ScottishPower Renewables

Hare Hill Windfarm Repowering and Extension

Environmental Impact Assessment Report

Volume 1

Chapter 14: Other Issues

November 2025

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Abbreviations

Abbreviation	Description
BEIS	Department for Business, Energy & Industrial Strategy
cm	Centimetres
CO_2	Carbon Dioxide
EIA	Environmental Impact Assessment
FSA	Forestry Study Area
GHG	Greenhouse Gasses
ha	Hectare
HH	Hare Hill
HHE	Hare Hill Extension
IEMA	Institute of Environmental Management and Assessment
ISEP	Institute of Sustainability and Environmental Professionals (formerly IEMA)
km	Kilometres
m	meters
Natural Power	Natural Power Consultants Ltd
PWS	Private Water Supplies
PWSRA	Private Water Supplies Risk Assessment
tCO_2e	Tonne Carbon Dioxide Equivalent
UK	United Kingdom

14. Other Issues

14.1. Introduction

1. This chapter has been prepared by Natural Power Consultants Ltd (Natural Power) and evaluates the potential effects of the proposed Hare Hill Windfarm Repowering and Extension (the 'proposed Development') on issues not covered elsewhere in this EIA Report. This chapter includes for shadow flicker, carbon balance, forestry, telecommunications, utilities and public access.

14.2. Shadow Flicker

14.2.1. Introduction

2. Shadow flicker can occur under certain combinations of geographical position and time of day. This occurrence takes place when the sun passes behind wind turbine blades towards a residential property. As the blades rotate, a shadow is cast across the window of residential receptors and can lead to the flickering effect. This can only occur within a building where the flicker appears through an opening, such as a window. The full shadow flicker assessment has been provided as **Technical Appendix 14.1: Shadow Flicker Impact Assessment**.

3. The duration, effect and likelihood of these occurrences will depend upon:

    - the direction of the property relative to the turbine(s);
    - distance from turbine(s);
    - turbine heights;
    - rotor diameter;
    - time of year and day;
    - topography and if it intervenes the turbine and receptor;
    - wind direction and orientation of turbine blades to the receptor; and
    - weather conditions leading to reduced visibility.

4. If significant effects from shadow flicker cannot be avoided through embedded mitigation, then technical mitigation solutions can be employed, such as the temporary shutdown of turbine(s) during the intervals in which the effect occurs.

5. Due to the nature of this effect, shadow flicker effects are only considered during the operational phase of the windfarm.

14.2.2. Methodology

6. When assessing the impact of shadow flicker, there are two possible conditions to be considered:

- Worst-case: this is a determination of the maximum number of theoretical hours of shadow flicker that can occur, not accounting for the likelihood of direct sunshine occurring in the region, coinciding with periods where shadow flicker is possible. This is based on geometric calculations, dependant on the location of the sun, respective to the turbine blades, and alignment with receptors. Outside of this, shadow flicker cannot physically occur.
- Real-case based on statistics: this takes the worst-case scenario and then adjusts the duration of the total potential flicker events by the likelihood that direct sunshine occurs in a region. Typically, this utilises sunshine data from a ground-based meteorological station to apply monthly scaling factors to the worst-case scenario. This is a more accurate representation of the number of hours per year, that a receptor location may experience shadow flicker.

7. The model makes the following assumptions:
    - turbines are always rotating;
    - the sun is represented as a single point;
    - the turbine rotor is modified as a sphere around the hub to account for all possible turbine yaw directions relative to the line of sight with the position of the sun;
    - terrain effects are considered, however, these are assumed as bare terrain and therefore surface effects from cover such as buildings and forestry are not considered;
    - the calculation is geometric and does not account for the sensitivity of the perception of the observer;
    - the likelihood of wind direction is not considered;
    - the calculation is for a height of 2 m Above Ground Level to represent an observer at a ground floor window;
    - receptors are simulated as a mounted vertical plate always facing directly at each turbine simultaneously, representing the worst-case (glasshouse) while real windows would be facing towards a particular direction;
    - the simulations are carried out over a 1 minute resolution;
    - the shadow flicker effects have been calculated for the area within the radius of approximately 2053 m from the centre of each turbine at the 180 m and 200 m tip height turbines. The shadow flicker effects have been calculated for the area within the radius of approximately 1811 m for the 150 m tip height turbines. This area is based on a calculated length that the shadows are likely to persist. This is calculated from the average thickness of turbine blades with dimensions matching those provided by ScottishPower Renewables (UK) Limited, from a turbine specifications database.

14.2.3. Results

8. The results of the assessment indicate that across affected receptors, the worst-case impact is between zero and 101.9 hours per year. One of the thirty receptors assessed was predicted to experience shadow flicker above the maximum allowed

30 minutes/day and 30 hours/year. However, when this was considered through a real-case assessment, no receptors breach the maximum limits of shadow flicker in terms of total hours per year. When assessing cumulative shadow flicker effects from neighbouring windfarms, it was found that there were no increases in effect at any of the receptors considered in this analysis that would put any of the locations over the recommended limits.

9. The real-case shadow flicker assessment shows there are days in which two of the receptors would receive shadow flicker effects. At one of these receptors there are no days in which there is an exceedance in the 30 minute daily allowance. At the other receptor, approximately 41% of the days that shadow flicker occurs would exceed the 30 minute allowance. It is recommended that further details regarding the orientation and dimensions of the windows at this receptor are sourced to update the analysis and assess any further reductions in the shadow flicker events recorded at the receptor, prior to construction.

14.2.4. Conclusions

10. The shadow model makes a number of assumptions with respect to the shadow receptor, including the assumption that they have windows directly facing the windfarm; that the direction of the wind is aligned with the line between the receptor and the sun at all times; and that there is no screening from vegetation or buildings which would otherwise mitigate the potential shadow flicker effect.

11. When assessing the impact of shadow flicker at a site, two possible conditions can be considered:

    - Worst-case – this determines the maximum number theoretical hours of shadow flicker that can occur, not accounting for the likelihood of direct sunshine occurring in the region, coinciding with periods where shadow flicker is possible. This is a geometric-based calculation, dependant on the location of the sun with respect to the turbine blade, and alignment with the receptor of interest. Outside of these periods, irrespective of the cloud cover and sunshine status, flicker cannot physically occur. The outcome of this process is the maximum number of hours (per annum) at which flicker could, in theory, occur.

    - Real-case – this takes the worst-case scenario, and then adjusts the duration of the total potential flicker events by the likelihood that direct sunshine occurs in a region. This results in a more accurate representation of the number of hours per year, that a receptor location may experience shadow flicker. The turbines are still modelled as though they are always yawed perpendicularly to the line between the receptor and the sun, inducing maximum shadow effect. The real-case does not take into account wind direction and the influence on this to the shadows.

12. At a single receptor there are approximately 41% of days that shadow flicker occurrences exceed the limit of 30 minutes a day. It is recommended that further details regarding the orientation of the property and the windows which may be affected by the potential shadow flicker are sourced to update the analysis. Once the updated information is available the potential impacts will be better understood. This update to the analysis will be secured through a planning condition. Should the updated analysis identify an issue

with shadow flicker, the suggested mitigation measures are detailed in the paragraph below.

13. The ability to implement the shutdown of turbines to mitigate potential shadow flicker effects requires the appropriate shadow module and sunshine sensors to be installed on the turbine and programmed into the turbine. One real-case assessment of the proposed Development was carried out with inputs from a site visit regarding orientation and dimension of receptors. The outcome of this analysis identified turbines 14, 15, 17, 19, 21 and 23 as having a potential shadow flicker impact, and findings of this assessment recommended this equipment is installed on turbines which have been predicted to cause a potential impact.

14.3. Carbon Balance Assessment

14.3.1. Introduction

14. During the manufacturing of components for the proposed Development and during the construction and decommissioning of the proposed Development, greenhouse gases (GHG) would be released. This is particularly prevalent where natural carbon stores, such as areas of peat, are present and potentially impacted by the proposed Development.

15. This section provides an estimation of the GHG emissions associated with manufacturing, construction and decommissioning of the proposed Development. It will also provide an estimation of the contribution the proposed Development would make towards the reduction of emissions, which would otherwise be produced by fossil fuel generated power.

14.3.2. Methodology

16. The methodology adopted uses the Scottish Government's Carbon Calculator Tool (Scottish Government , 2018), which is based upon the work of Nayak et al. (2008, 2010) and Smith et al. (2011). It adopts a life-cycle methodology approach to estimate the GHG emissions and savings associated with onshore windfarms. At the time of undertaking the EIA, the online version of this tool was undergoing maintenance and so an offline version was used.

17. Calculations are provided for the potential minimum, maximum and expected scenarios. The minimum scenario assumes the lowest energy output and lowest carbon losses from the proposed Development and the maximum assumes the highest potential energy output alongside the highest carbon losses. The scenario assumed the 23 turbines of the proposed Development with an installed capacity of up to 130 MW.

18. While the proposed Development is expected to provide savings of GHG over its lifetime, there is the likelihood that there are GHG emissions through:

- Disturbance of peatland and;
- Lifecycle emissions from the production and delivery of turbines and other infrastructure.

19. The GHG emissions and savings are combined and provide the overall potential (net) GHG effect from the proposed Development, as well as the period estimated for carbon payback.

20. The assessment of the proposed Development is based upon a detailed baseline description of the proposed Development itself and the locations the infrastructure covers. Calculations and from site-specific data wherever available. Where data is not available site specifically, national and regional information has been used, such as Met Office data for local air temperatures.

21. The proposed Development is seeking a consent for an operational lifespan of 50 years, however, for the purposes of the carbon calculator a 40 year lifespan has been used due to the phased nature of the proposed Development. The purpose of this is to provide an assessment from the point where construction has fully ceased on site and zero-carbon energy is being produced.

22. Results from the assessment are in accordance with ISEP's (formerly IEMA) Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emission and Evaluating their Significance (2022). Any project that can lead to the reduction or removal of GHG emissions from the atmosphere provides a beneficial effect will be considered significant. **Table 14.1** presents the significance criteria used for the assessment.

Table 14.1: ISEP's Guidance to Assessing GHG Significance (2022) Framework for assessment of significant effects

Significance	Level	Criteria
Significant	Major Adverse	Project adopts a business-as-usual approach, not compatible with the national Net Zero trajectory, or aligned with the goals of the Paris Agreement (i.e., a science-based 1.5°C trajectory). GHG impacts are not mitigated or reduced in line with local or national policy for projects of this type.
	Moderate Adverse	Project's GHG impacts are partially mitigated, and may partially meet up-to-date policy; however, emissions are still not compatible with the national Net Zero trajectory, or aligned with the goals of the Paris Agreement.
Not Significant	Minor Adverse Negligible	Project may have residual emissions, but the project is compatible with the goals of the Paris Agreement, complying with up-to-date policy and good practice.
Negligible	Negligible	Project has minimal residual emissions and goes substantially beyond the goals of the Paris Agreement, complying with up-to-date policy and best practice.
Significant	Beneficial	Project causes GHG emissions to be avoided or removed from the atmosphere, substantially exceeding the goals of the Paris Agreement with a positive climate impact.

14.3.3. Data Sources

23. **Table 14.2** below provides the sources of information used within the assessment.

Table 14.2: Data Sources used for the assessment

Input	Source of Information
Turbine capacity and lifespan	Up to 23 turbines, each with an expected rated output of: • 4.5 MW for 150 m Turbines • 6 MW for 180 m Turbines • 6.2 MW for 200 m Turbines Fixed lifespan is expected up to 40 years. Although the lifespan applied for proposed Development is 50 years, the main GHG savings will occur during the period when construction has ceased, and zero carbon energy is being produced.
Capacity factor	BEIS Scottish onshore wind average of 2020-2024 data with minimum and maximum average annual values across this period (Energy Trends, Table 6.1 Renewable electricity capacity and generation, Scotland Qtr dataset). Load factor statistics obtained from https://www.gov.uk/government/statistics/energy-trends-section-6-renewables (accessed on 13/02/2025). It is important to note that the capacity factors used here will not typically reflect the final capacity factor of the proposed Development and are much lower than energy yield assessments for this proposed Development and candidate turbines indicate, the capacity factor would be anticipated to be greater, as modern turbines are more efficient than many of the older turbines on operational wind farms where the BEIS data is derived from.
Fraction of output to backup	The extra capacity that would be needed for back-up power generation is currently estimated at 5% of the rated capacity of wind plant as UK wind power regularly contributes more than 20% to the National grid.
Type of peatland	In the tool, the choice of peatland habitats is limited to acid bog or fen. Acid bog has been chosen as this is considered to best reflect the peatland characteristic of the site.
Average air temp. at site	Site specific temperature based on 29 years (1991-2020) data collected from the closest Met Office weather station to the Proposed Development. The Saughall Climate Station is positioned approximately 25 km north-east of the Proposed Development. The expected value is the average annual temperature over the data collection period. The minimum value is the minimum average annual temperature and the maximum value is the maximum average annual temperature.

	https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcuurcfer (accessed 01/04/2025).
Average depth of peat on site	Informed by peat probe data collection. The average of all the peat probe data collected across the site boundary (over 68,000 peat probes) during Phase 1 and Phase 2. It was considered that the 100 m grid data was more appropriately used for this parameter as it covered the whole of the proposed Development area whereas the more detailed grid data focused on infrastructure areas only. As advised by the authors of the original Excel tool, the arithmetic mean was calculated from this data to represent the 'expected' value, and the minimum and maximum values provided represent the lower and upper bound values of the 95% confidence intervals of the sample data collected.
Carbon content of dry peat	Based on laboratory analysis of peat cores collected from site. Ten peat cores were collected from the proposed Development area at turbine locations. As advised by the authors of the original Excel tool, the arithmetic mean was calculated from this data to represent the 'expected' value (40), and the minimum (25) and maximum values (52) represent the lower and upper bound values of the 95% confidence intervals of the sample data collected.
Extent of drainage	No site-specific measurements have been taken so values are based on observations during site visits and previous experience on similar sites.
Average water table depth	Average water table depth was gathered from site observations alongside surveys.
Dry soil bulk density	This value for bulk density for peat was derived from the National Soil Inventory of Scotland (Lilly et al., 2010), is 0.2 g cm-3. Dryburgh (1978) report a range of typical bulk density of sod peat slightly higher, as being between 0.25 and 0.45 g/cm-3.
Time for regeneration of bog plants	This parameter has been estimated to be 15 years (10 years minimum and 20 years maximum) by the project ecologist. The time period for successful regeneration of bog plant species is dependent on numerous factors including relevant seed source, successional rate, the level of herbivore disturbance and the successful stabilisation of the water table in a restoration area. Opportunities for habitat management and potential peat restoration have been investigated and are reported in **Technical Appendix 7.4 - Outline Habitat Management Plan** presented in support **of Chapter 7: Ecology and Biodiversity** of the EIA Report. However, it is assumed that no peat restoration will take place.

Carbon accumulation due to C fixation by bog plants	Values have been taken from the guidance notes of the carbon calculator tool that quote published primary literature and NatureScot guidance values.
Coal-fired emission factor	Fixed value of the carbon calculator tool.
Grid mix emission factor	Fixed value of the carbon calculator tool.
Fossil fuel mix emission factor	Fixed value of the carbon calculator tool.
No. of borrow pits and dimensions	Stone on site would aim to be won from four new borrow pits for use in construction of turbines and hardstandings, as required.
Average depths of peat removed from infrastructure	Detailed construction information for each turbine and hardstanding has been included within the tool informed by 100 m grid and multiple detailed surveys peat probe data within the 50 m micrositing allowance areas. Over 14000 probes were collected for turbine and hardstandings data with some overlap due to the adjacent nature of the infrastructure. These values are derived from interrogation of the peat depth data collected underlying each type of infrastructure including micrositing areas. As advised by the authors of the original Excel tool, the arithmetic mean was calculated from this data to represent the 'expected' value, and the minimum and maximum values provided represent the lower and upper bound values of the 95% confidence intervals of the sample data collected.
No. of foundations/ hardstandings and dimensions	Turbine dimension inputs in the maximum scenario are based on a 26 m diameter foundation with maximum working areas of up to 12m at the surface and bottom of the excavation. Expected and minimum scenarios employ the same size foundation diameter with smaller working areas (10 m, 5 m). The Excel tool uses square foundations, so equivalent square areas are 36 m, 31 m and 39 m squares. Dimensions for the worst-case candidate turbine hardstandings are based on the footprints shown in **Figure 5.6** (~ 10,000 m^2 each). The actual crane pad and hardstanding areas as shown in **Figure 5.6** are less than 10,000 m^2 however, to represent a worst case, working areas and variations in the final size of hardstandings have been accommodated into each scenario such that maximum and minimum areas are 11,000 m^2 and 9,000 m^2. The hardstanding infrastructure will overlap the foundation in places so there is also an element of double counting here.
Total length of track	Total expected track length is approximately 32 km comprising 21 km of new excavated road, 4 km of new floating road and 7 km of existing track requiring upgrading. Minimum and maximum scenarios are -/+ 10% of the expected value to accommodate any changes to design through micrositing.

Length of floating roads	Total expected floating track length is approximately 3.9 km. Minimum and maximum scenarios are -/+ 10% of the expected value to accommodate any changes to design through micrositing.
Excavated road length	As the tool does not allow specific inputs for widening of existing tracks, this value includes the 21 km of proposed 'new' track as well as 1.5 km of existing road to be widened and the values for excavated road widths and peat depths for both are weighted according to the different lengths for new and upgraded tracks (as advised by the authors of the tool). It is also important to note that the calculations are based on worst case that the full 1.5 km length of existing track will need widening however topographic surveys undertaken pre-construction may indicate a smaller requirement.
Excavated road width	Calculation for weighted road width which takes into account new access tracks and widening of existing access tracks is 4.5 m running width plus 1 m for shoulders, with a worst case 3 m cable trench on one side and 4 m batters on both side with 3 m working area on each side.
Average peat depths for excavated roads	Informed by probes collected from Phase 1 peat probe data and multiple targeted detailed Phase 2 surveys. As advised by the authors of the original Excel tool, the arithmetic mean was calculated from this data to represent the 'expected' value, and the minimum and maximum values provided represent the lower and upper bound values of the 95% confidence intervals of the sample data collected.
Length of rock filled roads	There will be no rock filled roads.
Length of cable trenches	It is assumed that all cables will follow new tracks or existing tracks and an allowance for cable trenches (and drainage ditches) has been made when calculating excavated road widths.
Additional peat excavated	Approximately 15,473 m^3 of additional peat will be excavated in the expected scenario. This input accounts for the substation, control building and the construction compounds. External transformers/electrical cubicles are not included as they would be covered by turbine/crane hardstanding excavations.
Area of degraded bog to be improved	Peatland restoration measures and area are proposed as described in **Chapter 9: Hydrology, Hydrogeology and Soils** and **Appendix 9.4 Outline Peat Management Plan.**
Water table depth around foundations and hardstandings before and after restoration	The 'before restoration' water table depth is based on the scenario whereby drainage is not removed but left in situ. It assumes that the drainage left in place would cause some draw down on the existing water table. The 'after restoration' water depths are based on backfilling of the drainage which would bring the water table

	depth up to, and likely higher, than previous levels before construction.
Time to completion of backfilling, removal of any surface drains, and full restoration of the hydrology (years)	Values of 2, 3 and 5 years used to reflect the expected, minimum and maximum scenarios respectively. Based on site observations and professional judgement.
Will the hydrology of the proposed development be restored on decommissioning	Yes. Upon the decommissioning of the wind farm, best practice principles will be adopted.
Will the habitat of the proposed development be restored on decommissioning?	Yes. It is assumed that upon decommissioning, restoration of habitats will be undertaken. However, there are no plans to control grazing or reintroduce species using nurse crops or fertilisation, therefore a worst-case scenario of "no restoration" has been input into the carbon calculator tool.

14.3.4. Mitigation Measures

24. It is assumed that all activities during construction, operation and decommissioning would be conducted in accordance with good practice guidance, as outlined in the **Technical Appendix 5.1 - DCEMP**.

14.3.5. Potential Effects – Construction and Decommissioning

25. The results of the GHG assessment for the manufacture, construction and decommissioning stages of the proposed Development. Significant GHG emissions are predicted from soil organic matter, as well as emissions from the felling of forested areas. Total projected emissions are estimated to be 346,722 tCO_2e. The breakdown of this is shown in **Table 14.3** below.

Table 14.3: Total CO_2 losses due to the proposed Development

Source of GHG Emissions	Estimated GHG emissions (tCO_2e)	% of total
Losses due to turbine manufacture, construction and decommissioning	107,442	30.98
Losses due to backup power generation	96,851	27.93
Losses due to reduced carbon fixing potential	12,817	3.70
Losses from soil organic matter	129,612	37.38
Losses due to Dissolved Oxygen Content and Portable Oxygen Content	0	0
Losses due to forestry felling	0	0

Total	346,722	100

26. Site restoration and enhancement work completed post-decommissioning work would be aligned with the Outline Habitat Management Plan (**Technical Appendix 7.4)** and the Outline Peat Management Plan (**Technical Appendix 9.4**). Both of these appendix's outline GHG emission savings through the promotion of peatland improvements and similar carbon stores.

14.3.6. Potential Effects -Operation

27. During the operational period totalling 50 years for the proposed Development there is the greatest potential for GHG savings as construction activities will have ceased and the turbines will be generating zero-carbon electricity. **Table 14.4** provides the windfarm emissions savings compared to other electricity generation sources.

Table 14.4: Estimated annual emissions savings against fossil fuel and grid mix energy generation

	GHG Savings (tCO_2e)		
Energy Generation Source	Expected savings Value	Minimum Savings Value	Maximum Savings Value
Coal Fired	305,311	211,787	427,271
Grid Mix	49,912	36,434	78,020
Fossil Fuel	127,553	93,109	179,731

14.3.7. Emissions Payback Period

28. The emission payback period provides an estimate of how many years it would take to produce enough electricity, in comparison to other generation sources, to match the emissions caused by the proposed Development. This can be calculated through dividing the emissions caused by the proposed Development (346,722 tCO_2e) by the estimated annual savings from the operational proposed Development. **Table 14.5** provides the figures in comparison to each energy generation source.

Table 14.5: Estimated annual emissions savings against fossil fuel and grid mix energy generation

	Carbon Payback Time (Years)		
Energy Generation Source	Expected Value	Minimum Value	Maximum Value
Coal Fired	1.1	0.3	3.3
Grid Mix	6.7	1.8	19.2
Fossil Fuel	2.6	0.8	7.5

29. The realisation of the proposed Development will assist with the Scottish Government GHG reduction targets.

14.3.8. Residual Effects and Mitigation

30. As no adverse effects are predicted and the overall operational lifespan of the proposed Development is predicted to have a net positive influence, no additional mitigation measures are proposed.

14.3.9. Conclusions

31. The overall impact is considered to be **'Significant'** and **'Beneficial'** effect, that would contribute positively to long-term climate change mitigation.

14.4. Forestry

32. The Forestry Study Area (FSA) contains privately owned and managed commercial woodlands which extends to 338 ha within the north east of the proposed Development. The forest contains a limited range of woodland types and age classes, predominately younger crops, due to original planting and current felling and restocking programmes, together with areas of unplanted land. The crops are comprised largely of commercial conifers with areas of mixed broadleaves and open ground. The woodlands are in the management phase with first rotation felling and restocking largely completed. There is currently no active forest plan in place.

33. The proposed Development layout avoids the forestry area and existing tracks within the woodland will not be utilised for abnormal loads. Therefore, as a result of the construction of the proposed Development, there would be no loss of woodland area. **Note**: Existing track within forestry will be used as required for operational access between phases and Hare Hill Extension and in emergencies.

14.5. Telecommunications

34. This section describes the existing environment with respect to telecommunications and the potential effects on telecommunication operations from the construction and operation of the proposed Development.

35. Windfarm developments have the potential to cause a variety of effects on telecommunications, as new physical structures can cause interference between any present fixed link paths by blocking and/or reflecting radio signals from telecommunication infrastructure.

36. There are two micropath links within the proposed Development, related to the current operational Hare Hill (HH) and Hare Hill Extension (HHE) windfarms. As these are in place to aid in operation of the current windfarms, which would be decommissioned, it is predicted that the proposed Development will have zero impact.

37. As there are no further telecommunication links on or within close vicinity to the Site this topic was not assessed any further. It is therefore concluded that there are no residual effects and no further mitigation is required.

14.6. Utilities – Electricity, Water and Gas

38. This section describes physical utilities that are present within and/or surrounding the proposed Development which may be potentially affected through the introduction of the proposed Development.

14.6.1. Overhead Lines

39. There are two separate overhead line connections within the area covered by the proposed Development. These are the connection points for the operational HH and HHE to the grid network.

40. The most northern of these connections, as shown in **Figure 4.3a**, is the connection point for HH and will be removed during Phase 1 of the proposed Development. This connection will be replaced with a new substation on the proposed Development as shown in **Figure 5.1**.

41. The second connection is for the HHE substation and will remain in place as a connection point for Phase 2 of the proposed Development. A 200 m buffer has been adhered to through the design iteration process.

42. All new grid connection routes are subject to their own EIA and planning application and are not considered within this EIA Report.

14.6.2. Private Water Supplies

43. There is a risk of increased sediment erosion as a result of windfarm construction and decommissioning which can have impacts on the quality, quantity and continuity of water supply to properties surrounding the proposed Development.

44. East Ayrshire Council and Dumfries and Galloway Council were consulted regarding the presence of Private Water Supplies (PWS) within a 3 km search area from the proposed Development. Thirteen PWS were identified. **Table 4.11** of **Technical Appendix 9.2: Private Water Supply Risk Assessment** lists the eight PWS that were initially screened out of the assessment and rationale for doing so including, for example, the supply catchment lying outside that of the proposed Development. A further five PWSs were taken forward for individual consultation, via a questionnaire, and risk assessment. **Table 4.2.1 of Technical Appendix 9.2** summarises the PWS details and findings from the questionnaire responses.

45. The PWS Risk Assessment (PWSRA) identified that Hillend, Nether Waistland Farm and Meikle Westland Farm were at Low risk from the proposed Development, that Blackcraig Farm was at Medium/Low risk from the proposed Development and that Overcairn Farm was at Medium risk from the proposed Development.

46. With the good practice mitigation measures described in **Technical Appendix 9.2** in place, the proposed Development is predicted to not have a significant impact on PWS.

14.6.3. Public Water Supplies

47. The Afton Water near to the proposed Development is a heavily modified water body which is used for public drinking water supplies. As described in **Chapter 9**, the proposed Development would have no effect on this public water supply. As there are no other public water supplies within the vicinity of the proposed Development, this topic was not considered any further in this Chapter.

14.6.4. Buried Infrastructure and Underground Assets

48. There are underground cables present within the proposed Development, all of which are for the current operational windfarms. As part of the decommissioning process, these will be de-energised and left in situ to minimise environmental impacts through unnecessary excavation.
49. There are no further buried infrastructure or gas network assets within the proposed Development so this topic was not considered any further.

14.6.5. Conclusions

50. The proposed Development is predicted to have no significant impact upon utilities within the Site or the surrounding area.

14.7. Public Access

51. There are no core paths across the proposed Development. There is one core path adjacent to the eastern edge of the proposed Development and a 200 m buffer has been applied throughout design iterations to maintain an appropriate distance from turbines and infrastructure. Neither construction nor operational traffic associated with the proposed Development will use this core path. Therefore, this core path is unlikely to be impacted by the proposed Development.
52. There is one Right of Way (RoW) that passes through the central area of the proposed Development. This is shown in **Figure 4.3a: Constraints Overview**. A 200 m buffer has been applied to the RoW to indicate preferable distance based on the topple distance of the tallest turbines. There are currently two turbines and associated infrastructure within the 200 m buffer. During the construction phases of the proposed Development, it is likely that this RoW would require a diversion, due to interaction with the proposed infrastructure construction activities. This could cause inconvenience to regular users of the RoW, however, it would be temporary during the construction phase only and of negligible significance. Following construction, the access tracks of the proposed Development would be used to replace some sections of the RoW and would have no long term significant effects.

References

Dumfries and Galloway Council (2019) Local Development Plan 2. Available at: Local Development Plan 2 (LDP2) | Dumfries and Galloway Council [Accessed 18 June 2025].

ISEP (formerly IEMA) (2022) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available at: eia-guide_ghg-assessment-and-significance_iema_16may17.pdf [Accessed 18 June 2025].

NatureScot (2019, updated 2024) Good Practice During Wind Farm Construction, Avilable at: Good practice during wind farm construction | NatureScot [Accessed 18 June 2025].

Nayak et al; (2008 and 2010) and Smith et al (2011). Calculating Carbon Savings from Wind Farms on Scottish Peatlands - A New Approach. Appendix 2: Calculating Potential Carbon Losses & Savings from Wind Farms on Scottish Peat lands: a total life cycle perspective - Calculating carbon savings from wind farms on Scottish peat lands: a new approach - gov.scot [Accessed 18 June 2025]

Scottish Government , 2018. *Carbon calculator: technical guidance*. [Online]
Available at: Carbon calculator: technical guidance - gov.scot
[Accessed 18 June 2025].