Chapter 12

Access, traffic and transport

SCOTTISHPOWER RENEWABLES

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Chapter 12
Access, traffic and transport

12.1 Introduction

1. This Chapter considers the potentially significant environmental effects of increased traffic flows due to the proposed Development.

2. Potentially significant traffic related environmental effects may result from two sources of impact:

- The transport configurations made for the movement of wind turbine components (including blade, tower sections and nacelle), transported as abnormal loads. Abnormal loads are those which exceed the length, weight or height criteria defined in 'Abnormal Load Movements – A Brief Guide to Notification and Authorisation Requirements' (Transport Scotland, June 2007); and
- The import of general construction materials transported via "*conventional*" heavy goods vehicles (HGV's) and low loaders.

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

4. The assumptions are:

- All construction materials are assumed to be sourced from off-site locations, thus ensuring that the estimated level of trip generation is considered as a maximum (it is expected however, that stone would be won from the onsite borrow pits and concrete produced at the onsite batching plant, see **Chapter 3: Description of the Development**); and
- Future traffic increases associated with the proposed Development are measured against existing traffic flows, with no allowance for any growth in baseline traffic, thus ensuring that the highest level of impact is assessed. The capacity of the roads is not expected to be affected by additional development traffic, as the existing flows are currently very low. By not applying growth factors to the existing levels, we are able to predict a worst case impact in percentage terms.

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

6. During operation, the proposed Development would generate occasional maintenance trips, which would not lead to any variation in the baseline traffic flows beyond that of every day fluctuation. Given that there is no proposal to limit the lifetime of the proposed Development, the focus of the assessment within this Chapter is the construction phase.

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

12.2 Approach to assessment and methods

8. The assessment is required to evaluate the effects of the proposed Development and to determine the magnitude and significance of the impacts on the identified sensitive receptors. The main sensitive receptors to increased traffic levels and environmental impacts are anticipated to be located along the A714 between Girvan and Newton Stewart, with residential properties and sensitive non-residential properties such as schools considered. This assessment also considers the impacts associated with the transportation of turbine components.

9. Consideration has been given to the proposed access routes to the Site and the assessment process comprised the following principal stages:

- baseline survey and characterisation of the existing traffic network through desk study and traffic surveys;
- review of the findings from the ALRA document prepared by WYG Environment Planning Transport Ltd and identification of the preferred route and potential effects along this route;
- comparison of development against the previous Arecleoch and Kilgallioch Windfarms (60 and 96 turbines respectively) which have gained consent and are operational and the identification of any differences which may cause potential effects between the proposed Development and the permitted Arecleoch and Kilgallioch Windfarms;
- derivation of mitigation measures, where appropriate, to address any identified effects; and
- description of any residual effects.

10. This Chapter seeks to draw comparisons between the proposed Development and the existing developments of Arecleoch and Kilgallioch Windfarms which have previously provided thorough and robust assessments of the existing baseline conditions and the effects the developments may have.

12.2.1 Legislation, policy and guidance

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

12.2.2 Study area

12. The proposed Development is located in the south west of Scotland, approximately 3 km south west of Barrhill and is fully within the administrative boundary of South Ayrshire Council apart from the site entrance and junction which lies within the Dumfries and Galloway administrative area. The Site lies predominantly within the commercial forest plantation of Arecleoch Forest currently owned and managed by Forestry and Land Scotland. **Figure 12.1** shows the extent of the study area considered for traffic, access and transport.

13. Road access to the Site is principally from the A714, a single carriageway road that runs north west from Newton Stewart to Girvan; the A714 connects with the A77(T) at Girvan and the A75(T) at Newton Stewart. The route takes vehicles along a stretch of unnamed road to the west of Newton Stewart to avoid travelling through the town centre. The route is shown in **Figure 12.1**.

14. There are currently existing access points (see **Figure 12.1**) to the development Site from:

- a single-track unclassified road from Barrhill to New Luce;
- an existing forestry track that leads south west from Bents Farm; and
- an existing forestry track leading south west from Wheeb Bridge.

15. The extent of the road network that has been considered within the traffic study area is as follows:

- A714 south from Wheeb Bridge access towards Newton Stewart;
- unnamed road which connects south from the A714 to connect with the A75, west of Newton Stewart Hospital;
- A714 north from Wheeb Bridge to the access at Bents Farm; and
- A714 north of the access at Bents Farm to the roundabout junction with the A77 (at Girvan).

12.2.3 Effects assessed in full

16. The approach for the assessment of effects has been to define the level of traffic anticipated to access the proposed Development during its construction phase.

17. This Chapter includes a detailed assessment of the current conditions with focus on the potential effects during the construction phase. This includes a brief construction works programme, a description of the type of vehicles used during the construction phase and an estimate of the number of trips anticipated to be generated by HGVs, LGVs and other vehicles. In addition, the effects associated with the delivery of abnormal loads are to be identified.

18. The assessment of the construction phase impacts includes a comparison of the possible impacts associated with the proposed extension against the permitted and accepted impacts generated by the much larger Arecleoch and Kilgallioch Windfarms (156 turbines in total). The current base traffic flows will be described, the previous assessments will be reviewed in full and any changes from previous assessments discussed.

12.2.4 Effects scoped out

12.2.4.1 Operational effects

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

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

12.2.5 Baseline determination

21. An understanding of the existing situation and baseline conditions within the study area has been established through the following:

- Automatic Traffic Counters (ATCs) which were undertaken during a seven day period from 04 September 2018 to 10 September 2018 at two locations on the A714, with one installed just north of the access road at Bents Farm and one south of the access at Wheeb Bridge. A detailed report of this data in included within **Technical Appendix 12.2**; and
- Road traffic collision data for the period from 2013 to 2018 have been obtained to determine whether the study area contains any patterns of data suggestive of a deficiency in the safety of the road network. The data obtained are provided at **Technical Appendix 12.3**.

22. The inspection of the route from the port of delivery to Site has been undertaken by WYG Environment Planning Transport Ltd, the findings of which have been presented in the **Technical Appendix 12.1**. This has been reviewed to identify the baseline situation along the preferred and recommended route for delivery.

12.2.5.1 Data sources

23. The following data collection and analysis has been undertaken:

- a review of available Arecleoch and Kilgallioch Windfarm development application documents;
- a review of the ALRA document prepared by WYG Environment Planning Transport Ltd;
- analysis of commissioned traffic count data and accident data; and
- assessment of traffic impacts of previous developments to understand identified effects.

12.2.5.2 Consultation

24. SLR prepared scoping material for discussion with South Ayrshire Council (SAC) and Dumfries and Galloway Council (D&GC) as included in Chapter 6 of the ScottishPower Renewables (SPR) scoping report, issued in October 2018.

25. Account has been taken of the scoping responses received from, and discussions undertaken with D&GC and SAC. Further details on consultee comments and EIA team comments/action is provided in **Chapter 6: Scoping and Consultation** and **Technical Appendix 6.1** which provides a full Scoping Responses table. **Table 12.1** summarises the key traffic and transport issues raised by consultees and how they have been addressed.

Consultee	Summary of Key Issues	How this is addressed in this Chapter
Dumfries & Galloway Council (DGC)	Advised the full assessment of access route with swept path should be included with a description of any enabling works required. An assessment of impacts associated with the import of material on site should borrow pits not be sufficient. Preparation of a Traffic Management Plan (TMP) to include reference to other unrelated windfarm projects and the likelihood of cumulative impacts associated with combined construction traffic.	Swept path analysis – the access route has been assessed and swept path analyses undertaken to inform the preparation of this EIA Report chapter. Materials – a worst case scenario is assessed within this chapter, with assumptions made where the maximum possible volume of imported material is applied. TMP – a TMP is will be prepared to include appropriate control measures to manage the level of effects, prior to the commencement of development. Cumulative – possible cumulative impacts on the local roads due to other windfarm construction traffic will be included in this chapter as well as the TMP, which will be prepared prior to the commencement of development.
Ayrshire Roads Alliance (ARA)	No response	-
Transport Scotland (TS)	Request for a full Abnormal Loads Assessment report to identify potential key pinch points on the trunk road network. Swept path analysis to be included with enabling works identified. Assess the impacts of construction generated traffic in line with IEMA Guidelines.	An abnormal load routes assessment is to be carried out and will be referenced within the EIA Chapter. The EIA Chapter will assess a worst case scenario within the EIA Report, with assumptions made where the maximum possible volume of imported material is applied.
Network Rail	Advised to assess the effects of construction traffic on existing traffic flows and the public road network. Preferred construction traffic routes should be indicated to enable Network Rail to assess the possible impacts where/if the traffic crosses over/under our infrastructure and the suitability of these crossings.	An abnormal load routes assessment has been carried out to include reference to structures and rail crossing where required. The assessment within the EIA Report will include predictions of construction traffic flows in relation to specific routes.

Table 12.1: Consultation responses

12.2.6 Approach to assessment of effects

26. The likely significance of the potential effects from the proposed Development that relate to Site access, traffic and transport have been determined by considering the magnitude of change in traffic movements and the sensitivity of the receptors which would be affected by these changes. This has been undertaken in accordance with the IEMA guidance (IEMA, 1993) and standard good practice, based on the experience of the assessor.

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

28. Based on the IEMA guidance, the following factors have been identified as potential environmental effects likely to arise from changes in traffic movements. These are therefore considered in the assessment as potential effects which may arise from changes in traffic flows resulting from the proposed Development:

- Noise and vibration – the potential effect caused by additional traffic on sensitive receptors, which in this case would relate to residential properties near to the road (see also **Chapter 13: Noise**);

- Driver severance and delay – the potential delays to existing drivers and their potential severance from other areas;
- Community severance and delay – the potential severance to communities and the delays to movements between communities;
- Vulnerable road users and road safety – the potential effect on vulnerable users of the road (e.g. pedestrians/cyclists);
- Hazardous and dangerous loads – the potential effect on road users and local residents caused by the movement of abnormal loads; and
- Dust and dirt – the potential effect of dust, dirt and other detritus being brought onto the road.

12.2.7 Significance of effect

29. Criteria for the determination of sensitivity (e.g. 'high', 'medium', or 'low') or of importance (e.g. 'international', 'national', 'regional' or 'authority area') have been established based on prescribed guidance, legislation, statutory designation and/or professional judgement, as described in **Chapter 5: Environmental Impact Assessment**. For this assessment the significance of the likely effect has been determined by consideration of the sensitivity of receptors to change, taking account of the specific issues relating to the study area, and then the magnitude of that change.

12.2.7.1 Sensitivity of receptors

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

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

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

32. In this context, the IEMA guidance does not define a sensitive area and therefore the assessor has made a judgement based on experience and the nature of the study area. Each receptor has been assessed individually to determine its sensitivity and the assessment criteria chosen are shown in **Table 12.2**.

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

Table 12.2: Receptor sensitivity

12.2.7.2 Magnitude of impact

33. The magnitude of impact or change has been considered according to the criteria defined in **Table 12.3**.

Impact	Negligible	Minor	Moderate	Major
Noise	<25 % increase in traffic		>25 % increase in traffic. Quantitative assessment based on predicted increase in traffic against measured baseline (see **Chapter 13: Noise**).	
Driver severance & delay	<10 % increase in traffic.		Quantitative assessment of road capacity based on existing traffic flows and predicted future traffic levels.	
Community severance & delay	<10 % increase in traffic.	<30 % increase in traffic.	<60 % increase in traffic.	>60 % increase in traffic.
Vulnerable road users	<10 % increase in traffic.		Qualitative assessment of existing provision and future traffic levels.	
Road safety	<10 % increase in traffic.		Quantitative assessment of existing accident records and predicted increases in traffic.	
Dangerous loads	0 % increase in traffic.	<30 % increase in traffic.	<60 % increase in traffic.	>60 % increase in traffic.
Dust & dirt	<10 % increase in traffic.	<30 % increase in traffic.	<60 % increase in traffic.	>60 % increase in traffic.

Table 12.3: Magnitude criteria

12.2.7.3 Significance of effect (potential effects)

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

12.2.8 Limitations to the assessment

35. The assessment of the potential impacts to the baseline traffic relies on the accuracy of the traffic flow data. The subconsultants (Nationwide Data Collection) used to collect the data are considered to be reliable and no issues were reported during the survey period.

36. The proposed Development trip generation has been based on the quantity of materials as confirmed at this stage. While there is a possibility that these may alter, assumptions have been made to ensure that the figures are robust. These assumptions are specified in the remainder of the chapter at appropriate points.

12.3 Baseline conditions

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

12.3.1 Existing road network

38. The study area for this assessment has been defined as predominantly the A714:

- A714 south from Wheeb Bridge access towards Newton Stewart and the A75;
- Unnamed road which connects south from the A714 to the A75, west of Newton Stewart Hospital;
- A714 north from Wheeb Bridge to the access at Bents Farm; and
- A714 north of the access at Bents Farm to the roundabout junction with the A77.

39. The A714 is the main link that connects Newton Stewart in the south with Girvan in the north. Travelling north from Newton Stewart the A714 passes a number of small villages including Penninghame, Barrhill, Pinwherry and Pinmore. The road is a single carriageway with a general width of 6.5 m, with local reductions in width at bridges; the speed limit is typically at 60 mph with local reductions to 30 mph through villages such as Barrhill.

40. The proposed access point for the wind turbine components is located just south of Wheeb Bridge, east of Barrhill. Wheeb Bridge has a width of approximately 4.5 m, widening out to 5.5 m south of the bridge. On approach to the Wheeb Bridge access the A714 is a long and straight section of the road.

41. The A714 connects with the A75(T) to the south of Newton Stewart at a four arm roundabout junction, however the 2.38 km long road directly to the west of the town provides a bypass for larger, abnormal load vehicles travelling between the A714 and the A75. The A75 in this location is a single carriageway road with a width of approximately 7.3 m; a ghost island right turn lane accommodates the movement of vehicles from the A75 to the road linking to the A714.

42. The A714 connects to the A77(T) to the north of the Site on the southern outskirts of Girvan. The large four arm roundabout provides access to the A77 which extends south towards Ballantrae and Stranraer and north towards Ayr. The A77 in the vicinity of the roundabout junction is a single carriageway road and is approximately 7.3 m wide with a footway along the northern edge of the road around Girvan.

12.3.2 Existing traffic flows

43. Baseline traffic flows were undertaken by 'Nationwide Data Collection' (NDC) who installed two ATCs within the study area at the following locations:

- ATC 1: A714 just north of the access road at Bents Farm; and
- ATC 2: A714 just south of the access road at Wheeb Bridge.

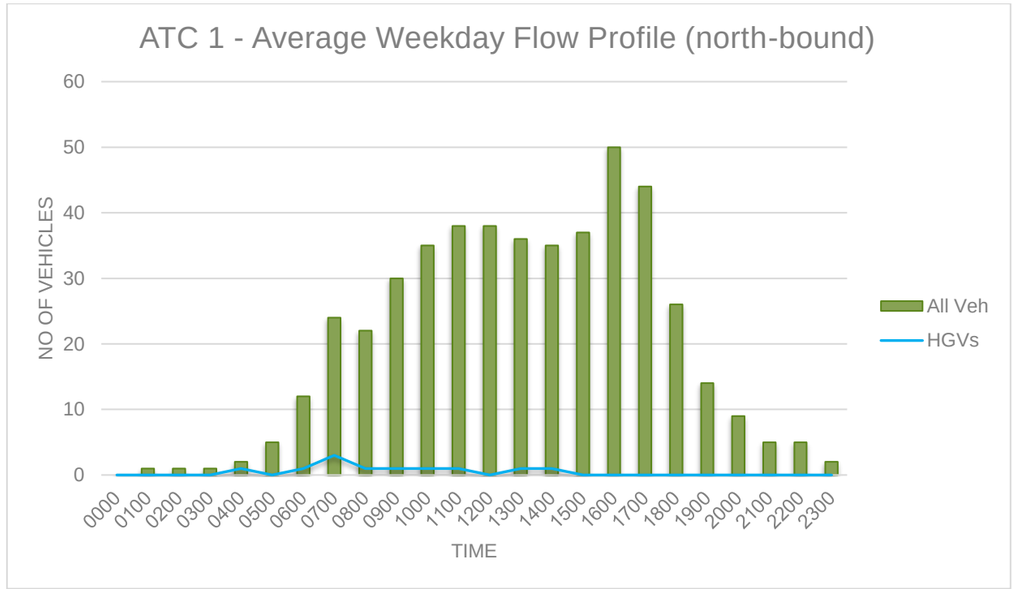
44. The ATC locations are shown on **Figure 12.1**. The ATCs collected data continuously over the seven day period between Tuesday 04 September 2018 to Monday 10 September 2018, a period which lies outside of any school, public or bank holidays.

45. The raw data are provided in **Technical Appendix 12.2: Traffic Data** and a summary of the average weekday (07:00 to 19:00 and 24-hour) traffic is provided in **Table 12.4**. The data includes directional and two-way flows for both ATC's.

Location	Period	Northbound / Westbound			Southbound / Eastbound			Two-way		
		Total	HGV	% HGV	Total	HGV	% HGV	Total	HGV	% HGV
ATC 1 – A714 Bents Farm	12-hour	439	22	5	442	20	5	880	42	5
	24-hour	500	26	5	519	24	5	1,019	50	5
ATC 2 – A714 Wheeb Bridge	12-hour	253	20	8	275	25	8	528	40	8
	24-hour	297	24	8	321	25	8	618	49	8

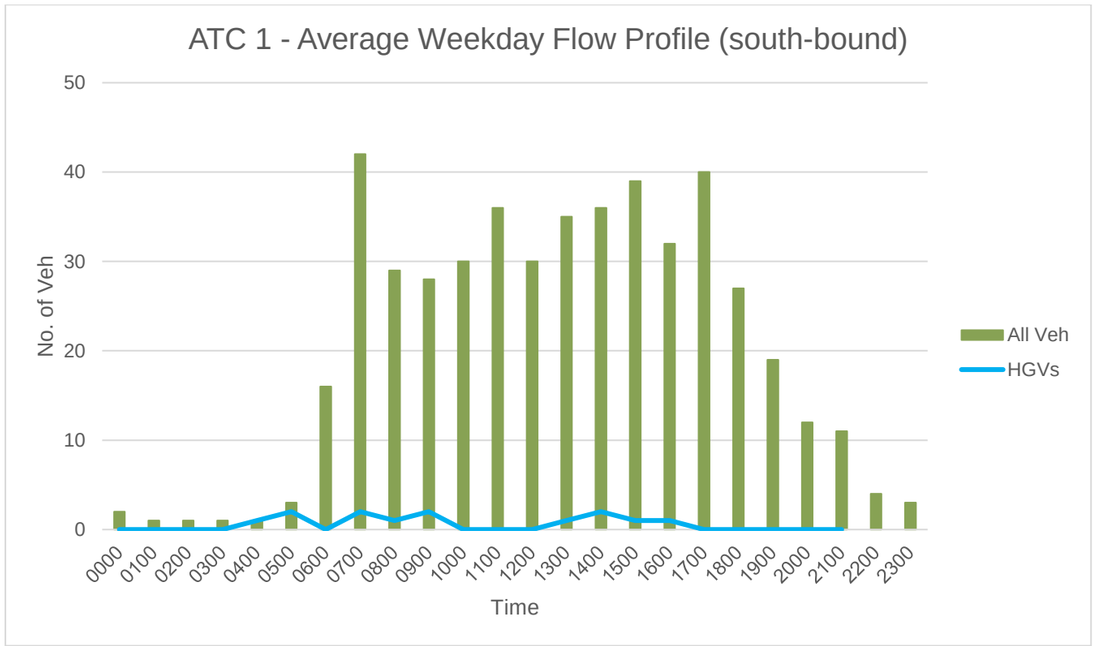
Table 12.4: Average weekday traffic flows (07:00-19:00 and 24 Hour)

46. **Table 12.4** shows that almost twice as many vehicles pass the access at Bents Farm compared with the access at Wheeb Bridge, however a higher percentage of HGVs tends to pass the Wheeb Bridge access, with the number of HGVs along the A714 at both access points remaining fairly constant. **Graph 12.1** provides a visual presentation of the average weekday flows heading north on the A714; from this it can be seen that the flow of all vehicles is fairly constant through the day, with a small peak at around 16:00. The number of HGVs is shown to be very low, with numbers recorded from early in the morning to mid-afternoon.



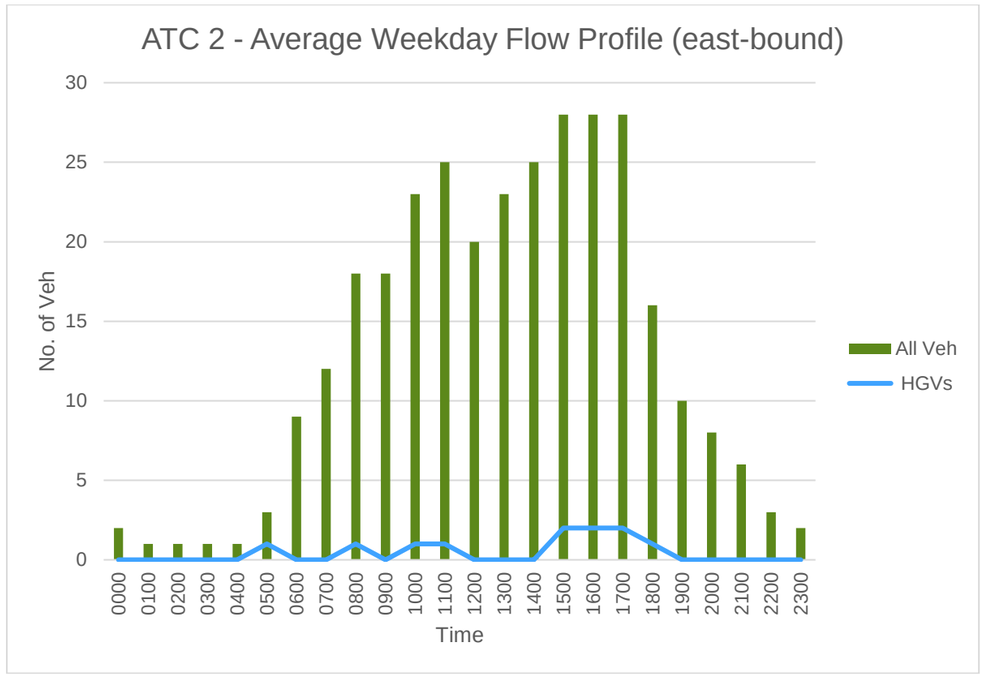
Graph 12.1: A714 (north-bound) at Bents Farm – Traffic flow profile (Ave weekday)

47. The average weekday south bound flow for all vehicles and HGVs can be seen in **Graph 12.2**. The profile shows that the flow of all vehicles varies through the average weekday, with a slight peak at 07:00. The number of south bound HGVs are recorded from early in the morning to late afternoon, with numbers at a similarly low level to those recorded north bound.

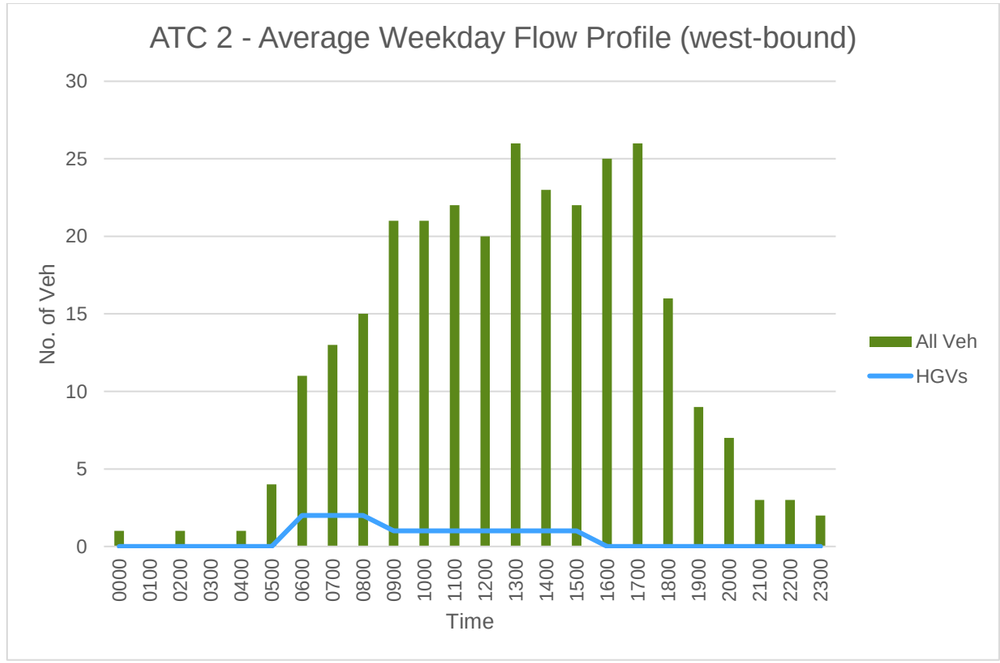


Graph 12.2: A714 (south-bound) at Bents Farm – Traffic flow profile (Ave weekday)

48. **Graphs 12.3** and **12.4** present the average weekday flows as recorded at Wheeb Bridge. The east bound all vehicle flows rise from 06:00 through the morning to peak at around 11:00; through the afternoon the highest flows are recorded between 15:00 and 17:00, falling away through the evening. The numbers of HGVs are recorded through the day from 05:00 to 18:00. The west bound flow of all vehicles increases through the day with a slight morning peak at around 09:00, an early afternoon peak at 13:00 and a similar peak late afternoon at 17:00. The numbers of HGVs recorded travelling west bound are recorded as a steady flow from 06:00 to 15:00.



Graph 12.3: A714 (east-bound) at Wheeb Bridge – Traffic flow profile (Ave weekday)



Graph 12.4: A714 (west-bound) at Wheeb Bridge – Traffic flow profile (Ave Weekday)

12.3.3 Network capacity performance

49. The capacity performance of the A714 has been calculated from Design Manual for Roads and Bridges, Volume 5, Section 1 TA 46/97 (Highways Agency, 1997) and compared against the existing 24-hour baseline traffic flows. The spare capacity has then been calculated and presented in **Table 12.5.**

Location	Baseline flow (24-hr)	Capacity	Spare capacity	Spare capacity %
Wheeb Bridge	618	24,650	24,032	97 %
Bents Farm	1,019	24,872	23,853	96 %

Table 12.5: Capacity performance of the A714

50. The A714 has been calculated to have a theoretical spare capacity of approximately 96-97 %.

12.3.4 Accident records

51. Personal Injury Accident (PIA) collision data have been obtained from Transport Scotland. All data provided can be viewed at **Technical Appendix 12.3;** the data provided by Transport Scotland have been cross referenced with the CrashMap database to confirm the location of each accident. Data detailing the specific causes of the recorded accidents, vehicle classification and number of vehicles involved has not been included in the data provided by Transport Scotland; CrashMap has been used to confirm the number of vehicles for each accident.

52. This data is used to determine the existing road safety situation and to establish a base against which the effects of the proposed Development are assessed. The data includes PIA collision records on the A714 between the junction with the B734 and the A75(T) between January 2013 and January 2018.

53. For clarification, those accidents recorded which result in slight injury indicate that the victim was likely to suffer from slight shock with occurrences of sprains or bruises from the accident, whereas a serious accident accounts for breakages, lacerations, concussion or hospital admittance. A fatal accident means there was a resultant death from the injuries sustained. The accidents are summarised in **Table 12.6**.

Date	Severity of injury	Number of vehicles	Number of casualties
05/02/2012	1	4	Serious
12/07/2012	1	1	Slight
30/09/2012	1	2	Slight
13/04/2013	1	1	Serious
21/06/2013	2	2	Fatal
08/07/2013	1	1	Serious
15/08/2013	1	1	Slight
24/10/2013	2	1	Slight
20/02/2014	1	1	Serious
13/03/2014	1	1	Serious
26/07/2014	1	1	Slight
18/12/2014	1	1	Slight
28/07/2015	1	1	Slight
29/05/2015	1	1	Slight
31/12/2015	2	1	Slight
15/01/2016	1	1	Slight
06/07/2016	2	1	Slight
01/03/2017	3	4	Slight
09/04/2017	1	1	Serious
18/11/2017	1	2	Serious
29/01/2018	1	1	Fatal

Table 12.6: Summary of accident data on A714 in last five years

54. A total of twenty one accidents were recorded throughout the study area over the most recent five-year period. Twelve of the accidents resulted in slight injury with seven serious accidents. There were two fatalities recorded. Most accidents appear to have occurred during 2013 with five accidents recorded, followed by 2014 with four accidents recorded on the A714. Both 2015 and 2017 have recorded a total of three accidents. This gradual reduction in the number of accidents recorded each year could result from improvements along the route; it is noted that the A714 was resurfaced in 2017 and 2018.

55. The CrashMap data has not identified any accident clusters which would indicate a localised accident issue. Sixteen of the twenty one accidents involved a single vehicle. The road is subject to the national speed limit and is relatively straight in alignment throughout. With 76 % of the accidents involving a single vehicle, speed could be a factor in some of the recorded accidents.

12.3.5 Existing road network performance

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

- the existing road network is laid out to allow substantial reserve capacity against existing traffic demand;
- this has been determined from reviewing previous planning records for the Arecleoch and Kilgallioch Windfarms;
- the study area does not have a high level of recorded accidents; and

- there are no further improvement works that have been proposed to the roads within the study area.

12.3.6 Existing windfarm development

57. The existing Arecleoch Windfarm was consented in June 2008 and was fully operational with 60 wind turbines in April 2011. The 2006 Environmental Statement (ES) submitted to support the application for the Arecleoch Windfarm included a Traffic, Access and Transport Chapter. This presented an assessment of the traffic and transportation effects, primarily associated with the construction phase. As with the proposed Development, the access for the Arecleoch Windfarm was via the location at Wheeb Bridges and the entrance close to Bents Farm; the route for abnormal loads was via the A75 and A714, with the construction traffic north from Newton Stewart along the A714.

58. The baseline for the assessment was informed by a number of traffic counts located both on the wider strategic network and on local roads within the study area. The local surveys gathered data during April 2005, with traffic flows collected on the A714 at Wheeb Bridge and at Bents Farm.

59. The number of development generated vehicles were calculated for each stage of the construction and then related to the construction programme, providing the predicted maximum number of vehicle trips per month and per day. These calculations identified that a maximum of 153 vehicle trips per day would be generated during the peak construction period, with 77 LGVs and 73 HGVs. The distribution of these trips on the local roads identified that there would be a maximum of 69 vehicles and 34 HGVs per day on the A714 at Bents Farm and 46 vehicles and 39 HGVs per day on the A714 at Wheeb Bridge. The environmental effects of construction vehicles at each location was concluded to be of minor significance, with negligible residual impact after the application of a Traffic Management Plan.

60. The Kilgallioch Windfarm is located 5 km south of Barrhill and was consented in February 2013, with 96 wind turbines now in operation. The Access, Transport and Traffic Chapter of the ES (February 2010) assessed the effects of the Kilgallioch Windfarm on the road network and associated receptors (based on the original layout of 132 turbines). The assessment focused on three key routes for access to include the A714, the B7027 and the C72 Chirmorie Road towards New Luce; in addition a new access route as a continuation of the C22 which runs northwest from the A75. Traffic surveys were undertaken along the key routes, to include the A77, the A75 and the A714 to establish the baseline.

61. The ES Chapter identified that the construction phase for the Kilgallioch Windfarm would generate 196,454 vehicle movements during the 36 month period, to include 1,335 abnormal load movements, 46,563 HGV movements and 148,556 light vehicle movements. Through consideration of the maximum impact month and with the application of vehicle distribution, the ES Chapter identified that the construction phase would see an additional 356 vehicles on the A714 northwest and south of Barrhill, to include 271 light vehicles and 85 HGVs. The effects of the construction traffic on the A714 at Barrhill were considered to be not significant.

62. **Table 12.7** provides a summary of the construction generated vehicle numbers for each of these two permitted windfarms.

Windfarm	Location	Total Vehicles	Light Vehicles	HGVs
Arecleoch	Bents Farm	69	35	34
	Wheeb Bridge	46	7	39
Kilgallioch	Northwest of Barrhill	356	271	85
	South of Barrhill	356	271	85

Table 12.7: Construction generated traffic for Kilgallioch and Arecleoch Windfarms.

12.3.7 Proposed Development (future base)

63. The proposed Development is explained in full in **Chapter 3: Description of the Development**.

12.3.7.1 Site access and onsite tracks

64. Access to the Site is proposed via two existing junctions, one close to Wheeb Bridge south of Barrhill and the other close to Bents Farm north of Barrhill. Approximately 80 % of HGV construction vehicles would use the access from Wheeb Bridge, however it is anticipated that the Site entrance at Bents Farm would be used for the remaining approximately 20 % of HGV construction traffic and also used for approximately 80 % of Light Goods Vehicle (LGV) during construction and operation. It is also proposed that the unclassified Barrhill to New Luce road may be used for some LGV traffic during construction and operation, contributing around 5 % of traffic movements. New access tracks would be required within the Site and existing access tracks may require upgrading.

12.3.7.2 Abnormal load access route

65. Following SPR's recent experience of constructing the Kilgallioch Windfarm, it is proposed that a dual port strategy is considered for the delivery of the wind turbine components. The wind turbines would be delivered to the George V Dock in Glasgow, but with the possibility of the port of Cairnryan. The port of Cairnryan has some restrictions including limited water depth and port handling facilities/component storage and may limit the use of this port. The turbines would be moved from the port of entry to the Site under escort. In the case of George V Dock the turbine components would be moved along the M8 then A74 (M) to the M6 where they would be turned northwards at junction 44 or 42, along the A75 to the unclassified road past Newton Stewart where they would join the A714 proceeding to the Site entrance at Wheeb Bridge. In the case of Cairnryan turbine components would be moved south along the A77, A751, A75 and then the unclassified road past Newton Stewart and then north along the A714 to the Site entrance at Wheeb Bridge. If consented, SPR would engage in detailed discussions with the turbine suppliers, haulage contractors, Transport Scotland, Police Scotland and road authorities in regards to the port of entry strategy and AIL delivery route.

12.3.7.3 Construction programme

66. The proposed Development would be constructed over a period of up to 18 months commencing around 2022 and depending on the weather conditions, the Site might be shut down over winter. Activities would include:

- offsite highway works;
- site establishment (construction compounds);
- forestry felling and export;
- construction of access tracks and crane pads;
- turbine foundation construction;
- substation civil and electrical works;
- cable delivery and installation;
- turbine delivery and erection; and
- windfarm commissioning.

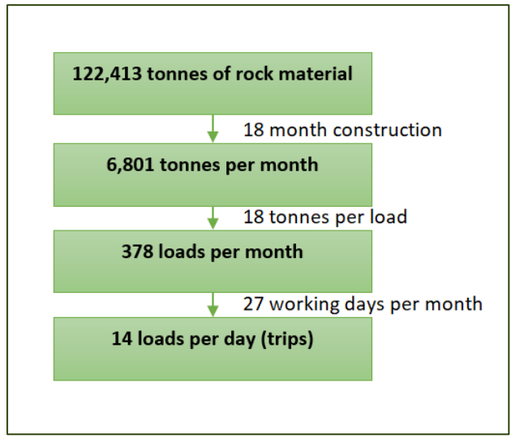
67. An indicative construction programme has been prepared and is set out in the construction timeline shown in **Chapter 3: Description of the proposed Developme**nt.

12.3.7.4 Site construction traffic generation

68. The construction working hours for the proposed Development would be 07:00 to 19:00 Monday to Friday and 07:00 to 16:00 at the weekends. It should be noted that out of necessity some activity, for example abnormal load deliveries and the lifting of the turbine rotors, may need to occur outside the specified hours stated, although they would not be undertaken without prior approval. The impact of the proposed Development has been assessed over the 12-hour weekday period, which considers the natural peak usage of the road network.

69. The increase in traffic flow along the A714 has been calculated for the worst case scenario, which assumes all rock material required during the construction phase would be brought to Site from external sources. It is expected however, that stone would be won from the onsite borrow pits. A concrete batching plant is to be provided onsite and much of the internal access tracks are already in place. As such it is anticipated that the import of material would generate the most significant number of trips.

70. **Technical Appendix 12.4** provides the breakdown of the volume of materials required for each infrastructure element of the windfarm construction, with any assumptions highlighted. From this it is identified that a total of 122,413 cubic tonnes of rock material would required during the construction phase. The material would be transported to Site steadily through the 18 month construction period, with material transported on HGVs with an average 18 tonne load; with an average of 27 working days (Monday – Saturday).



Graph 12.5-1: Calculation of construction generated HGVs

71. **Graph 12.5-1** determines that the importation of rock material would result in 14 HGV trips per day, or 24 two-way movements; with a 12 hour operational weekday, this would see 2 two-way HGV movements each hour.

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

73. As previously confirmed, 80 % of the HGV traffic is expected to access the Site at Wheeb Bridge, with the remaining 20 % travelling to the Bents farm access. In addition, 80 % of light vehicles would access the Site via the bents farm access with 15 % travelling via the Wheeb bridge access and the remaining heading on the unclassified road from Barrhill towards new Luce. Based on this distribution the construction generated vehicle numbers have been summarised in **Table 12.8**.

Location	Total vehicles	Light vehicles	HGVs
Wheeb Bridge	39	20	19
Bents Farm	85	80	5

Table 12.8 Construction generated traffic on the A714 (two-way 24 hour flows)

74. The traffic generated by the construction phase has been added to the base flows to provide a future base situation. The figures are given for the two locations on the A714 close to each access point, as provided in **Table 12.9**.

Location	Base flows			Base flow with construction Traffic			Percentage increase	
	Total vehicles	HGVs	Percentage HGVs	Total vehicles	HGVs	Percentage HGVs	Total	HGVs
Wheeb Bridge	618	49	8	657	68	10	6 %	25 %
Bents Farm	1,019	50	5	1,104	55	5	8 %	10 %

Table 12.9 Future baseline and construction traffic generation (two-way 24-hour flows)

75. The construction phase traffic generation would see less than a 10 % increase in the total number of vehicles in an average weekday (24hours) on the A714. When compared to the flows generated by the original Arecleoch Windfarm, those to be generated by the Arecleoch extension are similar. At Wheeb Bridge the proposed Development would generate an additional 35 daily vehicles, previously the Arecleoch Windfarm generated 46 extra vehicles per day during the construction phase; at Bents farm the proposed Development would generated 4 less construction vehicles per day. The Kilgallioch Windfarm generated 365 additional vehicles per day during the construction phase, significantly more than would be generated by the proposed Development.

12.3.7.5 Abnormal load traffic generation

76. Each turbine would typically require the transportation of 7 separate components, comprising 3 blades, 3 tower sections and the nacelle (motor). As there are 13 turbines, a total of 91 components would be required to be delivered as abnormal loads. It is anticipated that the turbine components would be delivered in convoys of three abnormal load vehicles, with a total of 31 trips made, or 60 two-way abnormal load vehicle movements.

77. Combining the component deliveries into small convoys of three vehicles would result in four to five delivery days per week, assuming that there would be two turbines delivered each week over a seven week period.

12.4 Assessment of effects

12.4.1 Embedded measures

78. The proposed Development has been designed to include a range of measures to mitigate potential effects, some which has been through experience of building other windfarms in the local area. Included within this are the design of the Site entrance to include radii and width suitable for ease of abnormal load access. All such measures are described fully in **Chapter 2: Site Description and Design Evolution**.

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

- A reputable construction Principal Contractor (PC) would be procured, with an Environmental Policy and good environmental track record. This would be established though assessment of environmental performance as part of the PC procurement exercise;
- Prior to the commencement of development, a detailed Traffic Management Plan would be agreed with Police Scotland, Ayrshire Roads Alliance, Dumfries and Galloway Council and Transport Scotland. This would include a number of measures to reduce the effects of the construction of the proposed Development on local receptors and communities, including the effects from turbine deliveries (abnormal loads). This would include details of any required temporary widening and other road improvement measures, together with detailed consideration of vehicle swept paths, loadings, structural assessments (where required), temporary street furniture removal details, dust and dirt management and community engagement (including the provision of contact details for SPR). An element of preparation of the TMP would be a trial run, which would be undertaken through a special licence, with the Roads Authorities and Police Scotland in attendance.
- A Traffic Control system would be implemented that may include the following:
  - All on site deliveries and collections will be co-ordinated through the Site Management Team and movements on to and off Site would be tracked by the Site Security Team;
  - Drivers will be issued with and required to carry induction cards with a unique number to identify them that will be reviewed if any Site protocols are breached; and
  - Where possible, no daytime or overnight parking of site or construction vehicles (site employees or visitors) outside of any predetermined construction compounds or work sites will be allowed.
- A road condition survey (including assessment of existing structures as appropriate) prior to the construction period and a similar assessment following completion of the works;
- Accurate directions are given to delivery drivers to ensure that they are able to efficiently locate site entrances to avoid impacting local residents, this may include the use of pre-prepared instructions/maps, grid references or other tools such as ‘what3words’.
- All HGVs delivering materials to the Site would be roadworthy, adequately maintained and sheeted as required;
- Adequate traffic management and banksmen would be deployed for the movement of HGVs and abnormal loads; and

- HGV loads would be maximised to ensure that part load deliveries would be minimised.

12.4.2 Construction effects

80. The predicted increases in traffic levels against the baseline levels have been calculated in this section, and then an assessment of the significance of the effect has been made against the criteria described in **Tables 12.2 and 12.3**.

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

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

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

83. The maximum trip generation has been calculated for the construction phase. It can be seen from **Table 12.9** that the total traffic would not increase by more than 8 % on the A714 close to each of the two access locations. The HGVs would not increase by more than 25 % in the vicinity of Wheeb Bridge or by more than 10 % in the vicinity of Bents Farm. Although sensitive receptors e.g. residential properties are present within the study area; the study area in its entirety is not considered to be sensitive, and therefore the threshold of 30 % has been applied.

12.4.3 Effect on driver severance and delay

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

85. The capacity performance of the A714 is detailed in **Table 12.5**. Existing traffic levels on the A714 are substantially below the maximum theoretical capacity of the road. **Table 12.10** considers the design capacity against the 24-hour base flows set out in **Table 12.5**.

Location	Base flow (24-hr)	Base flow + Dev	Capacity	Spare capacity	Spare capacity %
Wheeb Bridge	618	657	24,650	23,9937	97 %
Bents Farm	1,019	1,104	24,872	23,768	96 %

Table 12.10: Spare capacity on the A714

86. It can be seen that theoretically there is substantial spare capacity the A714 within the study area to accommodate the construction generated traffic. Therefore it is considered that the proposed Development would not lead to a material adverse capacity impact on the A714.

87. Using the criteria outlined in **Tables 12.2 to 12.3**, driver severance and delay is considered to be of medium sensitivity as the road network would be affected but is not currently experiencing congestion at peak times and the potential effect is considered to be of minor significance (a less than 10 % vehicular increase on the local highway but well within the maximum theoretical capacity of the road network).

12.4.4 Effect on road safety

88. There are no general thresholds that are used when determining the significance of increased traffic on highway safety, therefore professional judgement is required to identify the potential road safety effects associated with the construction phase.

89. **Table 12.2 and 12.3** define road safety as a high sensitivity receptor with an increase of traffic levels greater than 10 % requiring a quantitative assessment of existing accident records.

90. The accidents recorded within the study area are discussed in Section 12.3.4. A total of twenty one injury accidents were recorded within the study area. Twelve of the accidents resulted in slight injury with seven serious accidents. There were two fatalities recorded.

91. Deliveries of large components such as those required for the substation and turbines would be moved under suitable traffic management procedures, including the provision of banksmen at the Site access junction and appropriate warning signage.

92. The predicted number of HGV movements would be greater than the 10 % threshold set out in **Table 12.3**, however, this would be easily accommodated within the available capacity of the road network and therefore road safety would not be compromised.

93. The movement of abnormal loads has the potential to create a general hazard on the highway. Abnormal loads would be moved from the George V Dock in Glasgow to the Site (or potentially Cairnryan as discussed in Section 12.3.7.2) as detailed in the Abnormal Load Assessment Report (ALRA) dated April 2019 (**Technical Appendix 12.1).** The ALRA details that the Abnormal Loads must be delivered to the Site under controlled conditions and under a suitable escort. The manner in which abnormal loads are transported along the public highway/ trunk road network would be subject to the approval of Transport Scotland, D&GC and Police Scotland in advance and would be planned to ensure road safety is not compromised.

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

12.4.5 Effect on community severance

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

96. The A714 does sever the community of Barrhill with residential properties and local amenities situated on both sides of the road. Community severance for this section of the study area is considered to be a medium sensitivity receptor. Vehicle trips from the proposed Development would distribute throughout the road network with approximately 20 % of HGV trips and 35 % of the light vehicle trips impacting the village of Barrhill. Therefore the effect on community severance along the section of the A714 within the study area has been classified as medium and not significant.

97. In accordance with the significance criteria detailed in **Tables 12.2 and 12.3**, community severance has been classified as a medium sensitivity receptor and the effects of the proposed Development on community severance would be minor and not significant.

12.4.6 Effects on noise and vibration

98. Noise has been classified as a high sensitivity receptor as residential properties are present adjacent to both sides of the A714 within the study area. As discussed in **Table 12.3**, the IEMA Guidelines state that an increase in noise due to an increase in traffic of less than 25 % is deemed a negligible noise impact to receptors with anything greater than 25 % requiring a quantitative assessment.

99. The maximum traffic increase predicted for the proposed Development is 85 vehicle movements per day. This is less than 25 % of the current number of daily vehicle movements along both the A714 and hence, the traffic noise effects are considered to have a negligible impact and not significant.

100. The full environmental effects of noise are assessed in **Chapter 13: Noise**.

12.4.7 Effects on vulnerable road users

101. Vulnerable road users are considered to be a high sensitivity receptor according to the assessment criteria detailed in **Table 12.2**.

102. The impact of traffic on vulnerable road users would be most substantial within settlements along the proposed access routes where the presence of vulnerable road users, such as pedestrians and cyclists, is greatest. This includes the residential area of Barrhill.

103. The percentage increase in traffic would be less than 10 %. The majority of trip generation from the proposed Development would arise from 20 tonne HGVs and there are two pinch point locations on the A714 within Barrhill. Consequently, there would be a potential increase in risk to vulnerable road users during the construction period. The effect on vulnerable road users is therefore considered to be moderate over the term of the construction period and not significant in terms of the EIA Regulations.

12.4.8 Impact caused by movement of abnormal loads

104. The access route report for abnormal loads is provided in **Technical Appendix 12.1**. The assessments undertaken for the transportation of the Abnormal Indivisible Loads (AILs) has demonstrated a feasible route coming direct from the Ports of Cairnryan and Glasgow. The routes are considered suitable for such movements, subject to localised temporary works at junctions to facilitate movements. Any modifications to junction layouts would be confirmed through a trial run and further surveys, and any modifications or works required to accommodate abnormal loads would be discussed with Transport Scotland and the Roads Authorities; the necessary consents and permits would be obtained in advance of any works or delivery periods.

105. Transportation of the turbine equipment would lead to the following effects:

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

106. The severity of these impacts is considered as follows:

- delays to drivers due to lane/road closures would be inevitable, though abnormal loads could travel in convoy as described above and movements could be timed so as to avoid the peak hours. Abnormal load movements occurring outside of the peak hours would have a temporary minor adverse effect; and
- the perceived effect to residents is subjective and it is likely that the transport of abnormal loads close to properties could lead to local objection and frustration.

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

108. Each wind turbine consists of seven component parts: three blades, three tower sections and the nacelle (motor). Other loads would be associated with the delivery of the hub, cranes and drilling rigs, which would not be considered to be AILs, they however would be delivered at a similar time. These movements would be on articulated low loaders and would be moved under suitable traffic management procedures, including the provision of banksmen and appropriate warning signage.

109. There may be the potential to group the turbine component deliveries into a number of small convoys. This would allow the deliveries to occur over a reduced number of days, while only slightly increasing the impact on those days.

110. Turbine deliveries would be undertaken in consultation with the relevant roads authorities and Police Scotland and could include movements during the night which would reduce effects on road users at busier daytime periods. Deliveries are also usually scheduled to avoid peak times of the day and school opening/closing times.

111. There would be an unavoidable impact associated with the delivery of turbine components, however with suitable public awareness and the proposed grouping of component deliveries, the significance of effect would be moderate adverse on the turbine delivery days (significant).

12.4.9 Effects due to dust and dirt

112. The movement of construction traffic to and from the Site would have the potential to bring dust, dirt and other detritus onto the highway. Sensitive receptors within the study area include residential properties along the A714 at Barrhill. Therefore residential receptors which may experience dust and dirt have been classified as medium sensitivity receptors.

113. HGV's are likely to create the greatest impact in terms of dust and dirt. HGV traffic is anticipated to increase by 10 % on the A714 through Barrhill. The Site is also relatively remote from the public highway, and would be accessed via a long access track, reducing the risk of dust and dirt being transported onto the highway.

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

12.4.9.1 Proposed mitigation

115. The assessment has been undertaken under the assumption that embedded measures and general good construction practice would be deployed, as detailed in Section 12.4.1, including the development of a detailed TMP.

116. No further mitigation is recommended.

12.4.9.2 Residual construction effects

117. Residual effects are those that would still occur after embedded measures have been incorporated into the proposed Development. Potential residual effects are likely to be those associated with delivery of the abnormal loads and resultant temporary road closures. In addition, an increase in traffic would also add to the risk of general wear and tear to roads and verges. On minor roads this may be more apparent as traffic flows are usually likely to be limited to private vehicles.

118. Significant residual effects in relation to the proposed Development are unlikely as the percentage increase in HGVs along the A714 is less than the 30 % threshold and the road would still be operating well within maximum capacity.

12.4.10 Cumulative effects

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

120. To assess the potential impacts associated with an accumulation of construction traffic, the timing of surrounding wind farm developments has been considered. Wind farms which are currently operational or currently under construction have not been included. Those currently in the planning system and within a 40km radius of the Site have been reviewed and those likely to use the A714 during the construction phase have been selected.

121. Operational wind farms generate minimal levels of traffic during the operational phase and therefore would have a minimal cumulative effect. Wind farms that may provide significant cumulative effect/utilise the same construction route are summarised in **Table 12.11**. All but one of the wind farms are at the Scoping stage and so it has not been possible to identify the numbers of construction vehicles likely to use the A714 or establish if the construction programmes would coincide with the Arecleoch wind farm construction phase. Construction traffic data is not available on the South Ayrshire planning portal for the consented site at Chirmorie. As such it has not been possible to build a picture of the possible cumulative effects should the construction phases for the identified wind farms coincide.

Windfarm	No. of turbines	Distance from the proposed Development turbines (km)	Distance from the proposed Development red line boundary (km)	Local Authority	Status	Notes
Chirmorie	22	0.51	0.15	South Ayrshire	Consented	This site is consented but not yet constructed.
Arnsheen	12	5.58	0.15	Dumfries & Galloway	Scoping	This ste is located south east of Barrhill and so would see construction traffic on the A714.
Bargrennan	15	12.07	3.54	Dumfries & Galloway	Scoping	This site would see construction vehicles on the A714.
Clauchrie	16	8.04	0.90	South Ayrshire / Dumfries & Galloway	Scoping	Access close to the Wheeb Bridge access on the A714
Kilgallioch Extension	11	8.45	5.21	Dumfries & Galloway	Scoping	Located with access off the A714.

Table 12.11: Cumulative effects assessment

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

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

12.4.11 Potential operational effects

123. The operational effects have been scoped out of this Chapter as discussed previously in this Chapter.

12.5 Summary and statement of significance

124. The effects associated with the proposed Development before mitigation is are summarised in **Table 12.12**.

Type	Duration	Sensitivity	Magnitude	Significance (pre-mitigation)	Significance (post-mitigation)
Noise & vibration	Temporary	Medium	Negligible	Not significant	Not significant
Driver severance & delay	Temporary	Low	Negligible	Not significant	Not significant
Community severance & delay	Temporary	Medium	Negligible	Not significant	Not significant
Vulnerable road users	Temporary	High	Negligible	Not significant	Not significant
Road safety	Temporary	High	Negligible	Not significant	Not significant
Hazardous and dangerous loads	Temporary	High	Moderate	Significant	Not significant
Dust & dirt	Temporary	Medium	Negligible	Not significant	Not significant

Table 12.12: Summary of predicted effects (pre-and post-mitigation)

125. Following the assessment of traffic impacts, the significance of potential effects that could occur during construction before and after embedded mitigation measures are presented in **Table 12.12**. The impact of the construction phase on each of the identified environmental criteria has been categorised as ‘not significant’, with the exception of the abnormal loads delivery before the implementation of mitigation measures.

126. Taking account of all the potential effects that are likely to arise, it is considered that the proposed Development would lead to an insignificant adverse effect in terms of Site access, traffic and transportation. The assessment has tested to the worst case scenario expected, with all rock material sourced from external site locations. The onsite borrow pits have been identified as able to supply the Site with the majority of material required to construct the access tracks which would further reduce the amount of HGV movements required to build the windfarm.

127. The assessment concludes that the effects of the construction phase would not be significant; the review of the worst case scenario, the temporary nature of the construction phase and the application of mitigation measures would further reduce any impacts in traffic and transportation terms.

12.6 References

CrashMap database: www.crashmap.co.uk [accessed March 2019]

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