mitigation in this area in the form of a permanent traffic controlled pedestrian crossing, subject to agreement with Transport Scotland.

211. Additional mitigation will be required on link 4 in relation to the realistic worst case scenario for HHR1. As noted previously, a mitigation measure has been implemented at the A76/B713 junction in the form of vehicle actuated warning signage. This junction is a primary transport route for SORN Quarry regardless of the proposed Development and the quarry will have a traffic management plan for undertaking day to day business.

212. Additional mitigation measures such as a temporary speed limit reduction could be discussed with the relevant roads authority if deemed necessary. Consultation will take place during preparation of the detailed CTMP to establish any further mitigation measures which may be required.

213. It is anticipated that the requirement for a detailed CTMP will be secured through an appropriately worded condition of consent.

11.10.1. Residual Effects

214. After implementation of the above mitigation measures the residual effect of the increased traffic will be at worst minor and therefore not significant.

11.11. Conclusion

215. Chapter 11 of the EIA Report has assessed the impact of the proposed Development on the traffic and transportation resource within the surrounding area of the proposed Development. This primarily consists of an assessment of the impact of increased traffic on the local road network.

216. A detailed assessment of the predicted volume of vehicular traffic during the construction phases of the proposed Development has been undertaken. This assessment has identified that the peak months for construction and has assessed the effect on the local road network during these.

217. Mitigation measures have been proposed in **Section 11.10** to address the identified **significant** effects. Following implementation of mitigation measures the residual effect of the increased traffic will be at worst minor and therefore not significant.

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